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I. The Background of the Research

This research has been started from a more general question which investigated the theories of cultural evolution [13]. On the one hand it led to that hypothesis that beyond the received evolutionary analogies (e.g. Dawkins, 1976) it is worth investigating the topic in detail from a general theory of evolution (pl. Csányi, 1982; 1988), and on the other one, it led to that conclusion that for the sake of the successful research it is worth critical investigating the ruling Neo-Darwinian evolutionary theory in detail [11]. The philosophy of Michael Polanyi and his concept of evolution correspond to both requirements; furthermore Csányi quotes Polanyi’s theory of boundary conditions as one of the most important fundaments of his General Theory of Evolution [14], (Csányi, 1988), so it seemed worth investigating Polanyi’s concept of evolution in detail.

Nonetheless, Polanyi’s concept of evolution cannot be understood but from his concept of emergence –“…evolution can be understood only as a feat of emergence.” (Polanyi, 1962) So it seemed necessary that this research had to be run out into the detailed investigation of these two close connected concepts.

The main interval of Polanyi’s philosophical activity was taken place at the ‘50s and ‘60s when the theory of evolution became wildly accepted in the scientific and philosophical thinking thanks to the Neo-Darwinian synthesis of the ‘30s and ‘40s. Nevertheless it did not help Polanyi’s efforts connecting to the concept of evolution; moreover, it became a great obstacle for him because the Neo-Darwinian synthesis stands on the fundaments of that mainstream “critical” scientific/philosophical notion which was his aim to displace by a “post-critical” philosophy. According to this the concept of
evolution became a key issue for him because of a twofold reason; on the one hand, he tried to substantiate his novel post-critical philosophical approach by it, and on the other one, he had to substantiate an effective critic on Neo-Darwinism and sketch a new kind of evolutionary concept on the basis of this novel post-critical philosophical approach.

The close connected concept of evolution has also a key issue for Polanyi because this could permit to him to resituate man and the sciences and arts of him in a world which was fundamentally regarded as material. Although in the '50s and '60s he did not have to face with a ruling, alternative theory of emergence, as that was in the case of evolution, thanks to the British Emergentists (J. S. Mill, 1843; S. Alexander, 1920; L. Morgan, 1923; D. C. Broad, 1925) the concept of evolution needed a reinterpretation inevitably in such an atmosphere where commitment for reductionism was a widely accepted standpoint. Furthermore it is an obstacle in front of the appropriate interpretation of Polanyi’s unique concept of emergence that the reborn emergentism of the last decades of the 20th century uses the concepts of the British Emergentism ignoring Polanyi’s one and it is an obstacle too that extraordinarily he uses in two significantly different senses of emergence (conceptual and existential kinds of emergence).

According to all these Polanyi is not in the focus of the mainstream researches both in the case of the concept of emergence and evolution; if partly even so because of the significant conceptual and philosophical differences it leads to complete confusions and misunderstandings (e.g. Clayton, 2003, 2004).

At the same time, the philosophy of Michael Polanyi is in the focus of several researches in nowadays too, for example, now altogether three periodical are engaged in Polanyi (Appraisal, Polanyiana, Tradition and Discovery), thus also at the research place of the author several papers, presentations and PhD dissertations were born concerning to the philosophy of Polanyi. These works, however, never were focused on his concepts of evolution and emergence and tried to give a detailed picture of them, furthermore the system-theoretical interpretation and the contextualization of his concept in the emergence discussion of the 21 century is entirely unique.

2. The Goals of the Research

According to the above the authors’ aim was to sketch the most coherent possible picture of Michael Polanyi’s concept of emergence and evolution and to show that he has unique, absolutely new concepts, so there is no room for such accusations that he is a vitalist or a strong emergentist in the standard sense. On the basis of his theory of boundary conditions and of his theory of personal knowledge his approach to the topics is rather a system theoretical one.

So the first goal of the research was the identification and differentiation of those Polanyian theories which determine his concepts of evolution and emergence (tacit knowing, tacit knowledge, theory of boundary conditions, and the concept of personal reality).

This was followed by the detailed philological and logical analysis of the Polanyian texts then the system-theoretical reconstruction and contextualization of the concepts. In the case of his concept of evolution Csányi’s General Theory of Evolution while in the case of the concept of emergence the theory of Roger W. Sperry (Sperry, 1969, 1980, 1986) proved to be fruitful.
The importance of the research, on the one hand, follows from that it contributes to the international Polanyi-research from a new perspective (regarding both to its topics and its consequences to such territories which have been already analyzed in detail), and on the other one, from that it led to such theoretical results which will be utilizable both in the case of the theories of cultural evolution and in the contemporary emergence debate [6].

3 The Methods of the Research

The dissertation is fundamentally based on the detailed philological and logical analysis of the Polanyian texts. It was followed by the comparative studies of the texts to the secondary literature and then by critical analysis and system-theoretical reconstruction of the Polanyian theses.

4. New Philosophical Achievements

**Thesis I, Logical Severability:** The theories of tacit knowing and tacit knowledge which are always discussed together by Polanyi can logically be separated and only the consequence of tacit knowledge is emergence [4].

The tacit knowing is fundamentally the consequence of the “compelling clues” in the background which though we are not attending to still specify the object of our cognition. The clues are not necessarily tacit in themselves. So it is logically possible that someone has only explicit knowledge in itself and his knowing is still tacit.

It follows that it can be clearly differentiate between such an object which is undeterminable because it has “tacit relationship” with the compelling clues and such an object which is that because its higher level structure recognized by our previous tacit knowledge is undeterminable compared to its lower level topography described by our explicit physical knowledge.

Polanyi speaks about emergence merely in the latter one in accordance with the general concept of emergence which describes the relationship of a given thing and its parts.

**Thesis II, Conceptual and Existential Emergence:** Although Polanyi is interested only in the existential emergence and he always uses the word in this sense it can be shown that according to his theory that emergent structures which are not the achievements of evolution merely the consequences of the structure of tacit knowing are emergent only in the conceptual sense [2]; [4].

Polanyi states that we can distinguish two different types of boundary conditions. One of them is the test-tube type which has no influence on the elementary processes taking place within; and the other, the machine type which has the function of controlling and harnessing the elementary physical and chemical processes for the sake of a kind of purpose. (Polanyi, 1969b) The two types of boundary conditions are not in full contrast to each other: every machine type boundary condition is also a test-tube type boundary condition.

The test-tube type boundary conditions are merely recognized in the nature by us while the machine type boundary conditions are the achievements
of an evolutionary process independent from us [1]; [3]; [5]; [8]. (Polanyi, 1969b)

According to Polanyi’s new, personal concept of reality [2] in contrast to the test-tube type boundary conditions the machine type ones are real in themselves.

So the differentiation are substantiated by the theory of boundary conditions, according to which the conceptually emergent comprehensive structures are in themselves not real test-tube type, while the existentially emergent ones are real machine type boundary conditions also in themselves.

**Thesis III, The Ordering Principle of Evolution:** According to Polanyi’s theory evolution is a teleological developmental process determined by a higher level ordering principle thus it can be regarded as the gradual cumulating of (functional) information (knowledge) which again and again generates new emergent levels and principles [1]; [3]; [4].

It follows from the logical structure of machine type boundary conditions that a higher level structure which is random compared to its physical topography cannot be the consequence of lower level random processes merely of a higher level ordering principle [1]; [3]; [4].

Since for the Neo-Darwinian theory of evolution there is only one fundamental principle in the process of evolution, namely the Darwinian natural selection, which is a lower level random mechanical process, it cannot be the ordering principle of evolution in itself [1]; [3]. [5]; [8]. According to Polanyi, “the ordering principle which originated life is the potentiality of a stable open system…” (Polanyi, 1962)

Since Polanyi does not regard the higher emergent levels as substantial only as purposefully functioning operational principles which control and harness lower level processes according to Vilmos Csányi’s General Theory of Evolution we can describe the developmental process of evolution which leads to new operational principles and emergent levels as the gradual cumulation of (functional) information (knowledge) [1]; [3]; [4]. (There is no sharp boundary between the biological and cultural stages of evolution; it is true for both of them.)

**Thesis IV, Medium Emergence:** Polanyi’s dual concept of emergence cannot be put onto the framework of the standard theories of weak (epistemological) and strong (ontological) emergence. It can be regarded as a kind of medium emergence along with the theory of Roger W. Sperry [4].

Although conceptual emergence can be closely connected to weak emergence, existential emergence cannot be put onto the framework of the standard theory of strong emergence (e.g. Mill, 1843; Alexander, 1920; Morgan, 1923; Broad, 1925). The essential differences are the followings: In the case of strong emergence there are objective ontological higher levels, whereas for Polanyi although the higher levels are existential but not objective, otherwise Laplace’s demon would see them. In the classical case of strong emergence the typical emergent level is the chemical one on which the biological and then the psychological are built, whereas for Polanyi there are several levels starting with the first primitive cell—but the chemical is not a distinct one—and the structure of these levels are connected to the machine type boundary conditions. In the case of strong emergence the
higher levels are causally active, moreover, in a mechanical way (McLaughlin, 1992), whereas for Polanyi the activity of higher levels is our necessarily teleological understanding of the processes (Polanyi, 1969b; 1967). So in the case of strong emergence there is downward causation which breaks the causal closure of the physical domain but for Polanyi there is no downward causation (Polanyi, 1969a) and nothing breaks the causal closure of the physical domain otherwise Laplace’s demon could not “compute all future configurations of all atoms throughout the world.” (Polanyi, 1959)

One can understand Polanyi’s concept of emergence as a kind of medium emergence (from the concept of “medium downward causation” of Claus Emmeche et all (Emmeche, 2000)) because it is clearly stronger than the weak one—for Polanyi there are existential and active higher levels—but weaker than the strong one—there is no downward causation and nothing breaks the causal closure of the physical domain. One can classify into this category of medium emergence the concept of the famous neurophysiologist Roger W. Sperry which is very similar in several aspects to Polanyi’s one. (See e.g. Sperry 1969; 1980; 1986 or Emmeche, 1997; Hodgkin, 1992)

Thesis V, System-Theoretical Approach: The accusation that Polanyi is a vitalist can unambiguously confuted because he corresponds to the definitions of physicalism. His approach to evolution and emergence is unambiguously a system theoretical one. This is the source of its coherence [1]; [3]; [4].

Tim Crane asserts that physicalism claims that after putting all the particles in place and setting up all the fundamental physical laws God’s work is done. (Crane, 1991, 2001) This means that in principle, every possible future setting of the fundamental particles can be computed, as we have seen that in the case of Laplace’s demon in absolute accordance with Polanyi’s position (e.g. Polanyi, 1959). According to him the causal closure of the physical domain is not broken by the emergence of new levels, this new levels build up on it like another floor to a house.

Furthermore the higher emergent levels are not the consequences of a vital substance but of a higher level emergent ordering principle [1]; [3]; [4]; [5]; [8].

5. Utilization of the Achievements

The achievements of the dissertation have important theoretical contributions for the international and Hungarian Polanyi-research in themselves. Furthermore they involve the possibility of further interpretations and alternatives concerning to both the international emergence debate and the theories of evolution the elaboration of which seems to be very fruitful. In accordance with this the achievements of the dissertation have been partly utilized by the author himself [6], just as he has already been working on the elaboration of the Polanyi-interpretation called “medium emergence” of his theory of emergence which was suggested in section 5 of the dissertation.
6. References


Craine, Tim. 1991. All God Has to Do. *Analysis, 51*, 235-244.


gate.


7. Publications Connecting to the Theses


8. Other Publications


