

## REVIEW

of the dissertation of Kaloyan Nechev

### EMERGENT STRUCTURES AND FUNCTIONS IN MOLECULAR BIOLOGY AND NEUROBIOLOGY

The dissertation consists of 167 pages, including Introduction, four chapters and Conclusion. In the Bibliography 142 sources are listed, predominantly in English. In Chapter one the author presents the history of the emergent-properties debate. In the second chapter – his conception about a possible solution. In chapter three – a more specific analysis of the phenomenon intuition as an emergent one in the mind – body relation. The fourth chapter is of methodological nature.

The emergent-properties theme is situated generally in a theoretical field that is classical for Philosophy of Science. This is the competition between reductionism and the various antireductionist theories. What is common among the latter is that the behavior of the entities at a certain level of organization is considered as not reducible to the one of entities at a lower level of organization, which the former consist of, because of the effects of factors which are supernatural, or at least, of nature which is not yet known to science. More particularly, K. Nechev deals with the interpretations which explain the emergent properties by referring to, in his words, “new causal factors (extra-ordinal laws of reversely causal nature), which follow from the essentialization of the emergent properties”.

The aim of his research is to establish a new type of analysis of the emergent-properties phenomenon, which is called by the author “cluster reactional analysis” – a new term, introduced by K. Nechev himself. It is meant to integrate into a unified naturalist framework the concepts *natural kinds* and *emergent properties*. Further, in the same trend, the author introduces another, similar method, called by him “functionally-behavioral analysis”, and used by him for the interpretation of intuition in the context of the emergent-properties theme.

The solution that is proposed by K. Nechev is to consider the natural kinds as reactional clusters, and the emergent properties as complexes of reactional clusters in the sense of complexes of relatively fixed reactional components. In such terms the phenomenon emergent properties is nothing else but enhancing the

reactional potential of the respective structure or complex system “...which means that a given structure can react in much more numerous and much more complex ways to the particular conditions (an increased reactional plasticity)” p. 58. The “emergent-ness” here refers to the greater range of reactional alternatives (a greater reactional volume) which results from the combination of reactional clusters and their relations. From such a perspective the generation of new properties of the system does not involve considering them as independent, unexplainably emerging, new *essences*.

This approach is, as the author more than once points out, anti-essentialist. The entities’ essences are not a subject-matter of the research. I. e. the question is not whether or not to aim at reducing the very “nature” of certain things to the one of others. Declaring, in the extreme cases, the “secondary” nature to be not a true one. Unlike this, K. Nechev’s approach is methodological. What is at stake here is reducing the “conceptual tension between scientific disciplines”. In this way, at least in a worldview aspect, the emergent-properties problem is, so to say, dedramatized. It is not necessary any more to make a choice between, on the one hand, reducing a “higher” nature to a mere manifestation of a “lower” one, and, on the other hand, adding of mysterious, qualitatively new essences, which are to distinguish the two levels of organization.

Undoubtedly, we have to do here with an original and profound investigation. What raises some concerns is, in my opinion, the easiness with which the author coins a terminology of his own (“cluster reactional analysis”, “functional behavioral analysis”, “reactional plasticity”, etc.). To introduce an original terminology on such a significant theme in the Philosophy of Science is quite ambitious and daring. Usually, such endeavors are manifestation of great professional self-confidence which fits well established scholars. However, as in our case these proposals have been sufficiently substantiated, and the author has demonstrated a very good general competence on this subject-matter, the invention of this terminology should be evaluated exclusively in regard of its research adequacy.

I myself cannot produce such an evaluation, because the theme of the research is not in the focus of my academic interests, but I recommend the author, in regard of his further work in this field, to present his conception in publications in renowned international journals. Out of my own experience I know that highly

professional and unbiased (“double blind”) reviews, even if they are quite critical, can help a lot an author to situate his/her original ideas in the frame of reference of the contemporary research on the respective subject-matter.

Anyway, this dissertation has obviously been prepared in a competent, erudite way, using state of the art specialized literature. The thesis is original and well substantiated. I have no doubts concerning the authorship of the text. From all this I draw unreservedly the conclusion that the dissertation provides ample reasons to grant Kaloyan Nechev the educational and academic degree “Doctor in Philosophy”.

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Prof. Dr Plamen Makariev