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Lessons from culturally contrasted alternative methods of inquiry and styles of comprehension for the new foundations in the study of life

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ABSTRACT

Contemporary scientific approaches to Biology are the result of some cultural ideas considered as universal by Western reductionist traditions. The study of the cultural, symbolic and historical approaches to reality and Life provides us important lessons about the necessity of integrating Eastern holistic views into the study of Life. This is both an epistemological and ontological enhancement which provides more powerful and insightful ways to deal with Life and its understanding.

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1. Introduction

Reductionist methodology derived from the intellectual experience of classical mechanics transmitted to other disciplines of physics and physical sciences continues to be identified with the scientific method. It was successful in disciplines where the objects of study were relatively simple, i.e. when systems under consideration can be dissected into possibly large number of components, but with limited and easily separated interactions. This condition is not satisfied by biological systems (we can find a reflection of this problem in contemporary epistemological controversies in Synthetic Biology, for example (Gustafsson and Vallverdú, 2015), and for that reason the study of life was the first where reductionist methodology was questioned and where originally the need for holistic scientific methodology was recognized (Tauber et al., 2002). The problems arisen from the systems biology debates between the reductionist approach and more holistic visions are fundamental for the analysis of the living systems (Mazzocchi, 2012). The too narrow reductionist approach had led to some dead-end experimental problems (Ayala, 1987).

J. C. Smut's holism (1926) or General System Theory of L. Bertalanffy (1968) generated great interest, but did not bring any breakthrough in the scientific practice of biology. They did not go beyond very general concepts and ideas, from which it was impossible to derive actual research tools. More specific early ideas

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of a new theoretical approach to the study in the works of N. Rashevsky (1965, 1972) and R. Rosen (1958, 1987, 1991) had limited impact on biological research practice. Rosen recognized the importance of self-reference in living objects and derived from this necessity to develop entirely new formalism for biology, since self-reference was excommunicated from logic and mathematics, and therefore from science. The work of H. Maturana and Varela (1980) was more influential among biologists and their concept of autopoiesis became a symbol of a new approach to conceptualization of life. However, the philosophical depth of their vision of the study of life was not reflected in the progress in overcoming challenges to biology.

The calls for a holistic methodology and for discarding confines of logic in biology, amplified by surprising discoveries in physics that questioned intellectual Western tradition induced increase of interest in Eastern philosophies. Probably the widest audience had books of F. Capra (1975) addressed to general public, but of course widely read by scientists. The association of holism with the East was not new. Holistic ideas although without the term "holism" introduced by Smut in 1926 were propagated in esoteric writings ascribed to Eastern philosophers, mags or magicians since antiquity. The meaning of "East" was changing. First it was Egypt with its wisdom of priests, later India with multiplicity of religions and philosophical systems, and finally China or Japan. Europe had its own tradition of holistic, not necessarily esoteric thought exemplified in the work of Plotinus and his Neo-Platonic followers. However, in common reception holism always was associated with the works of mystics and esoteric traditions of the type of Hermes Trismegistos believed to be derived from the wisdom of Ancient Egypt.

This wide interest in Eastern philosophical solutions to the problems of Western science was frequently based on the naive conviction about superiority of esoteric knowledge over that exoteric, accessible to everyone. More justified is the belief in accumulated experience of philosophical systems with long lasting traditions. However the present authors are sceptic about the value of the direct import of concepts, ideas or systems from Eastern philosophies. Instead, this paper has an objective to stimulate further studies which confront Western and Eastern views on relevant methodological issues and to compare the ways in which similar questions were answered in these two very different civilizational realms. On one hand this can help to find alternatives to concepts, ideas and methods of scientific methodology in general, and in the scientific study of life in particular.

These alternatives may not be present directly in the thought of the East, but may be derived from it. On the other hand, the study of the Eastern way to comprehend reality or to understand life may help in critical analysis of the Western scientific tradition. For instance, the cornerstone ecological concept—the interconnectedness and interdependence of all things—is remarkably similar to the fundamental insight of Buddhism, according to (Barash, n.d.). Indeed, a major Buddhist text, the Avatamsaka Sutra-which consists of ten insights into the "interpenetration" between beings and their environment-could well have been written by a trained ecologist. After decades of removing predators to protect deer and elk herds, ecologists have belatedly come to a Buddhist realization that predation—and even forest fires—are natural processes that have an important place in maintaining healthy ecosystems. In Japanese philosophy the notion of *Fudo* (climate), by Tetsuro Watsuji mixed phenomenological analysis with the holistic perspective as well as with high intense social relationships (Berque, 2004; Odin, 1991).

The notion of continuity and interconnectivity among living systems, provided a holistic approach to Biology that was supported by Taoist, Neo-Confucian, or Buddhist thinkers (Barnett, 1986; Chao, 2002; Noda, 2000; Rolston, 1987). This integrative view considered a richer functionalist vision of how living agents operate, at the same time that became more powerful than oversimplistic animist ideas (Ochiai, 1989; Guthrie, 2002; Hornborg, 2006; Rong and Xia, 2010).

There is another aspect of interconnectedness which was intentionally abandoned in the Western intellectual tradition through the separation of the ontic and epistemic aspects of scientific studies. Eastern philosophies (like Daoism (Barnett, 1986; Goodman, 1980),) provide a wide range of the views on the relationship between what we know and how we know, especially in ecological perspectives (Ames, 1986; Girardot et al., 2001), in many cases very different from the Western approach, as we analyzed in our previous study (Schroeder and Vallverdú, 2015).

We agree that the division of philosophy into the strictly delineated disciplines of epistemology, ontology and ethics was a great achievement of the 18th and 19th centuries (the term epistemology was introduced by James Frederick Ferrier (1854) in response to earlier questions about the interactions between what we know and how we know) eliminating many misconceptions and misunderstandings, but we have to be aware that the mission of this division may have been achieved and it is time to reconsider it, when we realize that in the Eastern thought the methodological monism explicitly postulating interdependence of the methods of all types of knowledge was rather a rule than exception. The further distinction between ontology, ontics and metaphysics introduced in the works of Martin Heidegger and of Nicolai Hartmann reflect the special role of categories in our conceptualization of reality, but it is the study of the Eastern thought in its diversity which tells us how deceptive is our trust in absolute meaning of categories. Despite of an initial interest and uncritical imitation and acceptance of phenomenological Western tradition, Eastern authors understood the loss of analytic richness once they abandoned their cultural heritage (Kopf, 2012; Shimomissē, 1979).

This is only one facet of the more general and complex issue of the role of abstraction and idealization which are fundamental for modern scientific methodology and of the use of logic in the construction of knowledge about reality to be re-examined in the search of new methodology of inquiry. There is no doubt that the Eastern philosophies can provide us with a very wide range of alternative systems of thought directly or indirectly rejecting the Western path.

When we talk about Eastern philosophies, we have to be aware of possible confusion. Whatever is less known becomes more homogeneous, so someone can perceive Eastern philosophies as bound by one specific principle or doctrine. This is as false, as to think that the Western philosophies have a common denominator. For our purpose important is not to look for any particular trait of Eastern philosophies making them all distinct from the Western thought, but to explore the rich variety of positions and views which sometimes may seem very exotic, but which can impregnate our modern philosophical reflection on transcending the limitations of the present scientific methodology.

The present paper is intended rather as a preparation for further studies than a definitive answer to the questions what and how we can learn from the Eastern philosophy. We are not even convinced that the framework of the axis West-East is appropriate for the re-examination of scientific methodology (Ruse, 1988). After all, there is in this framework some residue of the century old naive fascination with the "oriental magic" from the past centuries mixed with the simple fact that the philosophical heritage of other cultures and civilizations outside of this axis has been lost. Also, we should remember that, what for Europeans is originating in the East (for instance Hindu intellectual tradition) came to China and Japan from the exotic West. Thus, in many instances we should