

SUMMARY

BETWEEN REDUCTION AND EMERGENCE. CONTROVERSY OVER THE PLACE OF MIND IN A PHYSICAL WORLD

1. Over the last several decades we have witnessed a spectacular development of the disciplines examining various aspects of the functioning of cognitive-mental systems at all their organizational levels: from quantum mechanics, complex systems theory and cybernetics, evolutionary biology and neurobiology, neuropsychology, cognitive neuroscience and information theory - defining structural and nomological possibility conditions for existence of various types of minds, to the disciplines examining logical-linguistic structures and social-cultural patterns determining the content and form of mental states.

Different dimensions and levels of organization of cognitive systems (conscious and unconscious, personal and sub-personal, internal and external, modular and contextual, diachronic and synchronic, computational and non-algorithmic, evolutionary and developmental) are studied with the use of diversified set of research methods. The research areas that used to be reserved for philosophers have now been reclaimed and developed by representatives of the empirical sciences who - frequently in collaboration with philosophers - seek for answers to fundamental questions about the nature, origin and the mode of existence of the multiple manifestations of mind (consciousness and intentionality, various kinds of memory, mental representations, rationality, linguistic and mathematical competencies, aesthetic, moral and religious experiences, personal identity and self).

2. The methodological specificity of the research in the mind - unprecedented in the history of science - consists in the fact that in order to unravel its riddles it has been necessary to reach for formal, natural, engineering and social sciences as well as humanities and philosophy. Most of the contemporary researchers share the conviction that cognitive-mental processes are irreducibly multidimensional and exceed the boundaries of isolated disciplines, their scopes of research and their explanatory powers.

Thanks to the integrated work performed by scientists and philosophers, detailed maps and models of the mind are created. We gain a better and better understanding of neurocomputational mechanisms grounded in all types of cognitive activities, as well as the relationships between mental properties and states and their physical, social and cultural environment. The increasing amounts of empirical data and theoretical models give birth to the need for a new ontology of mind that would be consistent with the entirety of the scientific knowledge on cognitive-mental systems whose objective is to describe the nature and the mode of existence of the mind in a physical world.

3. One of the most complicated problems of the ontology of mind and methodology of cognitive sciences concerns intertheoretic and interlevel relations. According to the main assumption adopted in this work, the appropriate theoretical context within which the

traditional psychophysical problem is formulated and solved is the contemporary controversies over reduction, emergence and supervenience. The placement of the psychophysical problem in the context of the interdisciplinary research in the mind furnishes it with a non-standard formulation and allows for accounting for its new aspects. Eventually, it enables to formulate a contemporary version of the psychophysical emergence theory.

According to the main assumption of the emergence theory, higher-order systems are created due to the organization of lower-order units participating in complex interactions with processes and objects occurring in their environment. In principle, higher-order systems manifest characteristic patterns, properties and functions which are never fully describable or explainable with the use of the theoretical tools of the disciplines engaged in structural research in the lower organizational levels. The most spectacular exemplification of the naturally occurring emergence phenomenon is mental patterns, properties and functions. Nonetheless, despite the dependence on the base processes they have generated from, they show a limited autonomy and manifest a number of specific properties that could not be found through examination of the microstructure of the brain or individual nerve cells.

4. According to the emergentist world-picture any complex systems, as well as the processes and functions based on them, are generated on the basis of simpler systems and their interactions of which they are ontologically derivative. Moreover, the opposition between what is derivative and what is ontologically basic is not absolute but relative. Phenomena that are thought fundamental at one level of organization may be recognized as derivative at another level. Cells are fundamental for such higher-level structures as tissue, organs or organisms, but they are derivative of the molecules which they are made up of, as well as the chemical reactions. The human mind is ontologically basic for its purely intentional products, but it is derivative of the hierarchical structure of the neural networks which the human brain is made up of (from a broader perspective it is also derivative of the evolutionary processes which have produced the human brain).

Hierarchical systems existing in nature consist of sequences of various level structures and processes building up on lower levels. Atoms are created based on elementary fields or particles and their interactions. Atoms account for chemical structures and compounds, and a specific organization of particles and chemical compounds results in creation of a complicated hierarchy of biological systems. Their progressive evolution generates a sequence of structures characterized by an increasing level of complexity - from a single cell to a hyperstructure of the human brain amounting to the basis of the mental functions and states. On the other hand, the interactions between the systems equipped with minds lead to generation of various types of societies of minds and ensuing institutions and social behavioural patterns making up further organizational levels.

The possibility condition for existence of any higher-level structure or function is the existence of base units whose appropriate interactions are the basis for higher-level systems. The dependence relation one deals here with features existential, structural and functional aspects. The existential dependence aspect consists in the fact that the destruction of the

base units will annihilate all higher-level systems made up of them. The structural dependence aspect means that any higher-level structures result from the appropriate organization of the base units. Finally, the functional dependence aspect consists in the fact that for any systemic function there are lower-level mechanisms that enable its realization. The above relation dependence aspects apply to any natural systems - from atoms to cognitive-mental systems.

5. This work attempts to analyze selected problems of the ontology of mind from the perspective of various theories of reduction and emergence. According to the position that in many variants runs through the work from its beginning to its end, the future ontology of mind should incorporate the postulates of the theory of emergence. Additionally, the claims of such a theory must be verified with respect to their empirical adequacy and analytical correctness.

The empirical adequacy condition requires that the emergence theory postulates should be consistent with the entirety of the scientific knowledge on cognitive-mental processes and with the results of sophisticated philosophical research (including analytical, phenomenological and hermeneutical), whereas the analytical correctness condition requires that the emergence theory postulates should not result in logical and conceptual difficulties (in particular that they should not generate contradictions, of which the classical theories of emergence had been accused). The structure of an ontological theory concerning the place of the mind in a physical world that would meet the above conditions is attainable exclusively due to wide-scale empirical, logical-analytical and philosophical research.

Although the literature on the subject contains a number of valuable monographs, articles and anthologies devoted to the problems of psychophysical reduction and emergence, the author's comprehensive proposal exceeds the existing works with respect to the scope and arrangement of the examined controversies and the way they are dealt with. This work is also inventive in some respects. The following proposals deserve particular attention:

- precise differentiation between the distinct meanings of the terms: "reduction" and "emergence";
- demonstration of a connection between the theory of psychophysical emergence and the problem of mind research interdisciplinarity;
- coordination of the emergence theory with the well grounded empirical knowledge on cognitive-mental processes;
- interpretation of psychophysical relations as interlevel relations which have their correlates in intertheoretical and interdisciplinary relations;
- critique of the dualistic approaches to the categories *the mental* and *the physical*, which assume an erroneous conceptualisation of psychophysical relations and result in a disjointed attitude to the mind and the physical world;
- critique of radical versions of psychophysical reductionism with a simultaneous incorporation of the moderate reductionism postulates (consistent with the emergence theory);

- demonstration of the fundamental limitations of the programmes of micro-reduction and functional reduction in relation to mental states;
- analysis of the extended mind theory and the controversy externalism-internalism in the broader context of the general systems theory;
- reconstruction of ontological and methodological assumptions of the cognitive neuroscience and the neurocognitive theory of consciousness;
- indication of the possibility to explain the "dualistic illusion" on the basis of the cognitive neuroscience results;
- critique of the fundamental theories of mind from the emergence theory's perspective;
- formulation of an integrated ontology of mind programme: (i) combining the results of scientific and philosophical mind research, (ii) incorporating mental processes in the multilevel structure of a physical world, (iii) granting mental states a relative autonomy, despite their dependence on the base processes.