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THE IMPLICATION OF MOVEMENT: FROM BERGSON TO BOHM

Instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially. We take snapshots, as it were, of the passing reality, and, as these are characteristic of the reality, we have only to string them on a becoming, abstract, uniform and invisible, situated at the back of the apparatus of knowledge, in order to imitate what there is that is characteristic in this becoming itself.

—Henri Bergson

The Cinematographical Mechanism of Thought

In *Creative Evolution* (1907), Henri Bergson's concept of the cinematographical mechanism of thought serves as a model allowing him to deconstruct an epistemology originating in ancient Greece. Within this epistemology, the "becoming" that Bergson writes of is seen primarily as the degradation of a form rather than that which breathes life into forms. While he first admits the practical benefits derived from the cinematographical character of our knowledge, Bergson then advances his line of argument by questioning the specificity with which such a knowledge can attain insight into the nature of this "moving reality" itself:

In order to advance with the moving reality, you must replace yourself within it. Install yourself within change, and you will grasp at once both change itself and the successive states in which *it might* be immobilized. (2001, 297)

Echoing ideas common to quantum theory, Bergson stresses both the necessity of including the observer in the picture as well as the role of uncertainty and potential. The affinities between his philosophy and quantum theory are further reinforced through his interpretation of two of Zeno's paradoxes of motion: the *arrow paradox* and *Achilles and the tortoise*. In the former, Bergson's interpretation is that the arrow's movement is indecomposable; not a movement from point A to point B, but rather movement AB. He solves the latter in a similar fashion. Just as it can be said that the arrow does arrive, it can also be said that Achilles will overtake the tortoise because each of his steps must be understood as an indivisible act. The arrow arrives and Achilles wins the race because measurement is embedded within (as opposed to being constitutive of) becoming. In Bergson's words: "[T]here is *more* in the transition than the series of states, that is to say, the possible cuts, *more* in the movement than the series of positions, that is to say, the possible stops." (ibid., 302-303) In a word, that more is *durée*, or duration.

Duration and States of Consciousness

Leszek Kolakowski's summarizes Bergson's philosophy in three words "time is real." (1985, 2) Kolakowski's summation is equally applicable as a means of explicating the more specific concept of duration. In *Time and Free Will* (1889) Bergson arrives at an interpretation of time as duration by way of mathematical figures. He first suggests that "when you equate the number 3 to the sum of $1 + 1 + 1$, nothing prevents you from regarding the units which compose it as indivisible: but the reason is that you do not choose to make use of the multiplicity which is enclosed in each of the units." (2002, 51) As such, Bergson considers numbers as "extended discontinuities." In other words, just as 3 can be divided into $1 + 1 + 1$, each "1" can also be divided (extended) ad infinitum. He then introduces states of consciousness into the equation:

[T]here are two kinds of multiplicity: that of material objects, to which the conception of number is immediately applicable; and the multiplicity of states of consciousness, which cannot be regarded as numerical without the help of some symbolical representation, in which a necessary element is *space*. (ibid., 54)

As duration and states of consciousness implicate one another, to spatialize the latter is to mistake space for duration. The implications of such a category mistake extend beyond the object of study and back towards the subject. Bergson writes: “If in order to count states of consciousness, we have to represent them symbolically in space, is it not likely that this symbolic representation will alter the normal conditions of inner perception?” (ibid., 55) He then draws a parallel between a clock’s pendulum and apperception: “[W]e get into the habit of setting up the same distinction between the successive moments of our conscious life: the oscillations of the pendulum break it up, so to speak, into parts external to one another...” (ibid., 63-64)

The various figures employed by Bergson all point towards one thesis: duration cannot be expressed in space. This echoes back to Zeno’s paradoxes and the difference between seeing movement as a set of immobilities or as an unbroken whole. Bergson further suggests that duration and motion are alike in that neither possesses any homogeneity. A consequence of this is that whether the context of consideration is mathematical or spatial, equations for the measurement of motion are always a misrepresentation because, in Bergson’s words “an algebraic equation always expresses something already done,” (ibid., 68) whereas “it is the very essence of duration and motion, as they appear to our consciousness, to be something that is unceasingly being done...” (ibid.)

Physics: Quantity vs. Quality

As was discussed regarding the extended discontinuity of numbers, the intervals measured by science may be made infinitely small, but duration and motion will nonetheless escape because the latter are not objects, but rather (in Bergson’s terms) “mental syntheses” with “no analogy to number.” (ibid.) In short, numbers and space are homogenous and quantitative, while duration, motion, and states of consciousness are heterogeneous and qualitative. Despite this, mechanisms for exploring the minutia of intervals proliferate within science and society in general. Bergson typifies this situation with the axiom: “...it is through the quality of quantity that we form the idea of quantity without quality.” (ibid., 70) That said, he readily admits that society, as it is predicated upon language, relies on such instrumental uses of consciousness. This conundrum can often be seen playing itself out in the study of physics: try as they may, scientists are unlikely to isolate particles correlating to states of consciousness.

If relativity theory (physics at a cosmological scale) and quantum mechanics (physics at a subatomic scale) were reconciled, this might be overlooked, but the two systems of thought remain irreconcilable. In theoretical physicist David Bohm’s words: “[R]elativity theory requires continuity, strict causality (or determinism) and locality. On the other hand, quantum theory requires non-continuity, non-causality and non-locality. So the basic concepts of relativity and quantum theory directly contradict each other.” (1980, 176) Might it be because the oversight is so deeply embedded in our thinking that it remains invisible? In other words, is the problem in our questions, rather than in a lack of answers?

Bergson met with Einstein in the Spring of 1922. In Keith Ansell-Pearson’s words “Einstein concluded the exchange by stating that there was an unbridgeable gulf between the time of the physicist and the time of the philosopher, the latter being a complete mystery to him.” (Bergson 2002, 26) However, had Bergson been alive in the second half of the 20th Century, he would

have found a sympathetic audience with Bohm. Bohm both worked on the Manhattan project and published one of the first textbooks on quantum theory.

The Limits of Fragmentation

Published in 1980, Bohm's *Wholeness and the Implicate Order* covers topics ranging from quantum theory to consciousness. Bohm writes:

Being guided by a fragmentary self-world view, man then [breaks] himself and the world up, so that all seems to correspond to his way of thinking. Man thus obtains an apparent proof of the correctness of his fragmentary self-world view though, of course, he overlooks the fact that it is he himself, acting according to his mode of thought, who has brought about the fragmentation that now seems to have an autonomous existence... (1980, 2-3)

Bohm's perspective is grounded by his experience with experimental observation. Throughout his writing, there is mention of the limit to the incontrovertibility of empirical data, a limit inscribed within the preunderstanding that gave rise to the experimental apparatus in the first place. Bergson's cinematographical mechanism of thought can be seen as such an apparatus. Again, this is not to suggest that fragmentation, as a model of interpretation, has not served an important role in the evolution of Western thought. It clearly has, whether one is speaking of frames in a film or atoms under an electron microscope, Bohm recounts that

this view was, in certain ways, an important mode of realization of wholeness, for it enabled men to understand the enormous variety of the whole world in terms of the movements of one single void that permeates the whole of existence. Nevertheless, as the atomic theory developed, it ultimately became a major support for a fragmentary approach to reality. For it ceased to be regarded as an insight, a way of looking, and men regarded instead as an absolute truth... (ibid., 8)

Thus, atomistic thinking works, but only to a point. Evidence of this can be found in quantum theory's inability to simultaneously define a particle's position and momentum. It is against this epistemological threshold that Bohm pushes when he suggests that what is necessary is to "look at the world as an *undivided whole* in which all parts of the universe, including the observer and his instruments, merge and unite in one totality. In this totality, the atomistic form of insight is a simplification and an abstraction, valid only in some limited context." (ibid., 11) Clearly, the call to favor wholeness over fragmentation risks being dismissed as romantic vitalism, spiritualism, or pseudo-science. However, neither Bergson nor Bohm deny the accomplishments of a mode of thought based in fragmentation, rather they point towards its limits.

Things As They Really Are

The following excerpt from Bergson's *Creative Evolution* prefigures Bohm's perspective by more than seventy years. Here, Bergson points towards the need for an epistemology capable of acknowledging an undivided whole:

[W]hile modern physics is distinguished from ancient physics by the fact that it considers any moment of time whatever, it rests altogether on a substitution of time-length for time-invention. It seems then that, parallel to this physics, a second kind of knowledge ought to have grown up, which could have retained what physics allowed to escape. On the flux itself of duration science neither would nor could lay hold, bound as it was to the cinematographical method. This second kind of knowledge would have set the cinematographical method aside. (2001, 330)

Bohm highlights the urgency of creating this second kind of knowledge when he writes:

[F]ragmentation is in essence a confusion around the question of difference and sameness (or one-ness), but the clear perception of these categories is necessary in every phase of life. *To be confused about what is different and what is not, is to be confused about everything.* Thus, it is not an accident that our fragmentary form of thought is leading to such a widespread range of crises, social, political, economic, ecological, psychological, etc., in the individual and in society as a whole. (1980, 16)

However, Bohm is just as quick to point out that even the imposition of a “fixed kind of integrating or unifying ‘holistic’ principle on our self-world view” (ibid., 17) will not ameliorate the situation. Bohm’s grounds are not unlike Bergson’s when he suggests that “an algebraic equation always expresses something already done...” (2002, 68) Bohm writes:

[A]ny form of fixed self-world view implies that we are no longer treating our theories as insights or ways of looking but, rather, as ‘absolutely true knowledge of things as they really are’. So, whether we like it or not, the distinctions that are inevitably present in every theory, even an ‘holistic’ one, will be falsely treated as divisions, implying separate existence of the terms that are distinguished... (1980, 17)

Herein lies the component of Bohm’s philosophy that is perhaps the least intuitive, that there is no limit to the subtlety of our exploration. If modern science has led us to believe that the narrowing of intervals of measurement will eventually lead us to apprehend “things as they really are,” Bohm rather suggests that there is no limit to what we can discover, no ground zero from which a reality expressible as a numerical multiplicity or spatial extensity will be found. It is perhaps less counterintuitive on a cosmological scale than on a subatomic scale, thus a useful approach may be to transpose what is generally considered to be the limitlessness of the former onto the latter. To think in this manner is to approach Bohm’s concept of the *implicate order*:

[I]n the implicate order the totality of existence is enfolded within each region of space (and time). So, whatever part, element, or aspect we may abstract in thought, this still enfolds the whole and is therefore intrinsically related to the totality from which it has been abstracted. (ibid., 172)

From here, Bohm recasts movement as an epiphenomenon emerging from a higher dimension:

In this higher-dimensional ground the implicate order prevails. Thus, within this ground, *what is* is movement which is represented in thought as the co-presence of many phases of the implicate order. [...] [T]he state of movement at one moment unfolds through a more inward force of necessity inherent in this overall state of affairs in the next moment. (ibid., 209)

Movement can thus be seen as empirical evidence of a multidimensional ground of being that is self-aware, or in Bohm’s terms “implicated” by consciousness itself.

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