

sewall wright, leading geneticist, reader of bergson, and almost bergsonian

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Sewall Wright (1889-1988) is an American biologist specializing in genetics. He is considered one of the founders of population genetics, along with Fisher and Haldane.¹ Population genetics is the application of Mendelian genetics at the level of populations. It is one of the pillars of the synthetic theory of evolution, also called neo-Darwinism.

In addition to his scientific work, Wright developed a philosophical conception of life. This conception is explained in three articles mainly: “Gene and Organism” (1953), “Biology and the Philosophy of Science” (1964), and “Panpsychism and Science” (1975).² In all these articles, Wright says to have been greatly impressed by Bergson’s *Creative Evolution*.³ Moreover, he takes two fundamental ideas about life from Bergson: life has a psychic dimension and it is creative in nature. Therefore,

Wright, like Bergson, can pass for a vitalist thinker.

The aim of this article is therefore the following: to show the proximity of the philosophical ideas of Wright and Bergson on life, and to determine if their conceptions are vitalist. Its interest is twofold: to show that Bergson has not been the object of a unanimous rejection on the part of the biologists who have contributed to the synthetic theory of evolution, and to show that the positions of Wright and Bergson concerning vitalism are far from simple. In fact, the word “vitalism” has several meanings. In the general sense of the term, Wright and Bergson are arguably vitalist thinkers. But, in detail, their conceptions are rather removed from that of classical vitalist thinkers.

Parts 1 and 2 will deal with the ontological ideas common to Wright and Bergson: the idea that life has a psychic dimension and that it is intrinsically creative. Part 3 will deal with an epistemological idea common to Wright and Bergson: the idea that science and philosophy must have different approaches to life. Finally, parts 4 and 5 will focus on their positions about vitalism and Darwinism.

1. LIFE HAS A PSYCHIC DIMENSION

Wright argues that life has a psychic dimension, a dimension whose nature is fundamentally the same as that of our own consciousness. More generally, Wright defends the idea that everything that exists has a double dimension, physical and psychic:

The only satisfactory solution of these dilemmas [about mind and matter] would seem to be that mind is universal, present not only in all organisms and in their cells but in molecules, atoms and elementary particles.⁴

As already noted the living cell, because of its tightly organized character, is more comparable to a molecule than to a mere aggregation of matter. It may be thought of as a supermolecule composed principally of C, H, O, N, P and S. Multicellular organisms, including man, are in turn not mere aggregations of cells, but so tightly organized that they may be considered super-super-molecules, ultimately with properties which are wholly those of the component atoms in the very complex combination. The arguments from continuity require the presence of mind in cells and, back of this, in molecules, atoms, and all that exists.⁵

This hypothesis is a form of panpsychism.⁶ According to Wright, panpsychism is the most convincing position to explain the existence of our own mind. In all of his articles, he develops the following reasoning to support this position:

- (i) The reality of our mind is indubitable.
- (ii) However, our mind has a natural origin.
- (iii) Besides, the hypothesis of an emergence of mind from a matter devoid of mind is extremely doubtful.
- (iv) Consequently, the most probable is that elementary matter already has a psychic dimension.⁷

Point (i) of the reasoning is based on our conscious experience. For Wright, this point is typical of the philosophical approach to things which, unlike the scientific approach, must take this experience into account. I will come back to this later. Point (ii) is based first of all on the principle of method saying that natural explanations should be favored over supernatural ones. But it is also based on the fact that our mind obviously originates from the animal world, since many animals seem to have psychic activity. There remains the question of where the mind comes from in the animal world. Point (iii) does not say that the emergence of mind from a matter devoid of mind is impossible, because this cannot be proven. It only says that this hypothesis is extremely doubtful. On this subject, Wright asserts the following: "Emergence of mind from no mind at all is sheer magic."⁸ Basically, Wright's intuition is that, because of its relation to the brain, our mind is based on a certain material composition, and that when there is composition in nature, the qualities of what is composed already exist, in a certain way, in the components. Point (iv) is the conclusion of the previous points. Moreover, according to Wright, what physics discovered in the 20th century shows that this conclusion is not incongruous. Today, elementary particles are no longer conceived as inert things, but as possessing an intrinsic (oscillatory) and indeterminate activity. From this point of view, these particles present an analogy with our mind.⁹

Wright asserts that several thinkers led him to develop this hypothesis, including Bergson. Here is what he writes about it:

As a student of science, I began with an acceptance of a determinism as rigorous as that of Laplace's dictum, although disturbed by the absence of any place in this scheme for the fact of consciousness. This mechanistic view

point was first somewhat shaken by reading (in 1912) Bergson's "Creative Evolution" which presented a viewpoint that seemed more satisfactory as a philosophy of Biology. I found, however, that I was unable to accept it as a philosophy of science as a whole. ... I began to see the possibility of a different approach on reading "The Origin and Nature of Life" by the biochemist Benjamin Moore (1912) who suggested that cells and higher organisms and societies might be looked upon as extensions of the series atom, molecule, colloid, but the dilemma: absolutely deterministic laws of physics at one end of the scale, consciousness and apparent freedom at the other, remained. The key to a unified philosophy seemed to be provided by "The Grammar of Science" by Karl Pearson (1899), the leader of the statistical or biometric school of biology which I read a couple of years later.¹⁰

In this passage, Wright explains that the concern to understand the place of consciousness in nature is at the origin of his philosophical reflection. From this point of view, we can understand why he was fascinated by *Creative Evolution*. In this work, indeed, Bergson clearly defends the following two ideas: first, consciousness is something real and irreducible; second, life is fundamentally consciousness. Here are some passages where Bergson expresses this idea:

Life, that is to say consciousness launched into matter, fixed its attention either on its own movement or the matter it was passing through; and it has thus been turned either in the direction of intuition or in that of intellect.¹¹

From this point of view, not only does consciousness appear as the motive principle of evolution, but also, among conscious beings themselves, man comes to occupy a privileged place.¹²

This question arises, no doubt, from the comparison of life to an impetus. And it must be compared to an impetus, because no image borrowed from the physical world can give more nearly the idea of it. But it is only an image. In reality, life is of the psychological order, and it is of the essence of the psychical to enfold a confused plurality of interpenetrating terms.¹³

Throughout *Creative Evolution*, Bergson speaks of life as an "impetus" (an "élan"). However, as the last passage quoted makes clear, this notion of impetus is only an image borrowed from the physical world. Life is actually psychological in nature. It

is therefore something psychological and analogous to an impetus. In the physical world, we talk about impetus when a body has enough kinetic energy to penetrate a material environment while continuing to move forward. The analogy therefore seems as follows: like an impetus, life is a kind of energy, but *a mind energy*,¹⁴ by penetrating matter, this energy produces effects, in this case organisms; matter also has an action on life, forcing it to divide and to take winding paths; but ultimately life continues to move forward.¹⁵

Some Bergson commentators, such as Gilles Deleuze,¹⁶ present *Creative Evolution* without mentioning this psychological or spiritual conception of life. Yet this conception is evident in the book. Moreover, the interest of such a conception is to considerably deflate the problem of consciousness: if life is in itself consciousness, the latter ceases to be a mystery in nature, that is to say something which would only exist in a few animals, and whose origin would be incomprehensible. This is probably why Wright was seduced by *Creative Evolution*.

However, as can be seen in the passage quoted above, Wright argues that Bergson was not enough to make him abandon his mechanistic approach to things. The reason is that, for him, the Bergsonian answer to the problem of the origin of consciousness was not entirely satisfactory. Bergson affirms in fact that our consciousness originates from life, itself conceived as consciousness. But he also affirms that life originates from a supra-consciousness,¹⁷ and not from matter, which amounts to going outside the natural framework. For Wright, we must attempt to answer the question while remaining in the natural framework. Hence his panpsychist hypothesis: matter has mental properties, and life comes from matter.¹⁸ Moreover, for Bergson, consciousness has some degree of independence from matter.¹⁹ This means that there is no parallelism between the two: two elements can be distinct in a man's consciousness, for example, without being distinct in his brain.²⁰ In contrast, for Wright, the psychic and the physical are two irreducible aspects of the same reality. Consequently, there is parallelism between the two: to any psychic determination there corresponds a physical determination, and vice versa. In this sense, and despite their common points, the fundamental ontologies of Bergson and Wright also present differences.

Wright developed his panpsychist hypothesis drawing on two other thinkers: biochemist Benjamin Moore (1867-1922) and mathematician Karl Pearson (1857-1936). In Moore, he found the idea that molecules and atoms are analogous to living organisms. Molecules and atoms indeed have a certain unity, while being endowed with ceaseless activity.²¹ In Pearson, he found the idea that physical

phenomena can exhibit a certain indeterminacy, like psychic phenomena. I clarify this idea in the next part.

2. LIFE IS CREATIVE IN NATURE

Wright defends the idea that life is creative and, as for Bergson, this second idea is in relation to the first. It is because life has a psychic dimension that it is creative. It is because life is memory that it is able not to repeat the past, and use it to produce something new. However, this second idea deserves to be considered for itself: while the first constitutes an opposition to physicalism, the latter constitutes an opposition to determinism.

Broadly speaking, determinism is the idea that everything that occurs is determined before it even occurs. In this sense, for determinism, the future is already fixed, already defined. More precisely, for determinism inspired by modern science, the future is already fixed *by a set laws*. According to this determinism, all processes are governed by few fundamental laws; so given any state in the universe, the following states are already fixed. In contrast, when Wright asserts that life is creative in nature, he means that its future is not fixed in advance. This future is not due to laws, nor to chance, but to choices.

Wright's argument, borrowed from Karl Pearson, is that it is possible to explain natural regularities without postulating the existence of laws. Unquestionably, there are regularities in nature. For determinism, these regularities are due to laws, understood as *the condition of regularities* (without these laws, the regularities would not exist). According to this view, the laws are therefore analogous to Platonic Ideas, in the sense that they give a determined form to natural phenomena. In contrast, for Wright, natural regularities are due to the psychic activity of beings, whatever their level in the natural hierarchy: atoms, molecules, cells, multicellular organisms. In other words, they are explained by kinds of choices. The main lines of Wright's reasoning are as follows:

- (i) At all levels of nature (atoms, molecules, cells, multicellular organisms), there are regularities of behavior.
- (ii) In humans, we know that these regularities are only statistical, and that they are due to choices.
- (iii) By relying on panpsychism, it is possible to conceive all regularities in this way.

- (iv) On the one hand, this conception is compatible with what physics says about matter.
- (v) On the other hand, this conception helps to explain the conscious experience of free will.
- (vi) Therefore, this conception satisfies both science and consciousness.²²

Point (i) is empirically obvious. Point (ii) is also obvious for social sciences. The latter indeed show that human behaviors can be explained by psychological elements, and that these behaviors present statistical regularities. This is due to the fact that, when the conditions of a choice tend to be repeated, the choices themselves tend to be repeated. Point (iii) is a metaphysical hypothesis consistent with panpsychism. Point (iv) is crucial. Wright explains that the difficulty for him was to reconcile the apparent indeterminacy of psychological life with the teaching of physics. Pearson provided the solution, arguing that every physical event is caused by a unique (not perfectly repeatable) set of other events. From this point of view, a certain indeterminacy of physical phenomena was possible.²³ Later, with quantum theory, this idea was asserted with more force:

As to the behavior of the individual entities, we have noted that physics itself, since Pearson wrote his *Grammar of Science*, has had to qualify the idea of complete predictability by Heisenberg's indeterminacy principle. Physical science thus has arrived at statistical mechanics as its ultimate form of statement, rather than deterministic equations. There seems to be nothing in physics that prevents the view that its particles are little creatures, acting essentially like the larger familiar organisms.²⁴

From this point of view, the laws formulated by science are not the description of fundamental realities conditioning the existence of regularities. They are only the description of the regularities themselves, understood as purely statistical:

After emphasizing the subjective nature of all of our knowledge of the external world, [Pearson] pointed out that the laws of nature could be looked upon, not as part of the eternal structure of the world, but as merely condensed statistical descriptions of how things are observed to behave. There need be no essential difference from statistical laws of voluntary human behavior such as the law of supply and demand.²⁵

Point (v) is based on two ideas. The first is that a matter which exhibits a certain indeterminacy can be controlled by a will. The second is that this control does not need to operate on a large amount of matter. It just needs to operate in a strategic place: a kind of switch in the body whose activation can trigger an action. Living organisms seem to be made this way. The brain, in particular, appears as a set of switches capable of triggering various actions.²⁶

Point (vi) is the conclusion of the reasoning. Wright makes this reasoning to show that his metaphysical hypothesis satisfies both science and consciousness: science, because the latter makes it possible to defend an indeterminist conception of reality; consciousness, because each of us can experience freedom of will. In contrast, determinism seems both incompatible with science and consciousness.

The idea that life is creative in nature can obviously be found in Bergson. In this regard, Wright recognizes the influence of the French thinker.²⁷ Moreover, certain points of Wright's reasoning are probably inspired by Bergson. This is the case for point (v) in particular, since the idea that the psychic can act on matter via kinds of switches in the body is omnipresent in *Creative Evolution*.²⁸ However, as Wright points out, point (iv) was not inspired by Bergson, but by Pearson. In fact, the idea corresponding to this point is also in Bergson, but it is not clearly expressed in *Creative Evolution*.²⁹

Finally, even if Wright does not share the Bergsonian hypothesis of the vital impetus (I explain why below), for him as for Bergson, the creativity of life is at work in evolution:

The present discussion has dealt with the problem of evolution as one depending wholly on mechanisms and chance. In recent years, there has been some tendency to revert to more or less mystical conceptions revolving about such phrases as "emergent evolution" and "creative evolution." The writer must confess to a certain sympathy with such viewpoints philosophically, but feels that they can have no place in an attempt of scientific analysis of the problem. ... As to evolution, its entities, species and ecologic systems, are much less closely knit than individual organisms. One may conceive of the process as involving freedom, most readily traceable in the factor called here individual adaptability. This, however, is a subjective interpretation and can have no place in the objective scientific analysis of the problem.³⁰

This passage dates from 1931, but Wright quotes it and defends it again in 1975.³¹ In this passage, Wright asserts that the scientific approach and the philosophical approach to evolution are very different. I come back to this in the next part of the article. He also expresses “a certain sympathy” for Bergson’s ideas on evolution, which obviously does not mean that he shares those ideas. But at the end of the passage, he clearly states that *freedom*, that is, creativity, plays a role in evolution.

For Wright, the main factor of creativity in evolution is what he calls “individual adaptability.” In his 1931 paper, Wright thinks about the adaptability of cells. Here is what he writes about it:

The evolution of complex organisms rests on the attainment of gene combinations which determine a varied repertoire of adaptive cell responses in relation to external conditions. The older writers on evolution were often staggered by the seeming necessity of accounting for the evolution of fine details of an adaptive nature, for example, the fine structure of all of the bones. From the view that structure is never inherited as such, but merely types of adaptive cell behavior which lead to particular structures under particular conditions, the difficulty to a considerable extent disappears. The present difficulty is rather in tracing the inheritance of highly localized structural details to a more immediate inheritance of certain types of cell behavior.³²

His hypothesis seems as follows: a singular combination of genes causes the cells of an organism to act creatively and unpredictably in response to given conditions, and this way of acting can be inherited (via natural selection).

In a later paper, Wright again makes the connection between the singular combination of genes within the cells of an organism, and the creativity of that organism:

In a panmictic population, natural selection operates on the field of variability provided by mutation merely according to the average effects of allelic differences in all combinations. It is a creative process...³³

This idea that genes act in combination in a cell is based on Wright’s scientific work.³⁴ However, it also echoes the organicist and panpsychist philosophy championed by Wright. For him, indeed, each type of organism in nature (atoms, molecules, cells, multicellular organisms) constitutes a unified whole whose global

action is a priori unpredictable.³⁵

This idea is part of the “shifting balance theory,” a theory developed by Wright to better understand the creative nature of evolution. According to this theory, a new combination of genes can first appear in a subpopulation, before spreading in the whole population due to its adaptive value. The appearance of this combination in the subpopulation is facilitated by the fact that, due to its isolation, this subpopulation can vary genetically without undergoing natural selection.³⁶

3. SCIENCE AND PHILOSOPHY HAVE DIFFERENT OBJECTS

Another point in common between Wright and Bergson deserves to be underlined, which this time concerns their way of conceiving science and philosophy. For both of them, science and philosophy have different objects. It follows certain consequences, in particular on the limits of science.

For Wright, a scientific hypothesis must be able to be tested by experience. Wright deduces from this that science (physics and biology) cannot explain a phenomenon by invoking psychic processes, and that its work consists essentially in discovering regularities:

I fully agree with Pearson here that science is restricted to verifiable knowledge and thus must exclude the knowledge of our streams of consciousness, because it is unverifiable by anyone else. We must continue to accept a rigorous determinism as far as possible, and supplement this by probability distributions where necessary, even though we interpret the determinism philosophically as the external aspect of choices throughout the hierarchy of existence and make use of this philosophical interpretation in choosing topics for research. Some use of subjective terms may be warranted in describing the behavior of human beings and perhaps of higher animals to avoid ponderous circumlocutions, but should be avoided in attempts at the most precise formulations.³⁷

In this sense, for Wright, science must defend a methodological determinism, as well as a methodological reductionism. Methodological determinism requires the scientist to seek as much as possible for regularities in the behavior of any system. And methodological reductionism requires the scientist to explain as much as possible the properties of any system from the properties of its parts. In both cases, it is a question of asking the scientist to apply a principle of method.³⁸

However, applying a principle of method does not amount to adopting a vision of the world. In this sense, for Wright, *methodological* determinism does not imply *ontological* determinism, that is, the idea that all processes are governed by laws and that there is no creativity in nature. Likewise, *methodological* reductionism does not imply *ontological* reductionism, that is, the idea that the properties of any system could be deduced from the properties of its parts. In fact, science is far from proving ontological determinism and reductionism. Moreover, science (physics and biology) does not take introspective experience into account. For Wright, therefore, ontological questions are not a matter of science, but of philosophy.

From this point of view, it is important to assert that science cannot be an integral knowledge of nature:

What we are given is a tenable philosophy of science and along with this a desirable humility in the recognition that science is a limited venture, concerned with the external and statistical aspect of events and incapable of dealing with the unique creative aspect of each individual event.³⁹

This explains Wright's position on the Bergsonian notion of creative evolution: for him this notion is interesting, but only within the framework of philosophy (see the text cited above). The same is true of the notion of emergence. In a review devoted to Lloyd Morgan's book, *The Emergence of Novelty* (published in 1933),⁴⁰ Wright clarified his position on this notion.⁴¹ On the one hand, he criticizes the notion of emergence for not contributing anything to science, even for opposing its work:

A scientific hypothesis is one that attempts to describe a certain order. The orderliness described may be of different degrees. The laws of mechanics describe the behavior of massive bodies with great precision. The order described by the Mendelian hypothesis is often poorly exhibited in small families but is well exhibited where there are large numbers. ... The hypothesis of emergence, on the other hand, has no such aspect and thus seems wholly negative on the scientific side. As a working hypothesis, its effect is rather to discourage the search for such order as may exist than to further it.⁴²

On the other hand, he defends the relevance of this notion, provided that it remains within the scope of philosophy:

It seems probable that there is a unique aspect to every event, which of necessity escapes the statistical net of science and thus that evolution like any other history involves the more or less gradual “emergence” of unpredictable novelty. The emergent hypothesis should not, however, be considered as a scientific hypothesis. It expresses rather a probable but undefined limitation on the possibility of complete scientific treatment.⁴³

Bergson develops a view very close to that of Wright on the difference between science and philosophy. And since this view is present in *Creative Evolution*, one can think that, on this point too, Bergson had an influence on Wright.

For Bergson, the ultimate goal of science is to act on matter.⁴⁴ Its object is therefore matter, in so far as it presents processes on which we can act, that is to say, repetitive and predictable processes. From this point of view, science is led to consider each living being as a machine, that is, as a system whose movements are repetitive and predictable, down to the smallest detail:

Now I recognize that positive science can and should proceed as if organization was like making a machine. Only so will it have any hold on organized bodies. For its object is not to show us the essence of things, but to furnish us with the best means of acting on them. Physics and chemistry are well advanced sciences, and living matter lends itself to our action only so far as we can treat it by the processes of our physics and chemistry. Organization can therefore only be studied scientifically if the organized body has first been likened to a machine.⁴⁵

This amounts to saying that, for Bergson, science must defend a certain methodological reductionism and a certain methodological determinism. However, as we have seen with Wright, science should not confuse method and ontology. On the contrary, it must realize that its approach to reality is only partial:

If science is to extend our action on things, and if we can act only with inert matter for instrument, science can and must continue to treat the living as it has treated the inert. But, in doing so, it must be understood that the further it penetrates the depths of life, the more symbolic, the more relative to the contingencies of action, the knowledge it supplies to us becomes. On this new ground philosophy ought then to follow science, in order to superpose on scientific truth a knowledge of another kind, which may be called metaphysical.⁴⁶

4. WRIGHT AND BERGSON ABOUT VITALISM

In the preceding sections, I have shown how Wright's ideas closely resemble those of Bergson. However, Wright does not fully take up the Bergsonian conception of life. As I will attempt to explain now, this has a direct relation to the question of vitalism.

In the general sense of the term, vitalism is “the doctrine that there is some feature of living bodies that prevents their nature being entirely explained in physical or chemical terms.”⁴⁷ In this sense, Bergson and Wright are vitalists⁴⁸ because both consider that there are forces specific to living beings. For Bergson, the vital impetus is a force specific to the living.⁴⁹ For Wright, each hierarchical level in nature corresponds to a whole which is irreducible to its parts. So, for example, “it is obvious that the mind of an individual is not merely the sum of those of the cells.”⁵⁰

In a more restricted sense, “the term *vitalism* designates the physiological theories that attribute the phenomena of life neither to matter, nor to the soul, but to an intermediary principle possessing properties of its own.”⁵¹ We are talking here about ideas developed in the 18th century in Europe, such as those of Théophile de Bordeu (1722–1776), Paul-Joseph Barthez (1734–1806), Johann Friedrich Blumenbach (1752–1840) and John Hunter (1728–1793). In this sense, Bergson and Wright are not vitalists because each of them attributes the phenomena of life to something psychic, that is, something whose nature is fundamentally the same as that of our own consciousness.

However, Bergson has a second reason for opposing traditional vitalism, which Wright does not echo. According to Bergson, vitalist authors tend to think that biological organization is explained by a vital principle *specific to each individual*, and this raises two problems. The first is that each individual is itself composed of parts having “a certain individuality,”⁵² as if those parts themselves possessed a vital principle. The second is that each individual seems to belong to a whole greater than itself, in the sense that it is only the detached part of another organism. This is evident in the case of a plant born from cuttings. But this is also true in the case of an animal derived from the sex cells of its parents.⁵³ Therefore, considering the hypothesis of an ancestor common to all organisms, why not postulate the existence of a single vital principle acting in all living beings? In this sense, Bergson develops the idea of a certain unity of living beings, beyond their physical division:

In this sense each individual may be said to remain united with the totality of living beings by invisible bonds. ... This life common to all the living undoubtedly presents many gaps and incoherences, and again is not so mathematically *one* that it cannot allow each being to become individualized to a certain degree. But it forms a single whole, none the less.⁵⁴

Roads may fork or by-ways be opened along which dissociated elements may evolve in an independent manner, but nevertheless it is in virtue of the primitive impetus of the whole that the movement of the parts continues. Something of the whole, therefore, must abide in the parts.⁵⁵

For Bergson, life is psychological in nature. This is why it can form a unique whole, beyond the physical division of living beings. This unique whole is in fact a unique force, which Bergson calls *the vital impetus*. As it evolves, this single force tends to divide and become multiple. But, for Bergson, despite this multiplicity, this force retains a certain unity at all times. This is why he writes that living beings are united “by invisible bonds,” or that they form “a single whole.”

This hypothesis of a psychic unity of living beings is justified by the fact that they have only relative individuality. But, for Bergson, this hypothesis also helps to explain several biological phenomena, in particular: evolutionary convergences, instinct, and a certain tendency of life to associate. Evolutionary convergences correspond to the fact that similar characters appear independently in different lineages. For Bergson, these convergences can be explained by the fact that, although physically separated, the different lineages retain a certain psychic unity.⁵⁶ Instinct is immediate knowledge, without learning or reasoning. As this knowledge can be done between different species, Bergson writes: “Thus the instinctive knowledge which one species possesses of another on a certain particular point has its root in the very unity of life, which is, to use the expression of an ancient philosopher, a ‘whole sympathetic to itself.’”⁵⁷ Finally, although separated into multiple lineages, multiple individuals, life exhibits a certain tendency to associate. For Bergson, this tendency is explained by the fact that life seeks to physically realize its psychic unity.⁵⁸

This Bergsonian criticism of vitalism is not found in Wright who, from this point of view, is closer to traditional vitalism than Bergson. Certainly, for Wright, the living presents a multitude of hierarchical levels, so that the individuality of a living being is also relative. However, Wright does not make the hypothesis of a

psychic unity of all living beings.

More deeply, it appears that Wright cannot make such a hypothesis. Wright indeed thinks that the psychic and the physical are two irreducible aspects of the same reality. This is what he calls the dual-aspect theory.⁵⁹ Consequently, for him, there is a parallelism (i.e. an isomorphy) between the psychic and the physical: to every physical element must correspond a unique psychic element, and vice versa. And to every physical division must correspond a psychic division, and vice versa. From this point of view, a certain psychic unity of living beings cannot coexist with their physical division.

5. WRIGHT AND BERGSON ABOUT DARWINISM

To complete what I have said about vitalism, it is interesting to situate Wright and Bergson in relation to Darwinism.

Modern Darwinism presents itself as a complete theory of the evolution of living beings. This means that, from its point of view, evolution is a purely scientific matter. This idea seems to be based on the presupposition that life is essentially a physical reality, reducible to a set of mechanisms (i.e., observable regularities): if life is that, then a purely scientific study of life is possible, including the study of the mechanisms of evolution.⁶⁰ Wright and Bergson dispute this presupposition: for them, life has a psychic and creative dimension. They also dispute the consequence of this presupposition: for them, evolution is a scientific *and* philosophical question. In other words, for them, something in evolution escapes science, precisely *its creative dimension*. For Wright, the creative dimension of evolution is explained by what he calls “individual adaptability” (see part 2). And as Wright himself puts it: “This, however, is a subjective interpretation and can have no place in the objective scientific analysis of the problem.”⁶¹ Science can see that cells have individual adaptability. It can even try to quantify this adaptability (in the form of statistics). But it cannot explain it, because the explanation rests on panpsychist ideas. In the same way, for Bergson, the creative dimension of evolution is explained by the hypothesis of the vital impetus, and there is no doubt that, for him, this hypothesis is not scientific, but philosophical.⁶² From this point of view, Wright and Bergson oppose modern Darwinism in its claim to make evolution a purely scientific matter.⁶³

If we now consider the details of Wright’s and Bergson’s hypotheses, we see that their relation to Darwinism is different. Wright asserts that cells are capable of

creativity in their response to external conditions. But he does not go so far as to assert that this creativity allows them to act on their own genome.⁶⁴ In this sense, his hypothesis remains within the Darwinian framework which asserts that genetic variation is random. In contrast, Bergson clearly introduces a non-Darwinian factor into his hypothesis: the ability of the vital impetus to direct mutations in a certain direction, in a whole population and over several generations.⁶⁵ This hypothesis implies that genetic variation is not random.

This difference between the two thinkers in relation to Darwinism echoes their difference in relation to vitalism. As we have seen, Bergson opposes traditional vitalism by asserting that life is a kind of global entity, beyond the physical division of living beings. Thus conceived, life can have a creative activity (via mutations) on the scale of a whole population, and over several generations. In contrast, Wright does not make this assumption. He retains the idea of a parallelism between the psychic dimension and the physical dimension of life. Therefore, for him, the creative activity of life can only occur on the scale of individual organisms.

6. CONCLUSION

Wright develops a philosophical conception of life which owes a lot to Bergson. For him, as for Bergson, life has a psychic and creative dimension. From this point of view, Wright is vitalist in the broad sense of the term, even if his philosophy differs from traditional vitalism.

Wright also develops a conception of the respective roles of science and philosophy which owes a lot to Bergson. For him, as for Bergson, only philosophy can fully account for the psychic and creative dimension of life. In contrast, the fundamental role of science is to predict phenomena, which means that its object is less the creative dimension of life than its dimension of repetition.

This results in a certain opposition to Darwinism. For Wright, as for Bergson, only philosophy can fully account for the creative dimension of evolution, by developing hypotheses that go beyond the Darwinian framework.

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His research aims to confront the main metaphysical ideas of Bergson with the contemporary ideas in philosophy and science. He is particularly interested in the Bergsonian theory of matter. He published several articles on this subject in French and English.

NOTES

1. Wright introduced several statistical methods in population genetics. He is also known for having developed the theory of genetic drift, which aims to explain how random events can vary the frequency of certain alleles in a population, and thus play a role in the evolution of this population.
2. Sewall Wright, “Gene and Organism.” *American Naturalist* 87, no. 832 (1953, 5–18). “Biology and the Philosophy of Science.” *Monist* 48, no. 2 (1964, 265–290). “Panpsychism and Science.” *Mind in Nature*. Eds John Cobb, David Griffin. University Press of America (1975, 79–88). As this book has become very difficult to find, references will be made to its online edition: <https://www.religion-online.org/book/mind-in-nature-the-interface-of-science-and-philosophy/>
3. Wright, “Gene”, 14; “Biology”, 281; “Panpsychism”, 170.
4. Wright, “Biology”, 278.
5. Wright, “Panpsychism”, 174.
6. Wright, “Biology”, 278; “Panpsychism”, 174.
7. Wright, “Gene”, 11–14; “Biology”, 275–278; “Panpsychism”, 169–173.
8. Wright, “Panpsychism”, 173.
9. Wright, “Biology”, 278–279; “Panpsychism”, 175.
10. Wright, “Biology”, 281.
11. Bergson, *Creative Evolution*. Trans. A. Mitchell. London: Macmillan, 1911, 191–192.
12. Bergson, *Creative Evolution*, 192.
13. Bergson, *Creative Evolution*, 271.
14. This expression obviously corresponds to the title of a book by Bergson: *Mind-Energy*. Trans. H. Wildon Carr. New York: Henry Holt and Co, 1920.
15. In this sense, Bergson asserts that life is “a force” (*Creative Evolution*, 97–98, 103, 133, 149, 157), “an effort” (*ibid.*, 134, 259, 267), “a need of creation” (*ibid.*, 265), “a current sent through matter” (*ibid.*, 280).
16. Gilles Deleuze, *Bergsonism*. New York: Zone Books, 1991.
17. Bergson, *Creative Evolution*, 261–262, 275.
18. Bergson also defends a form of panpsychism. However, in his philosophy, panpsychism is not linked to the question of the origin of life and consciousness. For more on this point, see Joël Dolbeault, “Bergson’s Panpsychism.” *Continental Philosophy Review* 51, no. 4 (2018, 549–564).
19. Bergson, *Matter and Memory*. Trans. N. M. Paul and W. S. Palmer. London: George Allen and Unwin, 1911, 177, 222; *Mind-Energy*, 54.
20. Bergson, *Matter and Memory*, xiii–xiv; *Mind-Energy*, 45–46, 52–54.
21. Wright, “Panpsychism”, 170–171.
22. Wright, “Gene”, 15–16; “Biology”, 281, 285–286; “Panpsychism”, 170, 176.
23. Wright, “Panpsychism”, 170.
24. Wright, “Biology”, 286.
25. Wright, “Biology”, 281.

26. Wright, "Biology", 286; "Panpsychism", 176–177.
27. Wright, "Panpsychism", 170.
28. Bergson, *Creative Evolution*, 120–122, 132–133, 265–266.
29. For this idea, see Bergson, *Mind-Energy*, 18, 21–22.
30. Sewall Wright, "Evolution in Mendelian Populations." *Genetics* 16 (1931, 97–159), 154–155.
31. Wright, "Panpsychism", 181–182.
32. Wright, "Evolution in Mendelian Populations", 147.
33. Wright, "Genic and Organismic Selection." *Evolution* 34, no. 5 (1980, 825–843), 841.
34. Wright, "Genic and Organismic Selection", 827–829.
35. For a more detailed account of the influence of Wright's philosophical ideas on his scientific ideas, see David Steffes, "Panpsychic Organicism: Sewall Wright's Philosophy for Understanding Complex Genetic Systems." *Journal of the History of Biology* 40, no. 2 (2007, 327–361).
36. In the 1980 article, Wright briefly sets out his theory and discusses its different interpretations. See Wright, "Genic and Organismic Selection", 832–840.
37. Wright, "Panpsychism", 180.
38. Wright, "Panpsychism", 183.
39. Wright, "Biology", 288.
40. Lloyd Morgan (1852–1936) is a British psychologist and philosopher. He is one of the leaders of emergentism in Great Britain.
41. Sewall Wright, "The Emergence of Novelty. A Review of Lloyd Morgan's 'Emergent' Theory of Evolution." *Journal of Heredity* 26 (1935, 369–373).
42. Wright, "The Emergence of Novelty", 370–371.
43. Wright, "The Emergence of Novelty", 373.
44. Bergson, *Creative Evolution*, 206–207, 347–348, 361–362.
45. Bergson, *Creative Evolution*, 98.
46. Bergson, *Creative Evolution*, 209–210.
47. Simon Blackburn, "Vitalism." *The Oxford Dictionary of Philosophy*. Oxford: Oxford University Press, 2016.
48. From a philosophical point of view, not from a scientific point of view.
49. For life conceived as a "force", see for example: *Creative Evolution*, 98, 126, 149, 150; *Mind-Energy*, 25, 26, 31.
50. Wright, "Biology", 284.
51. François Duchesneau, "Vitalism." *Encyclopedia of the Enlightenment*. Ed. Alan Kors. Oxford: Oxford University Press, 2003.
52. Bergson, *Creative Evolution*, 45.
53. Bergson, *Creative Evolution*, 45.
54. Bergson, *Creative Evolution*, 45–46.
55. Bergson, *Creative Evolution*, 57..

56. Bergson, *Creative Evolution*, 57.
57. Bergson, *Creative Evolution*, 176.
58. Bergson, *Creative Evolution*, 273.
59. Wright, “Biology”, 280–283; “Panpsychism”, 174.
60. On this point, see in particular Ernst Mayr, *What Makes Biology Unique?* Cambridge: Cambridge University Press, 2004, ch. 1 and 2.
61. Sewall Wright, “Evolution in Mendelian Populations”, 155.
62. Bergson, *Creative Evolution*, 84–85, 93–94.
63. For Wright and Bergson, to assert that the creative dimension of evolution is a matter of philosophy, and not of science, does not amount to asserting that the philosopher can say anything about evolution, in an arbitrary way. For them, the philosopher, like the scientist, must attempt to explain all of the known biological facts. However, unlike the scientist, the philosopher can appeal to explanations including the psychological dimension of life – knowing that this dimension is also, in our own life, an empirical fact.
64. Such an affirmation can be found today in James Shapiro : *Evolution: A View from the 21st Century*. Upper Saddle River, NJ: FT Press Science, 2011.
65. Bergson, *Creative Evolution*, 85–86.