

Published in: Grasce (Ed.) *Entre systémique et complexité, chemin faisant* (Between systemics and complexity, making the way) Festschrift for J-L. Le Moigne, 85–90, Paris: Presses Universitaires de France, 1999.

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Le Moigne's Defense of Constructivism

In the last few years Jean Louis Le Moigne has devoted much of his formidable energy in an effort to counteract the reactionary forces of the intellectual establishment which are campaigning against any modernization in the philosophy of science. In spite of the fact that French thinkers of the caliber of Valéry, Bachelard, Derrida, Barthes, Bourdieu, Barel, Morin, Atlan, Fourez, as well as thinkers in other countries, have long stepped out of the realist mould that was dominant until the turn of the century, a vociferous faction led by the *Académie des Sciences de Paris* would like to chain epistemology to the Newtonian model of the universe¹. The constructivist affirmation that rational knowledge, no matter how you might want to define it, cannot be considered the representation of a 'real' world, independent of the human subject, is a dangerous heresy in the eyes of these conservatives. They want to perpetuate the myth that human reason in its application in the domain that we call science not only has the purpose of unveiling the world "as it is", but has in fact already largely attained that goal.

In his arguments against these reactionaries, Le Moigne has been vastly more gentlemanly and generous than the attackers. He credited them with the ability to follow a reasonable development of ideas even if these ideas were different from their own. Consequently he patiently explained the two basic principles of his theory of knowing, the phenomenological and the teleological.² Given the importance of these two lines of thought, I would like to present them in my own terms.

Phenomenology is the study of experience, and the first to undertake a methodical investigation of how human beings might attain knowledge by examining the world as it appears to them (rather than by reiterating metaphysical assumptions) were Locke, Berkeley, and Hume, who are collectively referred to as the British Empiricists. Although each of these seminal thinkers has individually influenced later philosophers in different ways, they built on a common basis that was formulated with admirable clarity by Locke. Knowledge, he said, has two sources. On the one hand, it is derived from the senses, on the other, from the mind's reflection on its own operations.³ To many later empiricists, especially those of a behaviorist orientation, the first source seemed to confirm the commonsense notion that we see, hear, feel, smell, and taste the world as it is. But this was not what Locke intended. In fact, he

made it clear that he did not believe that sensory data could reflect properties of the real world.⁴ With this he anticipated the German physiologist Johannes Müller, who before the middle of the last century found that the signals emitted by our sensory receptors differ only in intensity but not in quality. As Heinz von Foerster frequently puts it: The senses tell us how much, but not what.⁵

That we have no grounds for the assumption that the structures and images we compose out of sensory details are 'representations' of a real world, was a conclusion drawn already by some of the pre-Socratics at the beginning of Western philosophy and it was reiterated by all the sceptics that came later. It is a logical conclusion, not an empirical one. As we are in no position to compare what we experience with an external reality, the notion of a 'true' representation of reality is no more than a metaphysical wish.

Locke's second source of knowledge, the mental operations of the experiencing subject, was further investigated by Berkeley and Hume, who concluded that the relations, by means of which sensory details may be combined to form images of our experiential world, are not given, but are the result of association. And associations do not happen by themselves – they have to be made by the mind of an actively thinking agent. Hume proposed three generic categories of relation: Resemblance, Contiguity, and the connection of cause and effect.⁶ These relations were under all circumstances relations between segments of experience, not between elements of a 'real' world.⁷ He expressed the hope that future philosophers would further study and analyse the mental operations that enable us to construe a more or less coherent picture of the experiential world.⁸

While most of the philosophers that followed tried to circumvent the epistemological conclusions of the empiricists by turning towards metaphysics, Kant elaborated a monumental scaffolding to map the constructive activity of reason. Although Kant's work contains a wealth of hints about the process of conceptualization, it was only with William James, Ernst Mach, Alexander Bogdanov, and Hans Vaihinger around the end of the 19th century that the praxis of conceptual construction became an area of serious study. What gave it impetus was the notion of adaptation borrowed from the theory of evolution. This development culminated in the work of Jean Piaget, who revolutionized the field of cognition by the consistent application of the principle that the purpose of human knowledge was not the representation of an independent reality in itself, but the thinking organism's adaptation to the world of experience.

Jean Louis Le Moigne has frequently quoted Piaget's dictum "*l'intelligence organise le monde en s'organisant elle-même*", a dictum which, if taken seriously, brings about a radical break with traditional epistemology. No longer can one maintain that the value of knowledge resides in its more or less 'true' reflection of structures supposed to 'exist' independently of the experiencer. Instead, its value is now determined exclusively by its successful application or 'viability' in the practice of living and thinking.

What Le Moigne called the 'teleological' principle acknowledges the fact that descriptions and explanatory models of both the behavior and the cognitive activities of living organisms make sense only if one acknowledges that these agents are intentional agents. The traditional approach, based on the Newtonian world view,

tried to reduce everything to the level of a fundamental determinism where all adequate explanations have to be in terms of the lawful physical interaction of molecules. Where this was done, the phenomena that enable us to distinguish the living from the inanimate were programmatically excluded as unscientific illusions. Anticipation, purpose, and goal-directed behavior were considered superstitions because they involved the notion of 'teleology'. This notion was believed to imply a determining influence of something in the future on what was happening in the present. The belief was founded on an all too simplistic interpretation of Aristotle's analysis of causal connections which led him to distinguish final or teleological causes from three other types which he called efficient, formal, and material. A careful reading of Aristotle, however, reveals that he used the term 'final' in two different senses. In accordance with his metaphysics, he posited the ultimate state of the world's perfection as a final cause of all development – an end towards which everything had to move. Yet, as a scientist interested in the practice of living, he used the term 'final' in a way that had nothing to do with metaphysics.

I have called this non-metaphysical use of final causes 'empirical teleology'.⁹ It is based on the empirical fact that human subjects abstract 'efficient' causal connections from their experience and formulate them as rules which can be projected into the future. Consequently, to use Aristotle's example, if I have learned from past experience that physical exercise has a beneficial effect on people's health, I can decide to exercise *in order* to improve my health. This is the key to goal-directed action, and it constitutes a perfectly valid explanation that does not require any unscientific metaphysical assumptions.

The fierce disputes that followed upon the publication of the paper on 'purpose' by Wiener, Rosenbluth, and Bigelow¹⁰, could have been avoided, if it had been made clear that the teleology the authors suggested was no less empirical than the accepted empirical fact that most living organisms are capable of learning and abstracting regularities from their actual experience. B.F. Skinner and his behaviorist colleagues were celebrated as pioneers of a new psychology when they demonstrated that starving rats were able to learn that, by pressing a certain lever in their prison-like box, they could obtain a food pellet and thus alleviate their hunger. But no one at that time dared to mention that this learning consisted in the rats' recognition of a causal connection between pressing the lever and the delivery of food, and that this connection could be used to counteract their internal discomfort. If hunger were not a discomfort, i.e. something unpleasant which living organisms try to get rid of, the experience that pressing the lever provides a food pellet would be of no interest to the rats. But the Skinner boxes have shown that, once a rat has accidentally discovered the effect of pressing the lever, it finds this causal connection so interesting that it continues to press the lever indefinitely. It was merely a kind of pseudoscientific materialist bigotry that prevented psychologists from saying that, given its deprived state, the rat pressed the lever for the *purpose* of feeding itself.

With the rise of cybernetics, the reluctance to speak of purpose was somewhat mitigated, but there still remained a feeling that, scientifically, it was not quite legitimate. Jacques Monod, for instance, avoided it in his famous book *Chance and necessity* by borrowing the term 'teleonomy' to account for artifacts whose construction can be justified only by the function "they are intended to fulfill".¹¹ This

introduced the notion of intention, but it did not yet make clear the important distinction that was brought out some twenty years later by Gordon Pask. A gun, for example, is designed so that it can launch a projectile at great speed. This is what Pask called the purpose *in* the gun. But when someone uses it to kill an animal or an enemy, Pask called it the gun's purpose *for* that effect.¹² Similarly, the lever in the Skinner Box has the inherent purpose of releasing a food pellet; but when the rat presses the lever, it does so for the purpose of relieving the discomfort it feels as hunger. In the first case, one could indeed speak of teleonomic design, but in the second it is simply goal-directed behavior or empirical teleology.

We owe to Jean Piaget the insight that intelligent action is not confined to the human species. All organisms can be said to act intelligently when they are capable of learning, that is to say, when they abstract regularities from their experience and use these regularities to create and maintain their inner equilibrium. Where the human animal is concerned, we know that there is more than one kind of inner equilibrium – it is not merely a question of satisfying physical needs and avoiding sensory discomfort. There is a higher level of equilibrium that involves the mutual compatibility of conceptual structures, a level on which contradictions tend to generate a perturbation.¹³ The point I want to stress in the present context is that abstracted regularities, and the goal-directed actions to which they give rise, pertain to the world of the acting and thinking organism's experience, not to a world posited as an independent realm of 'being'.

In my exposition of the 'phenomenological' hypothesis I showed that the constructivist theory of knowing accepts the sceptics' denial of 'true' knowledge of an ontic world. But constructivists are not satisfied with such a purely negative position. They therefore discard the traditional view of knowledge as representation and, in its stead, propose the notion of viability. In any given set of circumstances, an action scheme, a concept, or a theory, are considered viable if they function in the way that is expected of them. The recognition of the circumstances as well as the ascription of viability are always a matter of the acting subject's judgment. There is no reference to an objective world as a touchstone of 'truth'.

As Le Moigne clearly saw, the constructivist model of cognition does not imply any form of solipsism. It constitutes a radical break with the philosophers' traditional preconception that knowledge must necessarily be located at some point of the axis between materialism and idealism.¹⁴ Since the concept of intelligent action is based on regularities which the thinking organism abstracts from subjective experience, *including* his or her construction of others as parts of the experiential field, the judgment of viability and the subsequent construction of an experiential reality gain their value and relative permanence on the basis of their intersubjective compatibility.

A change of focus, from the impossible attempt to know an objective ontological reality to the generation of equilibrium in the world of our experience, is a change of orientation that has repercussions in every intellectual domain. Among other things it entails the realization that the question of the relation between experience and an experiencer-independent ontology has to be left to the intuition of metaphysicians and mystics. It is not a question that can be answered on the level of rational thought. But as Le Moigne remarked, the philosophical establishment remembers "*ses longs efforts*

pour substituer la vérité objective à la vérité révélée” and is therefore reluctant to replace the notion of ontological truth with that of viability.¹⁵

Consequently, it is not surprising that all who are intent on maintaining the conceptual status quo in the discipline of science, in education, and in other areas of public concern, will do whatever they can to stop the spread of the constructivist ‘heresy’. Looking back at the history of ideas, it seems quite possible that they will succeed. More than once, thinkers in the domain of epistemology, who endangered the basic conventional assumptions, were effectively discredited by the dogmatists. The novel approaches they suggested were misunderstood or deliberately misrepresented so that the mainstream could flow on, undisturbed. Berkeley, for example, was persistently misinterpreted so that his suggestion to define ‘existence’ in terms of the experiential world was made to look absurd; Vico’s maxim that humans can know only what they themselves have constructed was trivialized to the point where its function as the guiding principle of a theory of knowledge was totally obscured; and Kant’s monumental work was apparently never read with sufficient attention by those who determined his official evaluation.¹⁶

The critics, such as the *Comité des Études et Rapports de l’Académie des Sciences de Paris*, who vituperate against any questioning of ‘objectivity’, never find it necessary to explain a rational method that enables them to attain objective truth. This does not inspire confidence in the epistemological basis from which they launch their attacks. The fact that philosophers have unsuccessfully tried for more than two thousand years to bypass the logical arguments of the sceptics, is apparently not sufficient to dismantle a dogmatic position. This is why we are immensely grateful for the patient, measured defense of reason that Jean-Louis Le Moigne has led for many years.

Notes

- 1 *cf.* Rapport commun A.S.- CADAS n° 6, mai 1996.
- 2 Le Moigne, J.-L. (1995) *Les épistémologies constructivistes*, Paris: Presses Universitaires de France, p.70-78.
- 3 Locke, J. (1690) *An essay concerning human understanding* (Book II, §4).
- 4 *ibid.*, Book II, Chpt. VIII, §7 & §15.
- 5 Foerster, H.von (1973) On constructing a reality. In F.E. Preiser (Ed.), *Environmental Design Research* (35-46). Stroudsburg: Dowden, Hutchinson, & Ross.
- 6 Hume, D. (1742) *Philosophical essays concerning human understanding*, Essay III.
- 7 *ibid.* Essay XII, Part 1.
- 8 *ibid.* Essay III.
- 9 Glasersfeld, E.von (1990) Teleology and the concepts of causation, *Philosophica*, 46 (2), 17-43; (1997) Anticipation in the constructivist theory of cognition, paper presented at the International Conference on Computing Anticipatory Systems, Liège, August 1997.
- 10 Wiener, N., Rosenblueth, A., & Bigelow, J. (1948) Behavior, Purpose and teleology, *Philosophy of Science*, 10, 1943.

- 11 Monod, J. (1971) *Chance and necessity*. New York: Knopf, p,9; (French original, *Le hasard et la nécessité*, Édition du Seuil, 1970).
- 12 Pask, G. (1969) The meaning of cybernetics in the behavioral sciences. In J.Rose (Ed.), *Progress of cybernetics*; London/New York: Gordon & Breach, p.23.
- 13 cf. Glasersfeld, E.von (1995) *Radical constructivism – A way of knowing and learning*. London: Falmer Press; p.65ff.
- 14 Le Moigne, *op.cit.*, p.114.
- 15 Le Moigne, *op.cit.*, p.68.
- 16 cf. Bettoni, M. (1997) Constructivist foundations of modeling – A Kantian perspective, *International J.of Intelligent Systems*, 12 (8).

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Preprint version of 12 Mar 2006