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The Fundamental Question of Philosophy in the Historical-Philosophical Context

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Abstract

This article focuses on the relativization of the so-called "fundamental question of philosophy." In Marxist philosophy, this question was considered eternal and immutable. However, it was formulated by F. Engels within the context of the 19th-century scientific revolution. Following Engels' logic and his positivist approach, each scientific revolution brings modifications to the fundamental question. The same occurred during the quantum revolution when the fundamental question shifted to the status of reality and methods of studying it. A productive discussion between Einstein and Bohr significantly advanced the understanding of physical reality and its exploration. The EPR (Einstein-Podolsky-Rosen paradox) thought experiment effectively introduced the concept of a quantum communication channel, forming the basis for the next scientific revolution: the revolution in quantum computing. Philosophy is proposed to play a more elevated and meaningful role than merely serving as an intellectual janitor. Instead, philosophy can act as a scout, charting the intellectual landscape that physics may later inhabit. Furthermore, the concept of quantum artificial intelligence emerges. It necessitates developing an acceptable understanding of consciousness and intelligence and determining the basis of human consciousness—whether it is rooted in logic or something deeper that we tend to overlook. Until these questions are resolved, the issue of Artificial Intelligence will remain a philosophical pseudoproblem. Thus, the modern formulation of the fundamental question of philosophy becomes: What is consciousness? How can this phenomenon be adequately studied?

Keywords: *fundamental question of philosophy, scientific revolution, consciousness, artificial intelligence, physical reality.*

Introduction

In 1886, Friedrich Engels published the pamphlet Ludwig Feuerbach and the End of Classical German Philosophy. In the second chapter of this work, he articulated what would later be known as the fundamental question of philosophy:

"The great fundamental question of all philosophy, especially of modern philosophy, is the question of the relation of thinking to being. The question of the relation of thinking to being—of whether spirit or nature is primary—played a significant role even in medieval scholasticism. Opposed to the church, however, it took on a sharper form: is the world created by God, or has it existed forever?

But the question of the relation of thinking to being has yet another aspect: how do our thoughts about the world surrounding us relate to the world itself? Is our thinking capable of understanding the actual world? Can our ideas and concepts about the real world accurately reflect reality? In philosophical terms, this question is called the question of the identity of thinking and being." [1, p. 31]

Engels' thesis was expressed within the context of the 19th-century scientific revolution, marked by significant developments such as the discovery of the cell, the law of conservation of energy, and the emergence of Darwinism as a scientific ideology. However, a new revolution was already on the horizon. On February 26, 1896, physicist Henri Becquerel accidentally discovered the phenomenon of radioactivity. This revolution unfolded under the dramatic banner of "Matter has disappeared!" due to subsequent discoveries, including the divisibility of atoms and X-rays.

The electron became a favorite subject of philosophical inquiry. In unveiling an object, scientists typically test the hypothesis of its existence. In 1897, J.J. Thomson discovered that "corpuscles" emitted from

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cathodes had mass, thereby identifying negatively charged particles. R.A. Millikan continued Thomson's work, determining the electron's charge in 1908. Thus, scientists did not merely prove the existence of the electron; they interacted with it. As electron research progressed, instruments were developed, enabling discoveries in other fields of science. Over time, the electron transitioned from being a theoretical construct to an experimental subject. Many physicists adopted a realist stance toward certain theoretical objects they worked with. In 1897, W. Kaufmann measured the mass-to-charge ratio (m/e) of cathode rays and their mass. While his measurements were more precise, Kaufmann's philosophical convictions prevented him from identifying what he observed as a distinct particle [2].

Following Engels' logic and his positivist perspective, each scientific revolution transforms the fundamental question of philosophy. The same occurred during the quantum revolution. Quantum theory arose through the collective efforts of dozens of physicists working over approximately three decades. Among this formidable cohort of researchers, the most authoritative figure proved to be the great Dane, Niels Bohr.

The Copenhagen interpretation asserts that quantum physics is not a description of a quantum world populated by atoms and subatomic particles. Instead, it is merely a tool for calculating the probabilities of various experimental outcomes. This interpretation allows nothing beyond the prediction of quantum event probabilities. Quantum objects do not exist in the same way as the everyday world around us. This redefines the fundamental question of philosophy into one concerning the status of reality and the means of studying it.

Quantum mechanics resembles a vortex, mixing everything imaginable—from consciousness and parallel universes to eternal life and free will.

The debate between Niels Bohr and Albert Einstein centered on the physical meaning of the wave function. According to Einstein, the key concept was the state, which is objective and independent of any knowledge about it. Bohr, however, argued that the wave function describes both the state and the knowledge about that state. Bohr emphasized the need to reconsider traditional views on the problem of physical reality [5].

Another point of contention in the Einstein-Bohr debate was Werner Heisenberg's uncertainty principle. Einstein argued that the uncertainty inherent in the Copenhagen interpretation rendered quantum mechanics incomplete and inconsistent. Bohr, Heisenberg, and Wolfgang Pauli defended their interpretation, eventually convincing Einstein that it was self-consistent. Nevertheless, Einstein maintained that it was incomplete, continuously seeking new arguments to prove that quantum mechanics could not fully reflect the entirety of physical reality.

The article "Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?" [4] was a brief publication in Physical Review. In this work, Einstein, Boris Podolsky, and Nathan Rosen delineated the distinction between physical reality as such and its physical interpretation. Objective reality, they argued, is independent of physical theories and concepts. However, the concepts employed by a theory, insofar as they correspond to objective reality, enable us to conceptualize physical reality.

Einstein, Podolsky, and Rosen proposed two criteria for the success of a physical theory:

1. Is the theory correct?

2. Does the theory provide a complete description of physical reality?

They considered the ability of a theory to reflect elements of objective reality in its framework to be a necessary condition for completeness. To this end, they defined an element of reality but refrained from defining physical reality itself, deeming such a definition unnecessary for addressing their primary objective.

Albert Einstein, Boris Podolsky, and Nathan Rosen outlined criteria to identify an element of reality: "If, without disturbing a system in any way, we can predict with certainty (probability equal to 1) the value of a

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physical quantity, then there exists an element of physical reality corresponding to this physical quantity" [4, p. 605].

Einstein sought to demonstrate that Niels Bohr was incorrect in asserting that quantum mechanics is a complete and fundamental theory. He argued that there are elements of reality that quantum mechanics cannot account for. While Einstein acknowledged that quantum mechanics is internally consistent, he shifted the discussion toward the nature of reality and the relationship between physical theories and that reality. EPR contended that for a physical theory to be complete, there must be a correspondence between elements of reality and elements of the theory.

The absence of a clear relationship between reality and theory, they argued, indicates the incompleteness of the physical theory. This situation is analogous to a person borrowing a book from a library that cannot be recorded in their lending history. Even if the librarian insists that the book is not listed in the catalog, the library's markings on the book confirm its origin. The only explanation for this scenario is that the catalog is incomplete.

Bohr responded by publishing a paper with the same title in Physical Review: "Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?" [3]. He found EPR's arguments on the incompleteness of quantum mechanics unconvincing and challenged their criterion of physical reality. Bohr identified a weak point in Einstein's argument: the claim that measurements could be performed without disturbing the system. Bohr countered that attempting to simultaneously determine the momentum and position of a particle is impossible because measuring one characteristic inherently disturbs the other.

Einstein, Podolsky, and Rosen, however, did not dispute Heisenberg's uncertainty principle. In their thought experiment, they avoided simultaneous measurements of momentum and position. For Bohr, the concept of measurement was critical, as the "element of reality" defined by EPR relies on the use of measuring instruments.

EPR also assumed that particles do not interact with each other and that the actions of one particle do not disturb another. Bohr, in contrast, argued that particles are interrelated, forming parts of a single system, and cannot be treated as independent entities. Therefore, measuring the momentum of particle A simultaneously determines the momentum of particle B because the act of measurement assigns momentum to the second particle. Bohr maintained that measuring one particle influences the other.

In classical physics, the interaction between the instrument and the object of study is not significant, while in quantum physics, such interaction is an essential part of the phenomenon. Consequently, the description of a phenomenon in quantum physics includes a description of the apparatus on which the experiment is conducted.

Data about objects in quantum physics obtained from the apparatus complement each other. This complementarity provides possible answers that account for the fact that the object of study and the measuring apparatus are inseparable parts of the phenomenon.

N. Bohr believed that all ambiguities disappear if the concepts of phenomenon and measurement are understood unambiguously:

1. A phenomenon is something about which one can be unambiguously informed.

2. Measurement is a quantitative characteristic.

Correct terminology must be used in those areas where the concepts of classical physics cannot be applied. Another condition is the consideration of all mental setups. If these conditions are taken into account, it becomes evident that quantum mechanics meets the requirements of consistency and completeness, just as classical physics does.

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According to N. Bohr, the consistency of quantum mechanics becomes apparent when considering the results obtained using instruments under specific experimental conditions.

Bohr indicated that the concepts of relativity and complementarity, despite their differing applications, are epistemologically similar. Both relativity and complementarity explore regularities that cannot be encompassed by representations suited only to depict physical facts in a limited domain. An important condition is that the expansion of concepts occurs without reference to the observing subject. Such a reference would prevent the unambiguous transmission of facts.

Similar situations arise in other fields of science. The complementary approach is used when describing the integrity of organisms, humans, and cultures. The transmission of information in such cases implies the use of an extensive glossary, leading to the distortion of the meanings of terms, the emergence of connotations, etc., as a result, concepts may be misinterpreted. However, N. Bohr rightly noted: "... we are dealing not with vague analogies, but with clear examples of logical connections that in various contexts exist in broader areas of knowledge" [6].

Quantum mechanics is like a vortex in which everything in the world is mixed, from consciousness and parallel universes to eternal life and free will. Only quantum mechanics provides us with the scientific foundation that allows us to understand what a human being is at a fundamental level.

The concepts of complementarity and entanglement highlight the differences between the quantum and classical worlds. Complementarity indicates that an object possesses properties that are inaccessible to the observer. Entanglement is a quantum property similar to correlation, but not identical to it. Entangled states are the result of interaction or decay of quantum systems. Such entanglement is also possible for two particles that once interacted and later flew apart.

To unify quantum mechanics and general relativity, it is necessary to resolve the contradiction between entanglement and local realism. J. Harris remarked, "Why is it that the time we are living in is the most fascinating and the most uncertain in human history in terms of understanding reality?" [7, p. 13].

What is the role of philosophy in this context? I would like to propose a more interesting and elevated role for philosophy than that of an intellectual janitor: philosophy can be a scout. It can be a trailblazer — mapping the intellectual landscape that later will be inhabited by physicists. Far from all areas of natural sciences were pre-explored by philosophy, but some were.

Quantum computing seems to be a prime example. S. Aaronson believed: "At least in quantum computing, what we like to consider — the capacity of quantum channels, error probabilities in quantum algorithms — are things that no one would have thought to consider if it weren't for philosophy" [8].

Thus, the quantum revolution has evolved into a revolution of quantum computing and the associated field of artificial intelligence.

The law of conservation of energy and the second law of thermodynamics, which prohibit the creation of a perpetual motion machine, are fundamental prohibitions. A similar role is played by R. Penrose's theorem in relation to the possibilities of artificial intelligence.

R. Penrose argued that a device may possess enormous power, but certain aspects of human thought will remain inaccessible to it. In discussions about the potential for artificial intelligence to surpass humans, the power of the computer does not matter if we are talking about computers as we understand them today. The most powerful computer cannot think better than a human in all respects, as in some areas, human thinking will still be superior.

The structure of the computer is described finitely, as a finite formal system. It is also assumed that the computer performs justified, correct procedures. This property of the computer corresponds to the consistency of the axiom system in K. Gödel's work. The computer must be flexible in order to implement

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an algorithm that allows it to analyze its own algorithms for the ability to stop. This condition corresponds to the requirement of sufficient strength in K. Gödel's work. If the computer does not meet this condition, its capabilities are inferior to those of a human. Just like in Gödel's theory, a true statement can be created for the computer, but its truth cannot be proven by a finite computer. In this statement, Gödel-Turing theory is analogous to Gödel's theorem.

R. Penrose proposes a proof by contradiction: there exists a computer capable of using mathematical judgment in the same way a mathematician does, and in terms of mathematical abilities, such a computer is equal to the mathematician. According to the Gödel-Turing theory, the mathematician is capable of constructing a true statement, but for the computer, the truth of this statement will be inaccessible. A contradiction arises: the computer possesses all the mathematical abilities of a mathematician but cannot prove the truth of a statement that the mathematician has constructed. Therefore, the computer does not possess all methods, and some methods are beyond its capabilities. Consequently, humans possess abilities that are inaccessible to computers. Such abilities (implicit knowledge) were studied by H. Dreyfus. The existence of such human abilities, which are beyond the capabilities of computers, is precisely what R. Penrose's theorem proves. Penrose himself referred to this ability as the non-computational activity of the brain. This non-computational activity of the brain relies on problems that are not solvable algorithmically. For Penrose, quantum gravity — a stumbling block for science — may be related to the brain.

The brain is not a quantum computer, but a quantum-gravitational computer. The brain may serve as a testing ground for the study of fundamental physics, much like the Large Hadron Collider and orbital telescopes [9].

However, the fundamental issue of consciousness remains unresolved. How are the material basis of consciousness, the human brain, and ideal images related? The central question of philosophy transforms into the questions: What is consciousness? Is humanity rightfully the most intellectual being in the observable universe?

The issue of artificial intelligence arises. It is quite possible that the key to artificial intelligence (AI) lies in quantum theory. One promising direction for development may be the integration of AI and quantum computers, which would allow the merging of the power of these two fields to address numerous problems. AI and quantum computers complement each other. AI has the ability to tackle new, complex tasks, while quantum computers can provide the necessary computational power. AI, supported by the computational power of quantum computers, could handle more complex problems. The brain is a pattern-seeking, self-learning machine based on neural networks. Over time, neural networks may solve one of AI's most complex problems: the so-called "common sense problem." Things that people take for granted, and which are easily understood even by children, remain inaccessible to the most advanced computers. This is due to a lack of computational power. Quantum computers perform calculations across vast arrays of qubits simultaneously, exponentially increasing their power. Quantum computers will benefit from their ability to learn new things. AI will benefit from the enormous computational power of quantum computers [10].

Generative AI, based on large language models, does not always function as is often claimed. It is a black box, the working principle of which is not understood. Engineers know how to create these systems, but they cannot predict what exactly they will output at any given moment. Large datasets are fed into the system, and sometimes the output yields correct answers [11].

The mirror in which a person looks is artificial intelligence. Initially, there were discussions about what artificial intelligence lacks compared to human consciousness and why it is impossible. For example, this includes tacit knowledge or qualia. But why does it need all of this? Are we trying to create a copy of a person, or something else capable of solving ultra-complex problems?

In the second case, humans, as a species, act as a species-generating entity.

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There is an anecdote about the renowned mathematician Nikolai Vasilievich Bugaev (1837–1903), the father of poet Andrei Bely. Once, N. Bugaev was walking through the university and saw an announcement about a seminar titled “Do Animals Have Thinking?”. He attended the seminar and began asking everyone what thinking is. No one could answer the question. As a result, Nikolai Vasilievich closed the seminar for lack of a subject for discussion.

The moral of this story is as follows: we must develop an acceptable concept of consciousness and intelligence, determine what constitutes the foundation of human consciousness—logic or something deeper, something we tend to overlook. Until these questions are resolved, the problem of artificial intelligence will remain a philosophical pseudoproblem.

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