

Main Research Areas Of Scientists Of The Khorazm Academy Of Ma'muna

Gularam Kamilovna Masharipova

professor of the University of AlFraganus, Doctor of Philosophy

Abstract. The article presents information on the main research areas of the sources of scientists of the Khorezm Academy of Ma'mun. Everyone knows that scientists of this period worked in many areas, such as mathematics, physics, chemistry, astronomy, ethnography, medicine, history, literature, ethics, philosophy. The article examines the views on social relations, science, education, lifestyle and social life in the historical and philosophical heritage of scientists of the Khorezm Academy of Mamun, the dialectic of the natural science paradigm and the ontological views of Abu Nasr ibn Iraq and Based on the sources, Abu Rayhan Beruni, Neoplatonic elements in the ontological teaching of Abu Ali ibn Sina, the classification of sciences, the humanistic nature of ethical views and their influence on the development of historical and philosophical thinking were scientifically studied and analyzed.

Keywords: research, sources, main directions, philosophical, ontological, epistemological views, mathematics, physics, ethics, science, education.

INTRODUCTION.

Publications related to the study of the scientific heritage of the scientists of the Khorezm Academy of Mamun are mainly written by Uzbek scientists (S.D. Dzhaliilov, P.G. Bulgakov, Z.G. Dzhaliilova, G.P. Matviyevskaya, H. Tllashev, M.S. Bulatov, O.S. Tursunov, S.Kh. Azizov) studies were also included. In studies devoted to the scientific heritage of Central Asian scientists, the treatises of Muhammad ibn Musa al-Khwarizmi «Zij» and «Work with the Astrolabe» were briefly described, and it was also noted that the sine quadrant was described for the first time in science as a separate catastrophic instrument [1, pp. 201-218]; More complete information is given in the work of Mahmud al-Shaghmini «Al-mulakhas fi-l-haya» (الملكش في الهيئة) [2, pp. 191-210]; several articles are devoted to the work of Ulugbek, his Samarkand observatory and the work of its scientists, which reflect Ulugbek's achievements in the field of disasters [3, 7-140-pp.], the structure of the observatory built [4, 199-216-pp.], the scientists in it (Gazizade Rumi, Ali Kushchi) life [5, 36-pp.]

and work [6, 381-386-pp.], scientific commentary on the disaster. An instrument built in Tashkent in the 9th century is described [7, 56-60-pp.]. In one of the translations of these collections from Arabic into Russian, the catalog of stars of Abu Rayhan Beruni was translated and the necessary scientific commentary was given to it [8, pp. 83-194]. The next translation consists of excerpts from «Kanuni Masudi» by Abu Rayhan Beruni and the work of Ibn al-Haytham «Al-mulakhas fi-l-haya» [9, pp. 305-338]. In the studies of Uzbek scientists published in these collections, there are more issues related to the scientific activities of Abu Rayhan Beruni, including scientific works recorded on the basis of research and direct observations of specialists in specific sciences in the field of knowledge of catastrophes. [6, p. 381], the Ulugbek Observatory and tells about the scientists who created it [4, p. 201], Ibn Iraq and the scientific heritage of Abulhusayn Abdurrahman ibn Umar al-Sufi, a major representative of the Muslim East. philosophy [14, p.93]. Several issues of collections entitled «Historical and Astronomical Research»

(«Research on the History of Catastrophes») also reflect the activities of the Khorezm Academy of Mamun in the field of catastrophes. The bulk of the materials published in them are devoted to the analysis of the legacy of Abu Rayhan Beruni associated with the catastrophe. For example, the star catalog of Abu Rayhan Beruni was translated into Russian for the first time, as well as the star catalogs of Umar Khayyam (1040-1123) and Nasir ad-Din Tusi (1201-1274). time; in scientific commentaries, all three works are compared with the information of the Greek scientist Claudius Ptolemy [10, pp. 195-220].

The catalogue of stars by Abu Rayhan Beruni was first published in science in India as part of the «Kanuni Masudi» [11, p. 218]. B.A. Rosenfeld, who wrote the preface to the Russian edition, expressed the opinion that the catalogue by Abu Rayhan Beruni was compiled on the basis of Ptolemy's «Almagest» and the catalogues of Abulhusayn Abdurrahman ibn Umar al-Sufi (903-983), who lived in the city of Ray. This translation can be called the first serious study in Russian of the heritage of scientists from the Khorezm Academy of Mamun in the field of exact sciences. In the article by P.G. Bulgakov [11, p. 218], the work by Abu Rayhan Beruni «Geodesy» is noted as an important written monument related to disasters, which examines practical (geodetic) issues of disasters (determining the geographical latitude of a place, disaster). devices made by Abu Rayhan Beruni, Determination of the deviation of the plane of the ecliptic from the equator, in the description of the Honorary Sextant of Abu Rayhan Beruni, determination of the geographical longitude and size of the Earth, etc.) concludes that it was seen.

In the study of A.K. Taghi-Zade [15, pp. 183-200] quadrants that existed in the East in the Middle Ages are described; In this area, they say that al-Khwarizmi wrote about the sine quadrant in his book «Working with the Astrolabe», and Abu

Rayhan Beruni gave detailed information about the quadrant in his books «At-Tafhim», «Qanuni Masudi», «Geodesy», «Honorary Sextant».

In a number of other articles - research by Abu Rayhan Beruni on the Indian catastrophe [18, p. 227-236], his works on the zodiacal light in Kanuni Masudi [p. 16, 290-292], the treatise «Honorary Sextant» [17, pp. 211-220], written about his thoughts on the movement of the Sun [18, p. 227].

The study by B.A. Rosenfeld entitled «Catastrophes in Islamic Countries» is written in the form of general information, it briefly touches on the ideas about catastrophes that existed among the Arabs in ancient times, and then analyzes research in the field of catastrophes in the Baghdad Caliphate, in which Central Asian scientists are separately assessed (Muhammad ibn Musa al-Khwarizmi, Habash al-Khasib, Ahmed al-Farghani). Then, in the following centuries, information is provided about the development of disasters in some of its Eastern countries - the Middle East (Nishapur, Shiraz, Ray), Khorezm, Syria, Arabia, Egypt, Turkey, the Caucasus, India, Maghreb, Spain, during the reign of some dynasties (Ghaznavids, Seljuks, Timurids, Safavids) the history of knowledge about disasters is illuminated.

In the parts of the article devoted to Khorezm and the Ghaznavids, the author notes that the history of catastrophes in Khorezm has ancient roots, and during the research of the archaeological expedition in Koikiryanka, the remains of an observatory were discovered. After this, he briefly touched upon the research of catastrophes by scientists of the Khorezm Academy of Mamun (Ibn Iraq, Abu Rayhan Beruni, Mahmud Chaghini); As an example, the work of Abu Rayhan Beruni for the Ghaznavid dynasty is given [20, pp. 67-122]. In the article by G. P. Matviyevskaya, H. Tllashev in the 13th issue of «Historical Catastrophes» [19, pp. 219-234] the life and scientific legacy of Abu Nasr

ibn Iraq, a major representative of the Khorezm Academy of Mamun, are discussed. His name was originally given as Abu Nasr Mansur ibn Ali ibn Iraq, and it was shown that he came from an Iraqi family belonging to the Khwarazm dynasty. Then each of his works on astronomy and mathematics is given separately, with a brief reference and an investigation of the time of their writing, whether they have survived, or, if not, which of the Eastern scholars are mentioned in their works.

In the section of works related to mathematics, Ibn Iraq - «Islah Kitab Manalus».

(اصلاح كتاب منالوس) («Corrections to the Book of Menelaus («Spherical»)), its text was translated into German by M. Krause in 1936 from a single copy stored in the library of Leiden University, and published with a detailed description of the philological study, as well as a brief study by the authors of the article, given

Articles devoted to the development of mathematics in the East were also published in various volumes of the collection «Historical and Mathematical Studies», regularly published in Russian since the second half of the 20th century. A significant part of them is the scientific heritage of scientists of Central Asia and Khorezm of the Mamun Academy. In particular, there are many articles reflecting the works of Abu Rayhan Beruni on mathematics. They used the methods of Abu Rayhan Beruni to create an ellipse, parabola and hyperbola in one plane from a circle using an astrolabe, or more precisely, an image of the horizon and almucantar in the form of an ellipse, parabola, hyperbola (S.A. Vakhobov) [21, st. 339-344], a comparative analysis of the methods for determining the direction of the Qibla, recorded in the works of Abu Rayhan Beruni, Mahmud Chagmini and Kamoliddin Turkmani (11th century) (Atagarriev M.N.) [22, pp. 44-47], the manuscript of the Leiden University Library «Perfect Methods of Making an Astrolabe» by Abu

Rayhan Beruni («Isti'ab al-wujuh al-mumkina fi san'a al-asturlob») (استعاب الوجوه الممكنة في صنعها) (Or .591/4) analysis based on (Vakhobov S.) [23, pp. 328-335], «Special Words on the Problem of Shadows» by Abu Rayhana Beruni (Ifrad al-maqal fi amr al-azlal) [24, pp. 226-231] and the use of square interpolation (Rosenfeld B.A.) [25, pp. 421-430].

In two volumes of the collection Mathematical knowledge on the history of the peoples of Central Asia in the 9th-15th centuries (Yushkevich A.P.) [26, pp. 455-489] and the study of the history of mathematics in Central Asia (S.Kh.Sirojiddinov, G.P.Matviyevskaya) [27, pp. 51-56], articles were published devoted to topics that examined the development of mathematics in Khorezm. The above-mentioned study by A.P. Yushkevich, devoted to the contribution of the peoples of Central Asia to the development of mathematical knowledge in the 9th-15th centuries, is based on convincing evidence that the conclusion of Western scientists that mathematics among the Arabs is only a repetition of the legacy of ancient Indian and Greek scientists is incorrect. In the East, it was noted that only the achievements of ancient Indian and Greek science are subject to changes, corrections and new considerations. The article also states that the term «Arab», which has become a tradition in Western science, is a mistake, that many nations created the Arabic language in a certain period, and this situation also concerns the field of mathematics, and provides specific examples.

A. P. Yushkevich emphasized that mathematical sciences occupy an important place in the scientific heritage of Central Asian scientists of the 9th-15th centuries, highlighted achievements in the field of arithmetic, algebra and trigonometry, as well as fundamental discoveries; in calculus and combination - improvement of the hexadecimal positional system, discovery of decimal fractions, development of methods for deriving numbers from

roots, application of the «Newton binomial» formula for any natural indicator, expansion of the understanding of a real positive number; in algebra - application of numerical algebra in geometry and trigonometry and discovery of the integration method, creation of a geometric theory for solving cubic equations; such as the creation of a system of plane and spherical trigonometry, calculation of accurate and perfect trigonometric tables. In the article we approach the concept of the «Central Asian region» in a broader sense, partially covering the Middle East. Among the studies most relevant to the article is a short article «On the Study of the History of Mathematics in Central Asia» [27, p.60], co-authored by S. Kh. Sirodzhiddinov and G. P. Matviyevskaya. Its authors note that the consistent study of the history of mathematics in the Near and Middle East, as well as in Central Asia, began in the second half of the 19th century, and in Uzbekistan - mainly in the second half of the 20th century. It should be said that when it comes to research in Uzbekistan, this concerns not only mathematics, but also the history of specific sciences in general. As noted by researchers in this field, A. P. Yushkevich, T. N. Kori-Niyazov, B. A. Fayzullaev, V. P. Shcheglov, M. A. Sobirov are indicated. It is said that the research reflects the observatory of Ulugbek, Ulugbek «Zij», the works of Mahmud Chagmini on mathematics and astronomy, translations of the works of Abu Rayhan Beruni into Russian and Uzbek. Researcher G.K. Masharipova carefully studied the scientific legacy of this period [28-32].

In general, this article can be assessed as a preliminary retrospective analysis of the study of the history of mathematics in Uzbekistan.

Conclusion. 1. The materials published in collections dedicated to the legacy of scientists of the Khorezm Academy of Mamun can be divided into four groups: 1) problems related to specific sciences in the legacy of Muslim scientists of the

East; 2) Scientific heritage of scientists of Central Asia;

3) Research related to the activities of the Khorezm Academy of Mamun; 4) Translations of works of Eastern scientists related to natural science and philosophy.

2. It became known that the achievements in the field of philosophical sciences in Khorezm of the 10th-12th centuries were systematically studied in Uzbekistan in the second half of the 20th century, and the weight of local scientists in these studies increased. Published in the form of studies, scientific articles, popular science brochures, individual monographs and collections. 3. When summarizing the published works, it was found that the works of some scientists who worked in Khorezm in the 10th-12th centuries in the field of philosophical sciences (for example, the scientific heritage of Abu Rayhan Beruni) have been studied much better, while at the same time there are no studies of their works. Also, in various fields, studies were conducted on the work of Abu Ali ibn Sina by scientists of the Khorezm Academy of Mamun, but they were little studied from the point of view of philosophical views.

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