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## The Mosaic Theory of Natural Complexity A scientific and philosophical approach

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## Introduction

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## Introduction

What is complexity?

On the planet Earth it is usually assumed that living organisms, built on the complex architecture of carbon-based molecules, are the most complex systems that we can directly observe. The human brain, displaying evidence that huge quantities of memorized information are processed, is possibly the most complex structure on earth.

Despite attempts by mathematicians, it is not possible to give a clear-cut definition of what complexity is. The model presented here is not aimed at approaching complexity through mathematical considerations, but focuses on straightforward observations of living beings and the way they are built. It is one of a number of possible models of complexity. It is intended to describe structure of complexity as it appears in living beings, showing how complexity emerges in the world we live in.

As will be shown later, this model (named “Complexity in Mosaics”) comes from two main principles: “Juxtaposition” of similar structures and the subsequent “Integration” of these structures to produce structures at a higher level, a process that can be repeated several times in biological systems, leading to the well-known architecture of life, offering a series of levels ranging from cellular to populations and species.

There is no need for a sophisticated definition of complexity; a level such as an organism, built on structures at lower levels, *e.g.* cells or organs, will be considered as more complex than its lower level components. Similarly, an organ will be considered as more complex than its component cells, a population more complex than its component individual organisms, and so on. This practical point of view avoids the need for an (impossible?) definition of complexity.

The mosaic model can be used for accurate description of the complexity of living beings, with its scope including not only individual organisms and populations, but also genes, organs and groups of organs, as many examples will show. This leads to a specific role for the model in relation to Darwinism, as will be discussed. The model can be applied to properties that are linked to but different from biological systems. Mind processes such as memory, consciousness and language can be analyzed in terms of mosaics, as well as can other phenomena produced by the mind: literature, art and philosophy. The mosaic model thus offers a broad range of possible uses across numerous psychological and literary fields. The model will therefore be useful in both biology and social sciences.

In Aristotelian philosophy, a modern stance was introduced by the Russian medical doctor and philosopher Konstantin Khroutski with “Biocosmology” also

known as “Neo-Aristotelism<sup>8</sup>”, focusing on Aristotle’s argument that the universe is built biologically, not physically. In modern terms, this does not mean that the universe is simply a huge ape like King Kong, but rather that the very structure of complexity everywhere in the universe may have biological elements. Knowledge of rules governing complexity in living beings might therefore be an approach to a general understanding of complexity processes. I have adopted this point of view and one section of the present text will be devoted to the possible extension of the mosaic model beyond the realm of living beings on earth, exploring derivatives for the models, *e.g.* in mind processes. The possibility of applying this originally biological theory outside the field of biology will be covered. At the same time it will be apparent that my thesis on complexity as a mosaic formation is compatible with another thesis put forth by Konstantin Khroutski’s Biocosmological school, and that is the thesis of triunity in biological phenomena: this will then be related to the dialectics of life.

Another important point that will be discussed is the relationship between nature and culture. Though human culture may sometimes be in opposition to nature, the origins of culture show that culture is an extension of what nature had already started. This can explain why principles governing nature and principles governing culture, *i.e.* complexity in mosaics and/or the triune dialectical movement, are likely to be the same, supporting the Biocosmological stance that the laws of the universe are indeed universal.

As the present work on complexity as a mosaic phenomenon is at the intersection between biological theory and philosophical speculation, it involves both hard science (*e.g.* biology and astrophysics) and human and social sciences. It thus attempts to provide new and general answers to the scientific and metaphysical question of natural complexity.

Some of my arguments have been published (in French and English) as articles and books<sup>9</sup>, but this is the first time I have had the opportunity to present an extended albeit succinct view covering the scope of the theory.

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<sup>8</sup> Khroutski 2008, 2013.

<sup>9</sup> Chapouthier 2001, 2009a, 2011; Audouze *et al.*, 2015a.