Science and irrationalism or the generalized complementarity principle of Bohr

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Abstract

The article formulates and substantiates the philosophical epistemological principle, which generalizes the principle of complementarity of Bohr to all phenomena of reality.[1],[2] The general complementarity principle is formulated as follows: the rational side of reality and its cognition and its associated irrational side of reality and its cognition are complementary to each other. The general principle of complementarity allows one to search for phenomena of duality in various fields, grouping them according to rational and irrational signs.

1 Introduction

The law of nature is expressed the simpler, the more general it is. Max Planck

The complementarity principle was discovered by Bohr in 1927 and is an important principle of quantum mechanics. The essence of the principle of complementarity of Bohr in physics is as follows. In any experience with micro-objects, the observer receives information not about the properties of objects in themselves, but about the properties of objects in connection with a specific situation, including, in particular, measuring instruments. Information about the object, obtained under certain specific conditions, should be considered as additional to the information obtained under other conditions. Moreover, the information obtained under different conditions cannot be simply added, summed, combined into a kind of unified picture; they reflect different (complementary) sides of a single reality, corresponding to the object under study. The principle of complementarity finds its direct expression, in particular, in the idea of wave-particle duality and in uncertainty relations. The need to describe the properties of quantum objects in the classical language of measuring devices leads to many paradoxes. According to the complementarity principle formulated by Bohr in 1927, the solution of these paradoxes lies in the additionality of the classical description and the quantum properties of microobjects. Depending on the measurement conditions, the electron acts either as a wave or as a particle. The definition of the particle trajectory masks its wave properties. Interference experience leaves a trajectory uncertain. The classic description and wave properties are complementary.

After the initial formulation of the complementarity principle in physics, Niels Bohr did a great job of researching the use of the notion of complementarity in other fields of

knowledge. He considered this task to be no less significant than purely physical research. He substantiates the idea that the two approaches — biological and physicochemical — are complementary. According to Bohr, the fundamental difference between biological and physical research makes it impossible to establish firm boundaries for the application of physical ideas to the solution of biological problems, boundaries that in quantum mechanics would correspond to the difference between a causal mechanistic description and a description of quantum phenomena proper.[3]

Let's see, said Bohr, from this point of view on the phenomena of life. Are biological laws reduced to physicochemical processes? Not! The laws of living matter, although determined by the laws of physics and chemistry, are not reduced to them. Bohr substantiates the idea that the two approaches — the biological and the physicochemical — are complementary. Biological and physical studies are not comparable, since for those and others there are limited areas of reality. After all, if we imagine a completely destroyed living organism, then how do we know what is the role of individual atoms in life processes? In any experiment on a living organism there is some uncertainty in physical conditions, and therefore the thought arises that the minimal freedom that we have to give the body is just enough to allow it, so to speak, to hide our last secrets from us. From this point of view, the very existence of life should be considered in biology as an elementary fact, just as in atomic physics the existence of a quantum of action should be taken as a basic fact that cannot be derived from ordinary mechanical physics.

According to Bohr, the fundamental difference between biological and physical research makes it impossible to establish firm boundaries for the application of physical ideas to the solution of biological problems, boundaries that in quantum mechanics would be the difference between causal mechanistic description and description of quantum phenomena. Bohr believes that biological laws are complementary to laws to which inanimate nature obeys.

At one time, Niels Bohr was influenced by his father's interests. His father, Christian Bohr, was a renowned physiologist, the author of classic works on the physico-chemical processes of respiration. Despite his interest in physics and chemistry, he adhered to finalistic views, considering that biological laws should be perceived from the point of view of expediency, and not as a result of physicochemical laws. His work gave impetus to lively discussions on one of the main themes of that time - about vitalism and mechanism. Vitalism (from the Latin. Vitalis - "vital") - the doctrine of the presence in living organisms of non-material supernatural power that controls the life phenomena - "vital force" ("soul", "entelechy", "archaea", etc.). The theory of vitalism postulates that processes in biological organisms depend on this force, and cannot be explained in terms of physics, chemistry or biochemistry. Subsequently, this led Niels Bohr to the idea that a correct understanding of the living is possible only on the basis of the idea of the complementarity of physical and chemical causality and a biological purposefulness.

Bohr reflected a lot on the use of the concept of complementarity in psychology. He said: "We all remember the old saying that, trying to analyze our feelings, we stop experiencing them. In this sense, we find that between psychological experiments to describe which it is adequate to use such words as "thoughts" and "feelings", there is a complementarity relation, which exists between the data on the behavior of atoms. "[3] Bohr suggests that in this area there are reciprocal relationships that are due to the single nature of consciousness and strikingly resemble the physical consequences of the existence of a quantum of action, since the continuity of thinking and the preservation of individual

personality in relations between people are similar to the wave description of material particles while maintaining their individuality in the process of interaction. Trying to critically comprehend any strong feelings, say, love or godly affection, we immediately destroy these very feelings. But if, on the other hand, to give in to feeling, then it is hardly possible to think it over at this moment.

Bohr compares the measurement process in a quantum system with the effect of a targeted will, either his own or that of others, on the human consciousness. According to Bohr, finding the verbal equivalent of a thought is analogous to the effect of measurement on a quantum object.

According to Bohr, the physical picture of the phenomenon and its mathematical description are additional. Creating a physical picture of the world requires the neglect of details and leads away from mathematical accuracy. Conversely, an attempt to accurately describe the mathematical phenomenon makes it difficult to understand clearly. Indeed, the mathematical description is based on logic, while the physical picture of the world is based on guesses, intuition, images. To the question "What is an additional concept of truth?" Bohr answered "Clarity."[4]

Since her student years, Bohr has been (under the influence of the book by Paul Moller, The Adventures of the Danish Student) the problem of free will and determination. The Danish philosopher Soren Kierkegaard also had a strong influence on Bohr. According to Kierkegaard, the new arises unexpectedly. He denies the element of continuity that remains in the transition to a new quality. A new quality appears suddenly and mysteriously. A leap is illogical, inaccessible to rational understanding, does not follow with logical necessity from the previous state, is irrational.

Bohr also believed that free will and a sense of responsibility as well as mercy and justice are in additional relations to each other. Bor sees the common goal of all cultures in the closest combination of justice and mercy that can be achieved; nevertheless, it should be recognized that in every case where the law must be strictly applied, there is no room for charity, and vice versa, benevolence and compassion may conflict with the very principles of justice. The human community realizes the complementarity of justice and mercy in the bundle of the institute of state judicial bodies, guided in their activity by the letter of rational laws and jury courts, more susceptible to irrational feelings.

If we group the additional pairs established by Niels Bohr, we get the following list:

- Corpuscular and wave properties of a particle;
- Physical and chemical processes and biological processes;
- Mechanism and vitalism;
- Physick-chemical causality and biological purposefulness;
- Thoughts and feelings;
- The mathematical description of the phenomenon and the physical picture of the phenomenon;
- Truth and clarity;
- Determinism and free will;

- Justice and mercy;
- Quantity and quality;
- Logic and intuition;

In the above-established paired relationships, a general pattern can be traced: the rational side of reality is displayed on the left, and the irrational side of reality is on the right. Thus, the general principle of complementarity of Bohr can be formulated as follows: the rational side of reality and its associated irrational side of reality are complementary to each other.

Regarding the first pair, we note that the wave properties of a single micro-object are irrationalism, since from the point of view of rational thinking a single micro-object cannot simultaneously pass through two spatially separated slits and interfere with itself. However, it is precisely such phenomena that occur in the microworld. As the famous physicist Richard Feynman put it: "I can safely say that nobody understands quantum mechanics ... No one knows how to dig deeper here. Even nature itself does not know which way the electron will fly".[5] De Broglie waves have nothing to do with classic waves. Einstein called them "ghost" waves. This is due to the fact that the probabilistic laws of nature do not follow the rule of adding probabilities, but they require the addition of probability amplitudes. In nature, there are two phenomena of interference: classical interference due to the addition of waves, and quantum-mechanical interference due to the addition of probability amplitudes (or the so-called wave functions). The probability amplitude is a certain complex number, the square of the modulus of which is equal to the probability of a micro-object moving from the initial to the final state. In essence, the probability amplitude (state vector) is an irrational quantity that has no analogue in classical physics.

Erwin Schrodinger was the first to explicitly find the equation for wave mechanics and based on it a rigorous method for dealing with quantization problems. This equation, obtained by transforming classical equations in the Hamilton representation, has the peculiarity that not all of its coefficients are real numbers; it includes imaginary numbers. In classical physics, the equations of wave propagation contain only real numbers, and if sometimes real functions are replaced by imaginary functions (or, more precisely, complex ones), then we are talking only about the method of calculation. Meanwhile, in the Schrodinger wave function (probability amplitude), imaginary coefficients are fundamentally irremovable and therefore seem to be characteristic of the very phenomenon that they describe. In other words, if in classical physics, waves correspond to oscillations of a real-life medium (for example, air at sound waves), then a wave in wave mechanics cannot be considered as a physical reality corresponding to the oscillations of a certain medium. Such a wave as a wave conjugated with a particle, not carrying energy and propagating in multidimensional space, cannot be attributed physical existence; it is the "fictitious wave," as de Broglie called it, or the "ghost wave," as Einstein called it. This wave is an "irrational" wave.

Historically, classical physics first encountered the irrational aspect of reality at the end of the 19th - early 20th century when studying blackbody radiation, explaining the photoelectric effect, explaining the laws of spectral lines in atoms (Planck, Einstein, Bor, de Broglie, Heisenberg, Schrodinger, Dirac , Born, etc.). The created apparatus of quantum mechanics, which does not contain any internal contradictions, was successfully ap-

plied to the solution of specific problems, but its physical interpretation remained unclear for a long time. To this day, there is a kind of psychological barrier that everyone who begins to study quantum mechanics to a certain extent encounters. And it's not a matter of mathematical complexity. The fact is that it is difficult to abandon the usual concepts, it is difficult to rebuild the style of thinking developed on the basis of everyday experience. This is the price that has to be paid for contact with irrational reality.

The remaining additional pairs also follow the rule "rational" - "irrational". Here it is important to emphasize that even in the most rational science - physics, at the micro level we are faced with irrationality.

2 The general definition of rational and irrational

Rational - it is a logical, theoretically conscious, systematized universal knowledge of the subject. This is in epistemological terms. In the ontological - the subject, phenomenon, action, the basis of which existence is the law, form, rule, order, expediency. A rational phenomenon is transparent, permeable, and therefore it can be expressed by rational means, that is, conceptually, verbally, it has a communicative character, can be transferred to another, can be perceived by all subjects.

Irrational has two meanings. In the first sense, the irrational is such that it can be fully rationalized. In practice, this is the object of knowledge, which at first appears as the sought, the unknown. In the process of cognition, the subject turns it into a coherent, universal knowledge. More correctly, such an irrational must be designated as "still-non-rational". The interdependence of the rational and the irrational as still-non-rational is clear enough. The subject of knowledge is facing a problem that is initially hidden from him under the veil of the irrational. Using the means of knowledge available in his arsenal, he seizes the unknown, turning it into known. The still-non-rational becomes rational, that is, abstract, logically and conceptually expressed, shorter than the known object.

The second meaning of the irrational is that this irrational is recognized in its absolute meaning - the irrational-in and of itself: that which in principle is not knowable by anyone and never. Irrationalism supposes the existence of areas of the worldview inaccessible to reason and achievable only through such qualities as intuition, feeling, instinct, revelation, faith, etc. In irrationalism, the mind, which gives rational knowledge about the phenomenal world, is recognized as useless, helpless to myself. Rational knowledge is possible only with respect to the world of phenomena, the thing itself is inaccessible to it. From the point of view of irrationalism, rational knowledge does not and, in principle, is unable to give knowledge of the essence of the object as a whole, it slides along the surface and serves solely for the purpose of orienting a person in the environment.[6]

In the general complementarity principle formulated above, we mean the second meaning of the irrational.

3 The principle of complementarity in other areas of knowledge

The general principle of complementarity allows one to search for phenomena of duality in various fields, grouping them according to rational and irrational signs. Continuing the

series further, it can be argued that in the relationship of additionality among themselves have the following pairs:

- Discreteness and Continuity;
- Finiteness and Actual Infinity; Regarding the ineradicable contradictions in the foundations of modern (rational) mathematics, which do not take into account the complementarity of rational and irrational, we recommend the book by the mathematician Morris Kline "Mathematics. The Loss of Certainty".[7] One of the author's conclusions: logic, mathematical reasoning complements intuition, in the substantiation of mathematical truths, intuition (irrational) plays the main role, and only auxiliary role is assigned to proof, logic (rational). Proof is a test of ideas suggested by intuition.
- Locality and Nonlocality;
- Plurality and Unity, integrity (one, as the expression of the ultimate indecomposability of reality into sets);[8]
- Determinism and Indeterminism;
- The space-time picture of the world (static) and the impulse-energy picture of the world (movement, process, formation);
- Real particles and Virtual particles; Virtual particles take their energy from nowhere and, having existed for a short time in accordance with the Heisenberg uncertainty principle, disappear into nowhere. This is their irrationality.
- A mixture of states and quantum superposition of states;
- Science and Art; The core of science is logic and experience. The basis of art is intuition and insight. Thoughts and feelings are close to this: thoughts can be rationally conveyed in words, feelings are irrational, words cannot express feelings.
- Reflection on the world and Dissolving in the world, merging with it;
- Phenomenon (thing for us) and Essence (Kantian "thing-in-itself"), Noumenon;
- Consciousness and Subconscious;[9]
- Starry sky overhead and the moral law in the soul (Immanuel Kant);
- Mechanical unity (part cannot be whole) and organic unity (part is whole);
- Reductionism and Holism. In their studies, physicists can do in two ways: first, isolate the phenomenon from the surrounding world in order to study it separately, and, second, try to consider the phenomenon in its connection with nature. Those who share the first point of view are endangered by the danger of "killing" the phenomenon under investigation, breaking its life-giving links with the outside world. They try to understand how the system works, studying its isolated part. Representatives of this direction are called reductionists (from the Latin. Reducere - to reduce the complex to the more simple). Another approach - the system - is based

on the study of a phenomenon or a physical object as a whole. Followers of this method are called holists (from the Greek. "Holos" - "all", "whole"). Reductionism was the leitmotif of the development of physics of the twentieth century. Scientists tried to find the "material point" of physics, its primary object, the dimensions of which could be neglected (atoms, nuclei, elementary particles, quarks and leptons, Planck black holes ...). Scientists hoped that such a fundamental object could be described with a simple and convenient apparatus of linear physics. However, having reached the Planck scale, physicists discovered that the most fundamental objects for today - Planck black holes - have a length. This is where the movement into the depths is exhausted, since on the Planck scale any measuring instruments (accelerated electrons, protons, energetic photons, etc.) inevitably turn into similar Planck black holes themselves. Deeper space is nothing to verify, measure. This heralds another crisis of physics. The germ of a new direction that could lead it out of the impasse should be non-linear methods. Non-linearity, irrationalism, inevitably inherent in the holistic approach is a new dimension and direction in the development of physics with truly unimaginable perspectives. Probably, the physical science of the XX1 century will be completely different from all previous physics;[

- The Tonal and the Nagual (the dualistic concept of reality according to Carlos Castaneda.[10] Castaneda reveals two aspects of the tonal: this is the space in which the ordinary person exists throughout life, and the organizing principle that gives meaning and value to everything related to awareness. The tonal includes everything that a person is, everything he thinks about and what he does, everything we can think about and talk about in general. Reason, thinking and the usual description of reality are the stronghold of tonal. For an ordinary person, only the known exist, and therefore A well-known experience is limited to him within the tonal, the acquisition of this experience begins from the moment of birth and ends with death. Accordingly, the nagual can be defined as everything that remains outside the tonal. This is something that cannot be thought of. Castaneda describes the tonal as an island on which the whole daily life takes place. Nobody knows what lies beyond the island. In this case, the nagual will be the space of unimaginable secrets surrounding the island. The tonal and nagual are true opposites, although in essence they are one. The tonal is what is called order, cosmos, sansara, world below. Nagual - lack of order, chaos, nirvana, the world of the high. The tonal and the nagual are in everything .. In the person's tonal, a personality is formed. Physiologically, the personality is connected with the left hemisphere of the brain, and the essence with the right. At the beginning of life, both hemispheres of the brain have right-sided functions. After the division of the functions of the cerebral hemispheres, the struggle between the senses and the mind, nagual and tonal, the devil and the guardian angel, flares up in man. Often this keeper turns into a security guard - a despot who suppresses everything that does not correspond to his ideas of morality. The right hemisphere of the brain is connected with the left side of the body, which is considered to perceive the nagual world. The left brain is connected with the right side of the body - the side of the tonal. This division is known in many mythological, religious systems. The human nagual is responsible for intuition, feelings, dreams, and will. Tonal contains a map of the world, that is, a list of all known things, concepts, etc., which have their own verbal

designation. The nagual is our individuality. He is responsible for creativity (for the tonal is only patterns and stereotypes of learned actions), for strength and unusual abilities. The nagual can create the unbelievable: the spirit of man, his will. When the nagual comes out, the tonal is compressed. For example, at the time of the flash of intuition, the internal dialogue — the attribute of tonal, dies down. At the moment of strong emotional experiences, the logical mind of the tonal recedes into the background. The perception of the tonal is limited to the world of the tonal and the person cannot perceive the nagual. To perceive the nagual, you need to get away from the usual perception of tonal. Also, to see a dream, you need to fall asleep and disconnect from the physical world. The splitting of the tonal and nagual is performed by separating the right and left hemispheres of the brain, for which various methods are used (for example, the method of such splitting can be whispering in both ears). The mysterious power hidden in a woman is the gift of the nagual. A woman is more perfect in understanding nagual. Entry into the nagual is known in India as samadhi, but the impressions of this exit are not always easy to transfer to the tonal;

- Evolutionism and creationism. The longstanding dispute between evolutionists and creationists finds its resolution in the generalized principle of complementarity. Both are right. The observed world develops evolutionarily (rationally), but the basis of matter, life and mind is creation (irrational). And any act of creativity is an irrational phenomenon. Creativity is a creative process, a process of becoming. It is always an increase, an addition, a creation of a new, not being in the world - nothing becomes something, non-being becomes being. Creativity determines the eternal process of creation, it is immanent in freedom, as it implements the existential process. Freedom is the result of the creative process as being. Freedom is comprehensible only mystically, it is inexpressible, irrational, not commensurate with any of our categories. Behind this feature, the rational mind is powerless, since it is not able to express the inexpressible. There are only mystical insights, which are the basis of creativity. That is why modern computers built on cells with Aristotelian rational logic “yes” or “no” can only calculate, but not create.Computers are programmed, but not free.

- Between ”Something” and ”Nothing”, when God, from the point of view of human mental abilities, is inexpressible in any definitions or concepts. Therefore, God turns out to be “Nothing” as a negation of any definition of God. ”Nothing” possesses the producing potentials that have the existential possibilities and ultimately turn it into ”Something”, i.e. into certain things. God determine, i.e. to endow with certain qualities, it is impossible - humanity does not have such tools of knowledge. One can only study the creations of God, since God reveals himself precisely in the creation. Only through the endless process of creation, turning “Nothing” into “Something,” can one approach God, try to comprehend and describe his transcendental, irrational essence.

- Nominalism and Realism. The world is divided into quantum objects and devices. Quantum objects are described by quantum physics, instruments are described by classical physics. The properties of quantum objects are not characterized by any fixed numbers. To describe this situation, there is the concept of relativity to the

means of observation, illustrating the "occurrence" of numerically defined properties when measuring. For example, in the special theory of relativity, the length of an object and the duration of a process characterize not the attributes of the object itself, but the "relationship" of the observed object to another object related to the observer. Without a reference system, the length and duration are something indefinite. In quantum physics, a quantum object "by itself" is described by operators, not numbers, as in classical physics, so this object is "objectively" a set of operators of observables. The number "occurs" in the measurement. Such "objective uncertainty" means that uncertainty is not related to our ignorance, but is a property of the object itself. Heisenberg said that quantum physics is close to Platonism (the objective existence of general concepts), if we speak of quantum reality, as "by itself".[11] Description in the language of operators is interpreted as the existence of "coordinates in general", "impulse in general", the principle of identity of particles as the existence of "particles in general", etc. This is the philosophy of medieval realism, arguing with nominalism on the existence of common concepts. For example, is there a "man at all", and not just specific people. Then the dispute was resolved in favor of nominalism (as in classical physics in favor of separate, concrete objects). But in quantum mechanics, the principle of identity of particles says that, for example, in the presence of a system of electrons, because of their identity, they cannot be given separate names - first, second, etc. You can only say how many electrons there are. All this gives grounds for a more serious attitude towards realism and, accordingly, towards Platonism, which follows from it.[12] Nominalism and realism are complementary as rational and irrational;

It is obvious that the series drawn up above can be continued, with the rational sides of reality on the left, and the irrational sides of reality associated with them on the right. As Bohr wrote: Any truly deep phenomenon of nature cannot be uniquely defined using the words of our language and requires at least two mutually exclusive additional concepts to define itself.[4]

By virtue of the general principle of complementarity established above between rational and irrational aspects of reality, they never conflict with each other, since the more one aspect of reality is clarified, the more uncertain the second aspect of reality becomes associated with it. By creating more and more certainty on the rational aspect of any phenomenon, nature reduces certainty in the additional, irrational aspect of the phenomenon associated with it and vice versa.

Based on the above, one can generalize the Heisenberg uncertainty relation as follows.

$$\Delta R \Delta I \geq C$$

where R is the rational aspect of reality, I is the irrational aspect of reality associated with it, C is some constant. Accordingly, the switching relation between R and I will be

$$RI - IR = iC$$

that is, the result of a sequence of rational and conjugate irrational aspects of reality when performing some actions depends on the order of their following and the sequence RI is not identical to the sequence IR. For example, if a person performs an action, guided first by the rational mind, and then by irrational feelings, the result will differ from the

case when the action first occurs under the influence of irrational feelings, and then the rational mind.

Using the principle of complementarity of rational and irrational aspects of nature, we can solve, for example, the aporia of Zeno. Indeed, the aporia of Zeno are insoluble only within the framework of rational thinking. Consider, for example, the aporia Strela. It consists of the following: if we assume that space, time and the process of movement consist of some "indivisible" elements, then the body cannot move for one such "indivisible" (for otherwise the "indivisible" would separate), and since the sum indivisible elements cannot give movement, then movement is generally impossible, although we observe it at every step.

But splitting into "indivisible" elements is a rational action. According to the general principle of complementarity, it is also necessary to take into account the irrational aspect of movement. The irrational aspect is visually unrepresentable (therefore it is irrational), but it is he who is responsible for the transition of the body (arrow) from one indivisible element to another indivisible element or for the process of its "formation" when the arrow is simultaneously on a given segment of the path and is not on it (both "yes" and "no" at the same time or a superposition "yes" and "no"). Thus, the state of relative rest (characterized by coordinate in physics) provides the rational aspect of the phenomenon, and the state of motion (characterized by impulse in physics) provides the irrational aspect of the phenomenon.

Analyzing the dialectical nature of the movement, opened in the V century. BC e. the ancient Greek philosopher Zeno, the German philosopher G. Hegel wrote: "When we generally think about movement, we say: the body is in one place and then moves to another place. While it is moving, it is no longer in the first place, but not also in the second. To move means to be in this place and at the same time not to be in it; it is the continuity of space and time, and it is precisely this that makes movement possible."[13]

In motion, we find not only moments of stability (rational moments) - "yes" or "no", but also moments of variability (irrational moments) - that is, both "yes" and "no" at the same time. With the help of the interference of alternatives "yes" and "no", the problems of movement and development are solved. Relative rest (rational) is only a moment of movement (a moment of irrational), due to the relative constancy of a particular phenomenon. Relative rest is essential for moving matter, without rational (relative rest) it is impossible to know the irrational (movement, formation, development). The possibility of relative rest of bodies is an essential condition for the differentiation of matter and thus an essential condition for life. Relative rest and movement complement each other, but relative rest is only a moment of movement, and movement is absolute and eternal.

The irrational is the basis of being of matter, the rational is the private moment of the irrational, its degenerate case, the result of the process of decoherence, state reduction (decoherence is the process of losing the coherence of quantum superpositions as a result of the interaction of the system with the environment).

German physicist V. Heisenberg defended the idea that complementarity is universal. And in the context of the development of physics, he believed, this idea awakens hopes that in the final state, different cultural traditions, new and old, will coexist, that very diverse human aspirations can be combined in order to form a new balance between thoughts and action, between contemplation and activity.[11]

The physicist M. Born believed that the idea of ??complementarity is of universal importance, because there are many areas of human activity, where the same fact can be viewed in different but complementary aspects. He agreed with Bohr that the concept of complementarity can be applied in other areas of knowledge, particularly in biology, psychology, philosophy, politics, and stated that one should not abandon such enrichment of our thinking. Thus, physics leads to the fact that it is necessary to abandon the representation of all sides of the phenomenon through the same kind of observation in the same system of concepts. There are always at least two aspects of the process, and in each case it is necessary to choose which one to give preference to.[14]

"I think," wrote M. Born, "that complementarity is an important concept, because it clarifies a great deal beyond physics as well. This applies to such pairs of concepts as matter and life, body and soul, necessity and freedom. A philosophical and theological dispute took place around them over the centuries due to the desire to bring everything into one system. If even in the strictest and most simple science - physics, this cannot be done, then it is clear that the same must be expected everywhere."[15]

The physicist V. Pauli also believed that the concept of complementarity is beyond the scope of physics. Its philosophical significance lies in the fact that, opposing one-sidedness, it could be the first step on the path of progress towards a single common picture of the world, in which natural sciences are only part of it.[16]

This is the purpose and essence of the general complementarity principle between rational and irrational aspects of nature - the construction of a single common picture of the world.

4 Conclusion

The general complementarity principle formulated above is:

- The law of nature, the formula of the world, the general philosophical epistemological principle, along with other philosophical principles.
- Proof of the presence of an irrational, unobservable side of reality that exists alongside and in indissoluble unity with the visible, rational, real world, which is only part of a more general picture.

The general principle of complementarity harmonizes the scientific and irrational approaches to the knowledge of reality. The rational and the irrational in their interdependence and confrontation not only do not exclude each other, but complement each other in the most necessary way. These are categories that are equally important and significant for a philosophical study of the foundations of being and consciousness.

From the point of view of the general principle of complementarity, both ways - rational and irrational should not be opposed. On the contrary, these two ways of knowing the world lead to the fullness of truth. The unity of truth is the main postulate of the human mind, expressed in principle of the complementarity of rational and irrational aspects in the knowledge of nature.

Any system in its ideal must combine a rational and irrational principle in the form of organic unity. Spiritual integrity presupposes harmony and universalism. Outside the rational organization of being, man is doomed to an unworthy, miserable existence. Outside of irrational values, his life loses meaning. The history of states and nations that

deny the rational foundations of economics, politics and law is full of dramatic events. But at the same time, the universal, total rationalization, in the end, leads to amoralism, cultural degradation, spiritual poverty, in a word, degeneration. The future of mankind largely depends on how these extremes will be overcome and to what extent it will be possible to further form the organic unity of rationalism and irrationalism.

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