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İletişim Bilgileri | Contact Information

Address: Aşağı Öveçler Mah. 1307. Sok. No: 4/2, Çankaya Ankara, Turkey

E-Mail: beytulhikme2011@gmail.com

Web Page: http://www.beytulhikme.org

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Plato and the Revolution of the Modern Paradigm of Science

Platon ve Modern Bilim Paradigmasının Devrimi

OLEH SHEPETYAK
Borys Grinchenko Kyiv University

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Abstract: The greatest coup that European science has experienced in its history took place in the Renaissance. It is common knowledge that at that time there was a revival of ideological paradigms which were formed in Antiquity. However, the application of this statement to the realm of philosophy requires clarification. The late Middle Ages was influenced by the philosophy of Aristotle, who was also an ancient philosopher. Therefore, on the eve of the Renaissance, Antiquity was not forgotten. In the Renaissance, the philosophy of Plato was revived, and in the late Middle Ages, it was displaced by the philosophy of Aristotle. The philosophy of Plato became the foundation for the formation of the paradigm of modern science. The purpose of this study is to reveal which segments of Plato's philosophy gave impetus to the development of science, and to prove that Plato influenced the development of science by three theses: 1) the theory is higher and more important than experience, as the world of ideas is higher and more important than the material world; 2) cognition of the world is impossible without the application of mathematical categories; 3) experience is necessary for cognition, but it is completely subordinated to the theory.

Keywords: Plato, the Renaissance, scientific revolution, scientific progress.

✉ Oleh Shepetyak
Borys Grinchenko Kyiv University, Faculty of History and Philosophy, Dep. of Philosophy
04053, Kyiv, Ukraine | o.shepetyak@gmail.com

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Introduction

A well-known fact is that the Renaissance was a turning point in the history of European culture. Innovations brought by the Renaissance have been reflected in the most diverse spheres of life of Europeans. Peculiarities of painting, sculpture, architecture, literature, etc. of this epoch have become the subject of numerous studies. Similarly, thousands of volumes were devoted to the study of the Renaissance philosophy. However, much less attention was devoted to the revolution, carried out by the Renaissance in science. In the middle and second half of the twentieth century, this gap was filled with some invaluable works, among which the works of Alexandre Koyré and Annelise Maier occupy a special place. These scientists proved that the Renaissance was the birth of a modern scientific paradigm. However, the question remains open: what was a particular feature of the Renaissance that gave it the opportunity to start the phenomenon of modern science. We believe that the foundation, on which modern science was formed, was the philosophy of the Renaissance that changed the outlook and methodological approaches of European scientists.

1. "La Revanche de Platon"

The most brilliant scientist whose research will be useful to us as nothing else is Alexandre Koyré, a French researcher in the history of science, who devoted his talents to studying the peculiarities of the Renaissance science. Koyré asked himself the question: what exactly happened at that time? The studies of the scientist, in our opinion, are so valuable that a little more time should be devoted to the analysis of the problem he was engaged in, extending his thoughts to the studies of other scientists and his own conclusions. Koyré believed that "La revanche de Platon" was a peculiar feature of the Renaissance (1985: 19). The very name of the epoch "Renaissance" reports that at that time something was revived. It is common knowledge that achievements of Antiquity were revived at that time. However, there is one nuance that needs to be clarified. It is possible to revive what was lost or went into oblivion. In the last centuries before the Renaissance, the ideas of Aristotle, cultivated by Saint Thomas Aquinas and other scholastics, flourished in the philosophical world. The fact that Aristotle, an ancient thinker who was not only not forgotten, but also was at the root of the philosophy of the Late Middle Ages, means that Antiquity was not alien for the Middle Ages. They were in a close ideological affinity. Accordingly, the Renaissance ideologists could not set themselves the goal of simply reviving Antiquity. They revived those teachings of the ancient world, which in those ancient times stood in opposition to Aristotle. In other words, they tried to criticize Aristotle, while referring to those who have already disagreed with him in Antiquity. Plato was the only great thinker who could be opposed to Aristotle. This means that the Renaissance thinkers sought to clear the underpinning of the outlook of their time from the philosophy of Aristotle, and to insert Plato's doctrine there. This is exactly what Francis Bacon meant. He believed that Aristotle's argumentative methods spoiled natural philosophy (2013: 47). It is obvious that, like Aristotle of the Middle Ages, is not identical to Aristotle of Antiquity, so Plato of the Renaissance is not identical to Plato of Antiquity. Saint Thomas and other scholastics needed Aristotle only to help them in the inculturation of Christianity. Renaissance thinkers took from Plato only what most impressed them. And they took so much that it gave Koyré the opportunity to make loud statements: "According to Galilei, the new science is an experimental proof of Platonism" (1966: 175), and also: "For Galilei, Plato's cosmogony is not an ordinary myth, as it is in 'Timaeus'; for him it is possible – if not to say 'true' – story" (1968: 265).

In Plato's teaching there are several moments that have influenced the philosophy and science of the Renaissance. The Athenian genius believed that the world was formed on the model of eternally existing ideas. Like any thing made by a human being is produced according to a particular project that precedes this thing, the same way the world, as a great integrity, is formed on the model of a particular project. As in the world of products of human creativity, the project, embodied in things, always remains external to them, the same way the project of the universe Plato places in the world of ideas that always remains transcendental to the world of things. Human souls, while in the world of ideas, saw a true, exemplary being. However, getting into the human body, they forgot what they had seen at the time of their own pre-existence. The fact that a person saw the true being will always stimulate to restore the knowledge one has. Perceiving material things with the flesh, one recalls what he saw in the world of ideas, after all, to seek and to cognize means to remember. This allows thinking in general categories, despite the fact that one observes single facts of reality. Another important segment of Plato's thought is that he, maybe under the influence of Pythagoras or because of the same educational space trends, brings mathematics to a high level. Plato places mathematical categories between ideas and the material world. These categories ensure the proportional implementation of ideas, which allows us to see the same quality in different things, but to varying degrees.

2. Theory is Over Experience

From the above we can distinguish three main features that had a revolutionary influence on the development of human knowledge and lay in the methodological and axiomatic basis of modern science. The first one is of particular interest. Plato's philosophy proclaimed the thesis that true knowledge is beyond the material world, and not in it. What is in the world of mind is much more important for cognition than what is in the world of things. In the language of modern scientific methodology, this sounds like this: the theory is primary and dominant in terms of experience. The science from the Renaissance and to this day is based on the principles that exalt the theory. Experience instead plays a role either of arguments for the theory, or arguments against it, but is never its source. This idea requires some evidence, in the search for which we will look at the history of science. The natural science of the Renaissance and subsequent centuries was determined by the figures of Galileo Galilei and Sir Isaac Newton. Among the numerous discoveries of these scientists and their colleagues was a change in understanding the nature of the motion. The problem of motion was central to the physics of the Middle Ages; at least the researcher of the Renaissance breakthrough in science Annelise Maier, who wrote that the phenomenon of motion was "the source and the central point of scholastic physics", thought so. (1949: 10). Throughout the history of physics, the understanding of the phenomenon of motion has changed. Its first interpretation, adopted in Antiquity and the Middle Ages, was proposed by Aristotle. He believed that the motion is a transition from the dynamis to the energeia. At the same time, motion of material objects is a phenomenon caused by the action of external force. Exceptions to this rule are beings that have a source of motion in themselves. That's how Aristotle's theory of motion was interpreted in the Middle Ages. A body moves when something acts on it. Accordingly, the force acting on the body is the cause of its motion. The modern understanding of the motion is completely different: motion as a natural state of the body is a starting point. Accordingly, the body is always moving (even if its speed is zero). An ideal space in which there are no forces is depicted as an illustration to this theory of motion. A body moving at a certain speed in such a space will move infinitely and without changing the speed, since the force of gravity, friction, and so on will not act on it. If a body moves in the usual space, then external forces necessarily act on it, which, however, do not cause the motion itself, but only change its speed and direction. We observe that all known bodies after the end of the external impulse slow down its motion and eventually stop. This is not because external force no longer acts on it, but because it is influenced by the forces of gravity and friction that change the speed of the body, until it is completely stopped. If the body moves along the curved surface from the top to the bottom and increases its speed, then it means that the force of gravity that accelerates it is greater than the force of friction that slows it down. Our superficially described understanding of the motion rooted in classical mechanics has one important feature that we cannot ignore. Aristotle and scholastics could directly see what they described. They could touch the body on the table, and notice that it changed the place of its location. In other words: the Aristotelian-scholastic concept of motion was evident.

In the context of the theory of cognition, the history of understanding the nature of motion in physics is interesting to us only as an example, which perfectly illustrates the role of theory in cognition. While formulating the first concept of motion Aristotle did not apply the experiment method. He used only observation, albeit primitive. However, Galilei and Newton did not use even this method. It is impossible to see how the body moves without the action of any force. Under conditions of the material world it is impossible to find an environment in which no forces would act. Einstein and Infeld describe this problem as follows: "We have seen that this law of inertia cannot be derived directly from the experiment, but only by speculative thinking consistent with observation. The idealized experiment can never be actually performed, although it leads to a profound understanding of real experiments" (1966: 8). There are many similar examples in physics.

What is the basis of understanding of the motion in the new science? It is exclusively the theory. The main element of the new understanding of the motion is the postulate of the notion of an ideal space, in which there are no forces. Neither Renaissance scientists nor their colleagues from this time could observe such a space, since it does not exist. The ideal space is a fiction, but it is necessary for science. Without it, it would be impossible to construct a new theory of motion. The scholars of the new science are not at all upset by the fact that they have to base their arguments on something that is not only not observed in the real world. For science, this is not a problem. After all, what is the reality? For Plato, this is just a dim reflection of the world of ideas. If a person justifies something rationally, it means that one recalls what he saw in the world of ideas, that is, true being. It is more important than reflection. Even if in material reality there is something that does not correspond to the ideal reality, then it is nothing else than imperfection that has penetrated the process of creating the world. Science is full of examples, when the theory does not take into account the facts of reality. The model of the scientific cognition of the Renaissance and modern times, the basis of which is laid by Newton, is a theory whose empirical verification is impossible. It was not in vain that the advocate of the empirical experience in epistemology, Ernst Mach, required to review Newton's mechanics, since he considered it devoid of content, as it could not be verified empirically (1889: 213).

Another remarkable example of the temporal and substantive priority of the theory is the discovery of the seventh planet of the solar system. For several millennia, our star-planetary system consisted of six planets. After the assertion of heliocentrism by Copernicus, the result of which was positing the Sun in the center, the planets known at that time and whose number did not change from the time of ancient astronomers, were located in a certain order, according to their distance from the Sun. So Mercury, Venus, Earth, Mars, Jupiter and Saturn were known to science. There was no other information about the solar system. It is generally accepted that the notion of 'expansion' of the boundaries of the solar system occurred in 1781. It was in this year the English astronomer of German origin, Friedrich William Herschel, at a meeting of the Royal Society of London for Improving Natural Knowledge, announced the introduction of a new planet, which was decided to be called Uranus. The history of science records exclusively those scientists who have recorded the empirical confirmation of the fact of reality, and ignores the theorists who first described these facts and provoked empirical searches. Herschel's name is known in astronomy. However, historians of science rarely wonder whether Herschel would begin to seek empirical evidence of the existence of Uranus, if there were no theoretical substantiation of the existence of Uranus. It seems that the idea of the existence of the seventh planet was first expressed by Immanuel Kant (1755: 55) in 1755, when the Königsberg scholar devoted a lot of attention to the problems of natural science. Kant's guesses about the seventh planet were based on the theory of Newton. So who exactly is the discoverer of the planet Uranus, Kant or Herschel, given that Kant wrote about this planet 26 years before Herschel saw her? In the history of science there is a tradition that the scientist, who brought forward the evidence of the existence of a phenomenon is recognized as a discoverer. The question of the discoverer is always controversial, even in the plane of theoretical considerations. For example, today it is generally accepted that the discoverer of the theory of general gravity was Sir Isaac Newton, who first put it in the work "Philosophiæ naturalis principia mathematica" in 1678. However, this theory has already been described by the French scientist Giles Personne de Roberval (1644: 148). And already in 1646, René Descartes expressed the first systematic critique of this theory. However, let's return to the history of the planets.

The history of the eighth planet of the solar system is similar to that of Uranus. In 1848 Neptune was discovered. When asked who exactly discovered it, today it is difficult to answer clearly even for experienced science historians. Usually the whole pleiad of scientists is named: the

Englishman John Couch Adams, the Frenchman Urbain Jean Joseph Le Verrier and the German Johann Gottfried Galle. In order to see the relation of each of them to the planet Neptune, you need to plunge into this fascinating story. After the discovery of Uranus, a steady idea about the six planets of the solar system was destroyed. If there is a seventh, then why not search for the eighth! Besides, as always everything new is of particular interest, so astronomers were fascinated by the study of Uranus. Special success was achieved here by the English royal astronomer Sir George Biddell Airy, who in 1832 said that the orbit of Uranus actually goes with certain deviations from the expectations based on the theory of Newton. Since the theory in the new science, like the world of Plato's ideas, is untouchable, nobody doubted the truthfulness of Newton's thoughts. The problem began to be sought in nature. On this basis, yet unknown scientist Adams conducted accurate calculations, and described some of the characteristics of a new planet, which nobody had seen yet, but which was necessary to explain the orbital perturbation of Uranus. Adams' studies have not been approved by Airy, and have not been developed in England. At the same time, similar studies in France were conducted by Le Verrier, who in 1945-46 presented the Académie française descriptions and almost accurate calculations of the location of the eighth planet. Airy, though pointing out similarities in the calculations of Adams and Le Verrier, continued to ignore them. Galle began empirical quest for the eighth planet at the request of Le Verrier. Based on the calculations of the predecessors, "September 23, 1846, Galle opened the Neptune" (Franz 1910: 311). So who is the real discoverer of Neptune: Adams, Le Verrier or Galle? The latter probably did the least: he only sent the appropriate devices at the Berlin Observatory to the point that the theorists had pointed out to him and saw the eighth planet. But it was he who gave science the empirical evidence of the existence of a planet, which was guessed, as one believes, or which was discovered, according to others, by Adams and Le Verrier.

No less fascinating was the story of the ninth planet of the Solar System. In 1930, Clyde William Tombaugh of the Lowell Observatory reported the successful completion of the quest for the ninth planet launched by Percival Lowell in 1906. This planet was named Pluto. Today, Pluto is no longer considered a planet because it does not dominate in its own orbit and is only 7% of the total mass of all bodies, along with which it is in one orbit. Due to Pluto's mismatch with other planets, by the decision of the International Astronomical Union August 24, 2006, Pluto was deprived of the status of the planet and transferred to the rank of dwarf planets, where he took his place with Ceres, Eris, Makemake and Haumea. Still, for 76 years, Pluto was considered a full-fledged planet. The discovery of the ninth planet is a good illustration of the domination of the theory over empirical data. Thus, the discovery of Neptune did not give answers to all the questions that arose in the scientific community to orbital perturbation of Uranus. Studying the characteristics of Neptune certainly explained the perturbation of Uranus, but not all. This led to the idea that besides Neptune, there is another planet that influences Uranus. Percival Lowell, who built one of the oldest American observatories in northern Arizona, along with his colleague, William Henry Pickering, Harvard University professor, came to the conclusion that other planet acting on the Uranus must exist in the Solar System. Lowell called it 'Planet X'. Lowell's death, which occurred in 1919, for some time suspended the search for the Planet beyond Neptune. However, after a while, the searches were restored. The young scientist Tombaugh discovered a planet from Lowell's observatory in 1930. And again the same question: who should be considered the true discoverer of Pluto – Lowell or Tombaugh? Lowell put his whole life in search of the Planet beyond Neptune, he built his own observatory at his own expense, because he believed and even knew that the Planet beyond Neptune existed; he persuaded his colleagues in its existence. Conducting searches according to Lowell's calculations, it took a year for Tombaugh to fix the planet. Is it fair to give the glory of the discoverer to the scientist, whose genius, though undeniable, performed only a technical role in this process?

Presenting examples from the history of science, which show how crucial was the influence of the theory on fixing empirical data, one cannot ignore the brightest of such examples, namely the discovery of Julius Lothar von Meyer and Dmitri Mendeleev in the field of chemistry. Outstanding scientists, who are known to each one through the periodic table of elements, prove the decisive role of the theory in practice. Von

Meyer in 1864 and Mendeleev in 1869, placing chemical elements in a certain sequence, according to their properties, noticed that the logic of the placement of elements does not coincide with the data that they possess. Scientists knew only 63 chemical elements at that time. Today, 118 elements are known, 89 of which are in nature, while others have been discovered as a result of nuclear reactions. All 118 elements found their place in the periodic table, since from the periodic law itself it could not only be assumed about the existence of elements that had to fill the gaps in the table in future, but the information about some of their properties could be obtained. Before Pierre Curie and Marie Skłodowska-Curie discovered polonium in 1898, a place for it had already been prepared in the periodic table. The study of von Meyer and Mendeleev is a theory that helped many scientists to find its practical application.

There are numerous examples similar to the new explanation of the nature of the motion, the discovery of three new planets of the Solar System, and the filling of the periodic table. Moreover, no empirical discovery appeared without the prior appearance of the theory. Even when a scientist sees facts of reality that does not have a place in his theoretical constructions, he simply does not notice it. How often astronomers watched the starry sky, the same sky that Copernicus also watched, but they did not notice that the Sun was in the center of our stellar system. How often people looked at the variety of elements that fill the Earth, but only saw soil, water, fire and air, and guessed about the ether that would have to fill interstellar space. How often people watched objects fall to the ground, however, they saw in it the attraction to the centre of the Universe, and not the effect of gravity. The theory gives glasses, through which a person sees the world, but which at the same time paint it in its own colour. This led to the revision of Newton's mechanics in Einstein's theory of relativity, which is even less likely to be empirically verified. In this context, it is difficult for us to disagree with Webster who believed: "It is correct, of course, to perceive the architect, the water engineer and the mechanic to be practical people. Indeed they are: but one ought not to overlook the fact that theoretical knowledge has been learned by these practitioners and in turn integrated into their practical work" (2004: 39).

To affirm that the theory generates experience would be too uncritical. However, this still does not give grounds for completely abandoning the assumption that empirical data can have some influence on the formation of the theory. From the given examples, and a number of such examples can be continued almost to infinity, it becomes apparent that experience is preceded by the theory. This means that data of experience have no direct influence on the formation of the theory. However, in order not to be hasty, in the future we will return to the analysis of the possibility of indirect influence of empirical data on the formation of the theory.

The examples presented here show what exactly were and are the emphases in science from Renaissance to this day. The dominance of the theory became possible only due to the changed philosophical settings that underlie any outlook.

3. Mathematics and Experience

The dominance of the theory over experience was not the only consequence of the revival of Platonism, albeit the most important. Another consequence of Plato's revenge was the mathematization of science. Medieval scholars did not work with calculations. Mathematical categories were used only in those areas where it is absolutely necessary. Basically, the calculations were the prerogative of the money lenders and money changers. Since the Renaissance, science was no longer able to do without mathematics. One of the most creative Renaissance thinkers, Cardinal Nicholas of Cusa, wrote: "Saint Augustine and later Boethius asserted that the number was undoubtedly in the mind of the Creator as his chief model for the creation of things" (1937: 24), and also: "in creating the world, God used arithmetic, geometry, music, and likewise astronomy" (1937: 106). Today, each branch of knowledge is full of calculations. This is inherent not only in natural sciences, but also in the humanities and social sciences. Globalization and international contacts, which reached their peak in the twentieth century, forced to unify the units of measurement. So, in the 1960s the 11th General Conference on Measures and Weights adopted a unified system of measurement units Le Système International d'Unités.

The desire to define the units of measurement as accurately as possible was generated by the cultivation of the number, which was rooted in the philosophy of Pythagoras and Plato. The founder of the Academy of Athens believed that ideas are embodied in matter not arbitrarily, but proportionally, with well-defined harmony. If, according to the rules of constructing the definition, the definition of the content of the concept requires the enumeration of all its essential features, that is, the concepts at the intersection of which definiendum is created, then this definition can describe a species concept that is general. Definiendum is a general concept, even if the degree of its generality is less than the generic concept of definiens. We can construct definitions of concepts, rather than concrete, single things. In other words: we can construct definition of a square, but we cannot define the square table that is in my room; we can define a sphere, but not a soccer ball, which is now played by children in the yard. In order to cover the subject, it is not enough for us to know the definition of its essence, which is present in the definition. Here one more important aspect is needed, namely the outline of mathematical proportions. At the theoretical level, we know that a rectangle is a plane geometric figure that has four straight angles and four pairs of parallel sides. This knowledge is sufficient to us for theoretical mathematics, but not enough for the applied one. To make a billboard, it is not enough for the craftsman to know that it should be rectangular. He also needs to know the size of the sides. In order to prepare the medicine, the pharmacist is interested not only in the ingredients of the drug, but also exact proportions. Everything in the world can be measured by number. The units of measurement that have evolved over the millennia cover everything that exists. Michael Polanyi spoke the most profoundly about the mathematization of science. He was convinced that the science of the Renaissance and modern times felt a tremendous influence on Pythagoreanism and Platonism. He asserted this among other things in relation to the founder of Heliocentism: "The revival of astronomical theory by Copernicus after two millennia was a conscious return to the Pythagorean tradition. While studying law in Bologna he worked with the professor of astronomy, Novara, a leading Platonist, who taught that the universe was to be conceived in terms of simple mathematical relationships" (1985:

25). The most pronounced statement about the mathematization of science is the phrase of Pierre Maurice Marie Duhem: " One of the claims to fame of the geniuses who made the sixteenth and seventeenth centuries distinguished was the recognition of the truth that physics would not become a clear and precise science, exempt from the perpetual, sterile disputes characterizing its history till then, and would not be capable of demanding universal assent for its doctrines so long as it would not speak the language of geometers. They created a true theoretical physics by their understanding that it had to be mathematical physics" (1906: 172).

The third significant feature of modern science, generated by Plato's revenge, is the interest in these experiences. At first glance, the idea of increasing the cost of experience contradicts the previously expressed view about the priority of the theory over experience. In fact, these two segments are harmoniously consistent with the teachings of Plato. According to the Athenian philosopher, the true knowledge is construction of ideas. However, in our situation, when we are in the body, the recollection of what we have seen in the world of ideas is possible only as a result of the observation of material things in which ideas are embodied. It follows that empirical data are a necessary step in the process of gaining knowledge. Some scholars believed that the nature of science of the Renaissance and modern times was determined by Pythagoras with the cult of number and Democritus with the cult of empiricism and mechanics. In particular, Michael Polanyi wrote:

"After Copernicus, Kepler continued wholeheartedly the Pythagorean quest for harmonious numbers and geometrical excellence" (1965: 5). The thinker of ancient atomism is difficult to be called an empiricist, especially when he claimed: "Only in the general opinion there exists sweet, by convention bitter, by convention warm, by convention cold, by convention color, whereas in reality there are only atoms and the void" (1955: 61). Historians of philosophy have no doubt that Pythagoras had a tremendous influence on Plato. The concept of the number cultivated in the Pythagorean Union was also reflected in the Plato's Academy. After all, if the struggle in the Renaissance took place between the giants Aristotle and Plato, then it is unlikely that along with them in this confrontation the voice of Pythagoras or Democritus could be heard. If the science of the Renaissance and modern times turned its attention to empirical data, then it was only to the extent that they found themselves in the Plato's philosophy. And here they really occupied a special place. In Aristotelian-scholastic philosophy, experience also occupied a significant place. To illustrate, it's enough to recall at least the well-known medieval sententia "Nihil est in intellectu quod non prius fuerit in sensu", expressed by Saint Thomas Aquinas. However, the experience in both philosophical concepts is not identical. In Aristotle's philosophy, the sense-perception was direct: what was seen by the eye, was fixed by the mind. Let's return to the example above with a change in the notion of motion. In Aristotle's physics, the force acting on an object causes its motion. In the 'new' science, external force does not cause the motion itself, but its speed and direction. A new understanding of the movement required the postulation of absolute space, completely fictitious and absent in reality. Aristotle was not inclined to resort to such speculations of the mind. He described the motion as it is perceived by the eye. Today, after a long school, at sometimes university studying, we are convinced that the picture generated by the naked eye does not correspond to reality, or better, to say: the picture of reality that dominates the minds of the present. Aristotle is often accused of distorting the picture of the world and constructing a model of the universe that is not true. Perhaps it is so. But that model, which Aristotle built, corresponded to the fact that was seen by his eye. The modern picture of the world corresponds not to what was seen by the eye, but what was seen by mind, but not the reality.

Equally striking example is the change of the astronomical paradigm. The struggle that broke out between Claudia Ptolemy's geocentricism and Nicolaus Copernicus's heliocentrism, presents a different perception of experience. Today we know that in the center of the stellar system there is the Sun. Heliocentrism confirms experience, but special experience: obtained through research technology and clear mathematical calculations. It was not at Aristotle's disposal. He could rely only on his own eye. And it, like to Aristotle, today shows to us that the Sun rises on the eastern horizon and sets on the western, that means, it revolves around the Earth. And again experience, but one that is given to man by the eye, and not by mind. So, these examples show that the concept of 'experience' is significant. Experience is present both in science based on the philosophy of Aristotle, and in that based on Plato, but it is not the same. The first can be called the experience of the eye, or direct experience, the second – the experience of mind, or theoretical experience. Not all of our beliefs are based on truth. Many of them are based on an agreement. No one today objects to the assertion that Kyiv is located at 30°31'25'' east longitude. But its founders, obviously, did not guess about this fact. Such coordinates are due not to reality, but only to the fact that it is now accepted to calculate the coordinates taking the reference point of the so-called 'prime meridian', which passes through the English city of Greenwich. And the prime meridian became decisive only because in 1675 King Charles II preferred to build an observatory here, which later became central to Britain, received state funding and support, and its director got the title of royal astronomer. There are many examples similar to the prime meridian. Modernity accepts them as granted, but does not associate with them a picture of the world.

Conclusion

The world of Aristotle and the world of Plato find their foundations in their philosophies. Plato saw the true world through the prism of the mind sublime to the heavens; Aristotle saw it through the tumultuous and direct senses. It is difficult not to agree with Bacon, who wrote: "I regard every one of the accepted systems as the staging and acting out of a fable, making a fictitious staged world of its own. I don't say this only about the systems that are currently fashionable, or only about the ancient sects and philosophies; many other fables of the same kind may still be written and produced, seeing that errors can be widely different yet have very similar causes" (2013: 38).

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Öz: Avrupa biliminin, tarihinde yaşadığı en büyük darbe Rönesans'ta gerçekleşti. O zamanlar, Antik dönemde oluşturulan ideolojik paradigmaların yeniden canlandığı yaygın bir bilgidir. Ancak, bu ifadenin felsefe alanına uygulanmasının açıklığa kavuşturulması gerekir. Geç Ortaçağ, aynı zamanda Antik bir filozof olan Aristoteles'in felsefesinden etkilenmiştir. Bu nedenle, Rönesans arifesinde, Antik çağ unutulmadı. Rönesans'ta Platon'un felsefesi yeniden canlandı ve Geç Orta Çağ'da Aristoteles'in felsefesi ile yer değiştirdi. Platon'un felsefesi modern bilim paradigmasının oluşumunun temeli oldu. Bu çalışmanın amacı Platon'un felsefesinin hangi bölümlerinin bilimin gelişmesine ivme kazandırdığını ortaya koymak ve Platon'un bilimin gelişimini üç tezle etkilediğini kanıtlamaktır: 1) idealar dünyasının maddi dünyadan daha yüce ve daha önemli olması gibi, teori de deneyimden daha yüce ve daha önemlidir; 2) dünya hakkındaki biliş, matematiksel kategoriler uygulanmadan mümkün değildir; 3) deneyim biliş için gereklidir, ancak tamamen teoriye bağımlıdır.

Anahtar Kelimeler: Platon, Rönesans, bilimsel devrim, bilimsel ilerleme, paradigma.