MEDIEVAL ALCHEMY – THE PREDECESSOR OF EXPERIMENTAL SCIENCE OF NEW TIME

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At each stage of the development of culture there are unique historical types of science. Alchemy is the phenomenon of medieval culture, the predecessor of the experimental sciences of the New Time. It is the result of the birth of the spirit of pragmatism. Greed has forced people to look for easy ways of enrichment. One such way seemed to be alchemy, which set the task of turning base metals into precious, lead into gold with the help of a special mediator, philosophers' stone (Latin: *lapis philosophorum*). The science of New Time has adopted some of the ideas, technical devices, and even technology of Alchemy. But in general, the idea of fast enrichment using traditional alchemy today is thrown aside. In our time, mankind has gone the other way.

Keywords: «Alchemy», «Science», «Middle Ages», «New Time», «Pragmatism», «Transformation», «Philosophers' stone», «Elixir», «Lead», «Gold»

Thinking of each era is peculiar. It takes different forms and contents at different times. And science is a historical product, the most important cultural phenomenon of its time. We are interested in medieval alchemy as a phenomenon with independent cultural value, and at the same time acting as a step in the history of science that led to the emergence of new scientific thinking.

It is well known that the world outlook of medieval Western European man was for the most part Christian, that church dogma was the starting point and the basis of all thought, that all forms of spiritual activity depended on theology, were its «maidservants», performing a supporting role. Spiritualist principles that lead man to the world of symbols and ideas and show him the way from the visible world of ordinary reality to the unseen world of angels and fallen spirits triumph in culture.

People in the early Middle Ages preserved to the great degree the momentum of the New Testament mysticism. Their first commandment was «Do not lay up for yourselves treasures on earth... but lay up for yourselves treasures in heaven...» [13, Mt. 6: 19]. Therefore, tens of thousands of people literally apprehended the evangelical ideal of poverty renounced all personal property and left the world, became hermits, monks, beggars, pilgrims, seeking first of all, «the kingdom of God» [13, Mt. 19: 23–24].

Gradually, however, in the life of Western European society certain changes begin to occur, the growth of cities, craft guild, the development of commodity-money relations come to the fore. The spiritual atmosphere of culture in which a person becomes a pragmatist changes as a whole, and his New Testament mysticism and asceticism becomes a mere bourgeois thrift. Spirit of practicality and greed supersedes and modifies the Christian ideals, and is becoming a major determining factor in the system of moral values of medieval man, both a layman and a priest of the Catholic Church [3]. Formally, all remains in their places, but even now the salvation of his soul depends on the thickness of the purse, as the by widespread sale of indulgences evidences. People of all classes are increasingly starting to worry about when, where and how you can quickly and without much effort to get money to meet the ever-growing material and cultural needs.

Nature of alchemy

Against this background, in the late Middle Ages appears «devil» activity of alchemist unofficially recognized by members of that society as one of the easiest and the most convenient ways to get rich. Nature and purpose of medieval alchemical activity can be expressed in a very short formula: artificial transformation of base metals into precious. This problem was being solved on the basis of a number of ideas that were borrowed by the alchemists from the ancient teachings of the Miletian sages, Heraclitus, Democritus, Aristotle and were being interpreted in accordance with the general mood of the Christian era [4].

Alchemists borrowed two fundamental ideas from Greeks: first, they adopted the idea of existence of some primal matter, from which all five elements of nature (earth, water, air, fire, ether) come, and then the material bodies of this world, and second, the idea of cyclical development, variability of the space was being used. The transition from one substance into another or elements in each other was seen as a natural pattern. These thoughts of ancient philosophy fit perfectly into the context of medieval culture.

Christianity is not alien to the idea of the emergence of the world and beginnings of life on Earth from some primal matter, created by God, in which future five elements, as well as embryos of plant and animal life were mixed together and were not different yet. For example, Prophet Moses, speaking about genesis of cosmos, clearly says that at first the earth was «without form and void» [13, Genesis. 1: 2]. This point of view is also emphasized in the

book of Solomon Wisdom. According to the Hebrew wisest king and prophet, God created the world from «non-pictorial matter» [14, Wisdom. 11: 18].

The Antique idea of a possible transition from one substance into another in Christianity takes the form of the final transformation of the material beginning into spiritual. Godman Jesus Christ rose from the dead to spiritualize the whole nature of man. But since man is understood as a microcosm and the concentration of all the cosmic forces and elements of nature, so His transformation marked the beginning of transformation of the whole world, the whole cosmos, its transition to a higher stage of development.

The official position of the Church was to wait for this universal cosmic transformation by the Holy Trinity, God the Father, God the Son and God the Holy Spirit at the end of the centuries. But from the formal-logical point of view, it was impossible to exclude other possibilities, which are based on the activity of the person himself replacing the creative activity of God. The alchemy chose this path, placing itself in the category of semi-formal or even informal science.

The search of alchemists was originally aimed at identifying the substantial base of some three ideal first principles: sulfur, mercury and salt, the combination of which should have led to gold. However, later alchemists chose another path associated with the search for a particular intermediary substance – the philosophers' stone, allegedly possessing remarkable properties, some magical powers, the ability to manipulate the first principles of metals. R. Bacon, in his treatise «The Mirror of Alchemy» explained that if we added philosophers' stone to base metals, they would turn to precious metals [1, p. 864].

In the Middle Ages the production was of natural character, and therefore its product had the imprint of the master, manufacturing and consuming it. No wonder treatises of alchemists are full of a huge number of individual rules and recipes. Each alchemist had his own specific procedure of «great deeds», the creation of the alchemical god – the philosophers' stone. Science of New Time puts algorithm having the qualities of universality and necessity in place of individual recipes. No wonder New Time is the flowering of methodological problems, the creation of both inductive and deductive methods of cognition.

Theory of R. Bacon (1214–1294)

Of particular interest are the ideas of the English philosopher and naturalist R. Bacon. He developed his own theory of getting the philosophers' stone connected with the foundation of experimental science as such. The thinker believed that the alchemist in his activity must imitate nature. In the XVII century, this slogan of the medieval scientist R. Bacon was taken by his namesake, F. Bacon, who developed an empirical inductive method of cognition. Therefore, Hegel said that the spirit of Bacon's philosophy was permeated with empiricism [6, p. 281–294].

Putting forward nature to the first place in scientific knowledge, R. Bacon emphasized that neither the authority nor the opinion or habit should serve as a guide to the alchemist's activity [3, p. 864]. However, the author stipulates that he does not criticize the unshakable authority of the Church, faithfully reproducing the idea of st. Augustine's about Church as a criterion of Truth. This thesis is confirmed in his teaching that the human sensual experience is insufficient in the empirical sciences.

According to R. Bacon, a mystical experience supplementing empirical is also needed. Experience is twofold. Empirical experience is acquired through the external senses, and the mystical comes through religious faith and divine inspiration [1, p. 864]. Thus, on the one hand, there is a persistent focus on the thing, on the research of nature in sensual experience. On the other hand, there is respectful adherence to ecclesiastical authority and a mystical experience [1, p. 874].

God creates the world, being of a second order, a lower reality, but closely connected with Him. He gives knowledge of the world through Revelation to man. Therefore, knowledge of the position of Church, Sacred Tradition and Sacred Scripture (the Bible) is a necessary condition for empirical cognition of the mysteries of nature. Reading the Book of Nature is only possible in the light of the books of the Bible or personal mystical enlightenment. Therefore, the main task of a medieval alchemist, scholar, poet, painter was to see the divine in the earthly, the earthly through the divine.

So medieval thinking is symbolic. Medieval man longs to see in the earthly – the heavenly, in the temporary – the eternal, in the created – the uncreated. After all, the essence of the symbol is to express one reality through another [8]. That is why in the alchemy there was identification of seven metals with seven planets. Any element on earth must correspond to some celestial body. If all the planets in the sky strive for the Sun as a source of earthly light, the metals in the world should strive for Gold, earthly Sun. The result was a series of correspondence: Gold – Sun, Silver – Moon, Copper – Venus, Iron – Mars, Lead – Saturn, Tin – Jupiter, and Mercury – Mercury.

Celestial analogy in the minds of the medieval practitioner of black magic is often

replaced by earthly analogies. So, John Isaac Goland in his treatise «About the hand of philosophers» finds a match between the chemical processes and the human hand. Cartography of celestial bodies he transferred to the human hand, which showed what to understand and what to do to the alchemist [12].

Such transfer of symbolism of the Heaven to the Earth was due to certain reasons. The main reason is antinomy of medieval thought. On the one hand, the Heaven had in hierarchy of Being a higher status than the Earth, because «in the beginning God created the heavens» [13, Genesis. 1: 1], and then the earth. On the other hand, the Earth was recognized as a center of physical space and place of evolution. It is there that God incarnated in Jesus Christ.

Symbolically-shaped, high-quality perception of reality by medieval alchemists was connected with systematic attempts to quantify natural phenomena. These attempts were based on the biblical thesis that the world was created by God by «the measure, number and weight» [14, Wisdom. 11: 21]. This implies the recognition of a large role of mathematics in the learning process. According to R. Bacon, its strengths lie in the fact that it combines rational evidence with sensual perception. Owing to this there can't be doubts in mathematics [1, p. 869]. Then mathematical derivations must be checked by the alchemist by experiment in practice. And it is natural for the alchemist because his theory should have led to practical results, to produce gold, which all the society longed for. However, the ultimate criterion of truth was not even in the experiment, but in Holy Scripture and Holy Tradition. Any attempts to change the paradigm of thinking were painfully perceived.

The fate of the alchemy

The alchemists in search of the philosophers' stone, made a number of important scientific discoveries. They studied the properties of a variety of things, a lot of ways of influencing them, carried out the obtaining of various alloys and chemical compounds, acids, alkalies, mineral paints, created and perfected equipment and installations for the experiments: alembic, chemical furnaces apparatus for filtering and distillation [15, p. 449].

Apart from alchemy, which belonged to the category of informal science in the medieval culture, seven liberal arts (grammar, dialectic, rhetoric, arithmetic, music, geometry and astronomy) developed in the educational system. Theology was considered the most important science. Nevertheless, the medieval alchemists' call to experimentally investigate the nature was later heard by F. Bacon, and was realized in the science of New Time.

Experimental science of New Time

Experimental science of New Time, with its orientation to nature, to things themselves, is the product of a different culture. It is a product of the «spirit of capitalism» (M. Weber), the spirit of profit and entrepreneurship of the bourgeois culture and the capitalist mode of production. The basics of this culture are the capitalist commodity-money relations. These relations start to dominate. They are accepted as independent, supposedly defining all relations in society [10]. Hence scientific thinking assumes the character of commodity relations. Therefore, the main task of cognition leads to the study of relations of things existing independently of man. The consequence of this is the appeal to experience, experiment to find out how things themselves behave. The call of F. Bacon to do experiments was taken up by society. Hence the teaching of F. Bacon and other philosophers of New Time about the empirical method of learning developed.

Another reason for the birth of New Time science is the change of technological process labour. Labour process is being transformed from personal art of the medieval craftsman to the algorithm and becomes a formal sequence of actions. Labour skills turned into abstract operations, which are then transmitted to machines. Knowledge is reduced to the study of properties and relations of natural bodies for the purpose of using knowledge in material production. You must assess the theory «by the fruit – says F. Bacon – and consider fruitless which is barren» [2, v. 2, p. 38].

Thus, the experimental science of New Time dialectically «removes» preceding medieval science that focuses on the study of various superamaterial entities controlling nature and man. The analysis of properties of natural objects existing by themselves and acting as objects of practical operating in material production – a symbol of the power of man, having replaced the «dead» God becomes the purpose of scientific knowledge. Science of New Time, according to A.F. Losev, was to increase the power of man on earth, «work wonders and stun all living by its own methods» [7, p. 495–496], skillfully manipulating nature and man. At that time the whole meaning of life was seen in the fact that «scientific and technological means create and transform the whole nature like God» [7, p. 492]. And all the major philosophers and scientists of that time had to solve this problem in their own way.

Conclusion

In our time, the belief in the limitless possibilities of science has historically compro-

mised itself. Science is not the only form of cognition of the world, which gives a person the necessary knowledge. It does not study being in its general forms and can not determine its ultimate meaning. In search of world outlook grounds one should turn not to science but to religion, philosophy and art. Scientific knowledge can only be an important auxiliary material. Science gives the «facts», and philosophy and religion explain them, each in their own way. Only together with the ordinary, artistic, mythological, religious and philosophical knowledge, science can help a person to develop a holistic picture of life and point out the place of man in it. Finally, it can not lead a man in his private life, can not know the inner strength of the human soul and human relations. Science itself is constantly in need of guidance. Therefore, the words of K. Marx «then natural science will include the science of man in the same extent that the science of man will include natural science: it will be one science» have not lost relevance.

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