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THE LIFE AND SCIENTIFIC LEGACY OF AHMAD AL-FERGHANI

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Annotatsiya: This article discusses the life of al-Farghani, a great astronomer, mathematician, and geographer among the Central Asian scholars of the Middle Ages, and his scientific legacy.

Keywords: Kat, Gurganj, xalifa, Yazdigart, Alfraganus, «Zij», «Kitob surat-ul-arz», Bayt ul-hikma, Habash al-Hosib.

Introduction

The scientific legacy of Farobi, one of the greatest encyclopedists of his time, has been studied by world scholars for several years. From this point of view, it can be said that the scientific legacy of Ferghani can also be studied as a separate object of research.

The full name of the scholar is Abul Abbas Ahmad ibn Muhammad ibn Kathir al-Farghani. The sources have almost no other information about him, except that he was from Fergana. However, it should be noted that, according to the tradition in Muslim countries in the Middle Ages, the capital or center of the country was also called by the name of the country. For example, Kot, the capital of Khorezm until 995, and its later capital Gurganj, were also called Khorezm. This custom is still preserved in some Arab countries. This is why the capital of Egypt is called Cairo - Misr, and the capital of Sham (Syria) is called Damascus - Sham. According to this custom, the central city of the medieval Fergana Valley, Akhsikat, was also called Fergana. Al-Farghani was born in the village of Quba (Quva) in the Fergana Valley. It is known that al-Farghani was a member of the circle of scholars in Merv, the deputy of Caliph Harun al-Rashid in the eastern lands, and his son Abdullah (the future Caliph al-Ma'mun). Perhaps because Abdullah was thirsty for knowledge from a young age, when he was appointed governor of Merv in 806, he began to gather scholars and talented young people from Transoxiana, Khorasan, and Khorezm. It is also possible that the bulk of these scholars had gathered there before Abdullah arrived, since Merv had been a major scientific center since the Sasanian period. It is known that when the last Sasanian emperor, Yazd-e-Garde ibn Shahriyyar, fled the Arabs in 615, he brought with him the books of the capital's library. Merv did not lose its position even under the Arabs, but rather continued to grow until the Mongol invasion. Accordingly, it is natural that it was a major scientific and cultural center of the caliphate at the beginning of the 9th century.

Despite the paucity of information about al-Farghani's life, his name was well-known in the Middle Ages in the East. Orientalists such as Ibn al-Nadim (10th century), Ibn al-Qifti (12th-13th centuries), Abul Faraj Bar Ebrey (13th century), and Haji Khalifa (17th century) mention him in their works. Al-Farghānī's main astronomical work, "The Book of Celestial Movements and the General Science of Astronomy" ("Kitab al-harakat as-samowiyya wa jawāmi' ilm an-nujum"), was translated into Latin twice in Europe in the 12th century and into other European languages in the 13th century, and its Latinized name "Alfraganus" became widely distributed in the West for several centuries. His book served as the main textbook on astronomy in European universities throughout these centuries. The Latin translation of Al-Farghānī's work was first published in 1493, making it one of the oldest published books. After the famous Dutch mathematician and Arabist Jacob Golius published the Arabic text of Al-Farghānī's work in 1669 with a new Latin translation, the fame of Al-

Farghānī and his work in Europe increased even more.The famous scientist Regiomontan, one of the great figures of the European Renaissance, lectured on astronomy at Austrian and Italian universities in the 15th century based on al-Farghani's books. Al-Farghani's name was also mentioned by Dante (15th century) and Schiller (18th century). Among the European scientists, Dalambre, Brokelman, H. Zutter, I. Yu. Krachkovsky, A. P. Yushkevich and B. A. Rosenfeld highly appreciated al-Farghani's work.

Currently, eight works by al-Farghani are known, all of them related to astronomy, and none of them has been translated into modern languages. They are: the above-mentioned work, usually also called the "Book on the Fundamentals of Astronomy" - manuscripts are in almost all libraries of the world. "Book on the Making of the Astrolabe" - manuscripts are in the libraries of Berlin, London, Mashhad, Paris and Tehran, "Book on the Practice of the Astrolabe" - a single manuscript is in Rampur (India), "Tables of al-Farghani" - manuscript is kept in Patna (India), "Treatise on Determining the Times of the Moon's Staying Below and Above the Earth" - manuscripts are in Gota and Cairo, "Book on the Making of the Sundial" - manuscripts are kept in Aleppo and Cairo. The work "Substantiation of the Theoretical Views of Al-Khwarizmi's "Zij" is mentioned by al-Biruni, but the manuscript has not been found. The other two works of al-Farghani at the top of this list have not yet been studied by anyone. Without a doubt, their study and analysis will open up new aspects of al-Farghani's work and will also clarify the reasons why the scholar was so famous in the Middle Ages, and later in the East and West.

As we have said, the first of these works was translated into Latin several times starting in 1145. In all of these translations, al-Farghani's name was written in Latin as "Alfraganus", and in this form it entered the science forever. This work of Al-Farghani is the simplest textbook on astronomy, it does not contain complex geometric shapes and mathematical formulas, calculations. This made it much easier to master the basic information on astronomy. Perhaps the great Regiomontanus, realizing this feature of the work, chose this work of Al-Farghani as a guide for his lectures at universities.

Thus, this work of our great ancestor played a significant role in the development of culture during the European Renaissance and much later. The geographical section of the work, which is described according to the theory of climates, is noteworthy. Judging by the names of countries and cities, al-Fargani was familiar with the geographical work of al-Khwarizmi or he also used the source used by al-Khwarizmi, since these names are the same in both authors. The geographical section (chapter 9) is entitled: “On the names of certain countries and cities on earth and on the things in each climate.” After this, all seven climates are described, along with the provinces and cities of the countries in them. It should also be noted that the earliest geographical work written in Arabic in the Middle Ages was al-Khwarizmi’s “Kitab Surat-ul-Arz.” In it, al-Khwarizmi described the seas, countries, mountains, rivers, lakes, and cities in the seven climates. In it, he continues the description from the westernmost edge of the Rub’i Ma’mur, that is, to the Atlantic coast of Africa, that is, to the Japanese islands in the Pacific Ocean. The description continues in a wide direction from the equatorial lands to the northern polar lands. The method of describing the climates given by al-Farghani differs from that of al-Khwarizmi. While al-Khwarizmi based his description method on the Ptolemaic tradition, al-Farghani based his description on the Indian tradition and begins his description of the Rub'i Ma'mur from the easternmost edge. The descriptions of climates 3, 4, 5, 6 and 7 in his description of the climates are noteworthy. Because they describe the cities and regions of Central Asia and adjacent lands. Therefore, we will cite an excerpt below that includes those descriptions.

"The third climate begins in the East and passes through the north of the country of China, then through the country of India, and then through the provinces of Kabul and Kerman.

The fourth climate begins in the East and passes through Tibet, then through Khorasan, which includes the cities of Khujand, Usrushana, Fergana, Samarkand, Balkh, Bukhara, Herat, Amuya, Marwarrud, Marv, Sarakhs, Tuye, Nishapur. Then it passes through Jurjan, Kumis, Tabaristan, Demovand, Qazvin, Dailam, Ray, Isfahan.

The fifth climate begins in the East from the country of Yajuj, then passes through the north of Khorasan, where there is the city of Toraz - a city of merchants, Navokat (Navkat), Khorezm, Isfijab (Sayram), Turar-band (O'trar - present-day Aris) and Azerbaijan, the region of Arminia (Armenia), Barda'a (Barda), Nashava (Nakhchivan).

The sixth climate begins in the East and passes through the country of Yajuj, then through the country of the Khazars (North Caucasus and the lower Volga), crosses the middle of the Jurjan (Caspian) Sea and goes to the country of Rum (Byzantium).

The seventh climate begins in the East from the north of the country of Yajuj, then from the Turkic countries (Central Asia), then from the north of the Sea of Jurjan, then crosses the Sea of Rum (Black Sea), passes through the country of the Slavs (Slavs) and ends in the western sea (Atlantic). It is clear from the passage quoted that although al-Farghānī described a vast area, he described his native land, Transoxiana, in greater detail. It should also be noted that al-Farghānī's vision of the Rub'i Ma'mur is quite clear and free from any mythological connotations. For example, he did not refer to the land of Gog as a mythical land in the East, but rather to a specific geographical area corresponding to present-day eastern Mongolia and northeastern China.

The name of Ferghani, like Khorezm, is famous throughout the East and the West. As a scientist who made a great contribution to the development of natural and scientific knowledge in the Middle Ages, he is mentioned and studied with great pride and honor in sources, in the works of recent Western and Eastern authors, and in his homeland, Uzbekistan, especially in his homeland, and today streets and educational institutions are named after him. In 1998, by decree of the President of the Republic of Uzbekistan, the 1200th anniversary of the scientist's birth was celebrated with great festivities.

It is known that the scientific school that emerged in Baghdad in the Middle Ages - the "House of Wisdom" ("Bayt ul-Hikma") - acquired a special significance in the history of science of the Eastern peoples. The scholars who worked in this center made a significant contribution to the development of science of that time, in particular, the exact sciences, studying the scientific heritage of ancient Greek, Indian and other peoples, analyzing them and enriching them with new ideas. As a result, a number of works attributed to their pen appeared, which became unique masterpieces of medieval science. Although Central Asian scholars played a leading role in the development of science and culture throughout the Muslim East in the 9th-12th centuries, the lives and activities of these scholars who lived during this period, which was recognized as the "golden age" of Muslim culture, have not been fully elucidated to this day. A certain number of Central Asian scholars were selected by Caliph al-Ma'mun and taken to the capital, Baghdad. Among them were the great scholar Muhammad al-Khwarizmi from Khorezm, the famous astronomer Ahmad al-Farghani from Fergana, the great astronomer and mathematician al-Abbas al-Jawhari from the Farab (now Gawhartepa) region of that time, Yahya ibn Abu Mansur from Merv, the organizer of astronomical research and observations in Baghdad and Damascus, and others.

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