American Journal of Advanced Scientific Research (AJASR)
ISSN: 2195-1381
Vol. 1 Issue 6, September – 2024, Pages: 10-12

Scientific Heritage Of Fakriddin Ar-Razi, One Of The Scientists Of The Anushteghini-Khorazmshah Period

Masharipova Gularam Kamilovna
professor, non-governmental educational organization
"Alfraganus University", Doctor of Philosophy

Abstract: *The article presents information about the scientific heritage of Fakhriddin ar-Razi, one of the scientists of the Anushtegini-Khorezmshah period. The scientific heritage of Fakhriddin ar-Razi in his time and later was taught as a textbook in madrassas. In particular, his work "Mafatikh al-Ulum" is based on the original foundations of various sciences, that is, on the foundations of sciences, and many people referred to this work. Today, this work has not lost its significance.*

Keywords — Anushtegins, Khorezmshahs, scientific heritage, foundations, education, training, scientific research, mathematics, astronomy, medicine, music, chemistry, physics, animal world.

INTRODUCTION.

Fakhriddin ar-Razi (1149-1209) is one of the great thinkers who lived in Central Asia. According to sources, he was born in Rye, came to Khorezm in his youth and received his primary education there. Later, he visited the cities of Mecca, Medina, Baghdad, received education from famous scientists, returned to Khorezm and continued his scientific research. Many of Fakhriddin ar-Razi's works have not reached us. In the work entitled "History of Iranian Literature", published in Tehran in 1336/1917, it is said that the number of works belonging to the pen of Fakhriddin ar-Razi is more than thirty.

In the introduction to the scientist's work "Collection of Sciences"**(جامع العلوم)** ("Jama al-Ulum"): "The author of the book is Muhammad ibn Umar Fakhriddin ar-Razi. Having written this book, I embarked on the path of science, agreed with my mind, argued, and then decided that it was necessary to write it exactly like this. As a result, I decided to write a book with this title. I tried to open complex, closed things in it. I tried to convey to those in need the secrets of a number of sciences, such as mathematics, astronomy, medicine, music, chemistry, physics, animals, history and plants. With this book, I guided those who walked in ignorance," he says.

The book is divided into 60 chapters, which include a number of scientific fields, such as arithmetic, geometry, history, music, shatranj (chess), logic, medicine, language, ethics.

J.H. Ibodov studied individual scientific chapters, translating them into Uzbek based on the comments [1, pp. 29-31; 2, pp. 118-119].

According to the Iranian orientalist Jalal Humay, Fakhriddin ar-Razi wrote the book in Gurganj, the ancient capital of Khorezm, in 1178 under the name of Sultan Takash ibn Arslan (1172-1200).

Khorezmshah Takash believed in victory in the struggle for first place in the east of the Muslim world and was not afraid of difficulties. He continued the policy of formation and development of Khorezm of his grandfather Muhammad Khorezmshah Ociz (1127-1156).

During the period when Fakhriddin ar-Razi lived and worked, political changes were taking place in the country. He writes about this: "Since I became interested in science, I have no interest in anything else. I have only tried to achieve this goal. At the time of writing this book, I even stopped all my activities to ensure my livelihood and devoted all my attention to this book. I completed "Jome al-Ulum" in Khorezm in three years. I wrote this book for the benefit of people living under the guardianship of the Khorezm kingdom and other peoples. This treatise is a book that reveals the secrets of the heart and enlightens the ignorant. It is unique among the books known to people until now." The scientist continued his thought: "What should be understood by science? Which science is suitable for our purpose? Scientists before us talked about these problems in their works, and I also wrote about them. My goal is to summarize them. Let people read them and be inspired. Everyone likes to discuss these sciences, read them, study them and explain complicated things to people easily. If a person interested in science wants to know which one he wants, he will find it in this book and will be able, like me, to remember the author and tell people. That is why I called this book "Jome al-Ulum" ("Collection of Sciences"), which includes all sciences.

We provide information about the geometry section in the encyclopedic work of Fakhriddin ar-Razi.

The author calls this the science of geometry. This part of the treatise consists of three sections, and the term "asl" ("initial") is used.

1. He writes: "If we consider the origin of everything, we are sure that it is divided into two parts. For example, take a straight line, if you take an arbitrary point on it, it will divide the line into two parts. In this problem, we examine the plane. Therefore, we call this thing common to the divided parts. In the same way, now let us check time.

If we take the time in which we live now, it will connect the past with the future. In other words, the present separates the past from the future and therefore is common to them. It is the end of the past and the beginning of the future. This state is division. If you divide four numbers into two, then the previous and the next will be equal to two. If a thing, quantity or number is divided into two parts, one is one and the other is three, then there is no middle or common concept, that is, in such cases there is no concept of the end. previous and the beginning of the next.

2. "Basic". Here it is said that geometry is divided into four types by adjacency, i.e. by the things (principles) that are attached. These include: a straight line, a surface (plane), a body (volume), and time (time). The first has one dimension, the second has two, and the third has three. The amount of time is movement. In this section, al-Razi gives an example to explain the formation of rotating bodies: "If one straight line is equal to another straight line, one of them is stationary and the other moves, then the latter bends around the first and takes its previous position, as a result a rotating body is formed."

3. "Basic". In this section, angles and their types are discussed. Triangular, quadrangular, circular, their surfaces are discussed in relation to solids in geometry. Fakhriddin ar-Razi writes on this matter: "If two lines have two directions, if we continue their extension in their direction, they will intersect at one point and form an angle. Euclid claimed that "an angle is formed as a result of the gradual bending of two lines." Sheikh Ur-Rais Abu Ali ibn Sina objected to this definition given by Euclid. He wrote as proof: "If two straight lines meet perpendicularly, angles are formed, they are right and equal to each other. If they meet but are not perpendicular, then one of the resulting angles is acute and the other is obtuse. During the reign of the Anushtegini-Khorezmshahs, especially during the reign of Muhammad Khorezmshah, Khorezm flourished in all respects, all areas of crafts, trade, science, culture and science developed in it, madrassas, mosques and libraries were built in large cities.

Along with religious sciences, mathematics, astronomy, geography and medicine were also considered in madrassas. During this period, achievements were made in specific sciences, administrative, economic, cultural buildings and structures acquired direct practical significance.

The scientific achievements of the Khorezm Academy of Mamun, especially the works of Abu Rayhan Beruni, had a great positive impact on the development of the exact sciences in the kingdom of the Anushtegini-Khorezmshahs. In particular, Mahmud Chagmini continued this tradition in the field of disasters. In the Introduction to his treatise Al-Mulakhhas fi al-Haya (الهيئة في الملخش), he stated that his name was Mahmud ibn Muhammad ibn Umar al-Chaghmīnī, and that Chaghmīn was a village in Khorezm [3, p. 216]. In studies, his name is also written as Abu-l-Fazl Mahmud ibn Muhammad ibn Umar al-Chaghmīnī [4, pp. 163-175]. This information may be sufficient grounds for the conclusion that Chaghmīnī lived and worked in Khorezm. The year of the scholar's death is recorded as 618/1221 in the manuscript of his book Al-Mulakhhas fi al-Haya in the Leiden Library [4, p.8]. This date could have been inserted into the manuscript during the editing process or by the calligrapher.

The manuscript collection of the Abu Rayhan Beruni Institute of Oriental Studies contains 5 manuscripts of Chagmini's work "Al-mulakhas fi-l-haya", and they are stored under the following numbers: 7761/III, 8796/II. , 10417, 10417/XII, 11599/III. Two of them - 7761/III and 8796/II in the sixth volume of the catalog "Collection of Eastern Manuscripts" [5, pp. 70-71] and two more - 10417 and 11599/III in the volume devoted to the exact and natural sciences. of this catalog [6, 80-83 -bb.]. Information about these manuscripts is as follows:

1) №10417. It was written in Nasta'liq script during the Timurid period, more precisely, it was copied in Mashhad in 839 AH (1435 AD) by the calligrapher Burhan ibn Muhammad ibn Uthman. There are drawings. Volume - 103 sheets (1b - 103b);

Consists of the treatise under review, an introduction and two books. The first is the sphere of the planet, the Moon, its movement, the equator, the ecliptic, the latitude of places, azimuth, etc. The second is the Earth, the equator, determining the qibla, Lunar and Solar years. It is written in Nasta'liq script and lists the disasters.

2) No. 7761 / III. This is written in Nasta'liq script. Only the first part of the work is dedicated to the catastrophe. There are drawings. Copied around the 15th century. Volume 11 sheets (52b-62b);

3) No. 8796/II. This is written in the letter of resignation. On page 198 it is written that it was copied in 1238 AH (1822-1823 AD). This manuscript contains information about the movement of the Planets and the Moon. Volume – 17 sheets (257b – 273a); 4) No. 11599/III. It was rewritten in Nastaslik script around the 19th century. It contains a summary of the work of Mahmud al-Shaghmini, consisting of the two books mentioned above. Volume – 18 pages (121b – 138b).

One of his manuscripts, entitled "Al-mulakhas fi-l-haya" (الحيثة في الملكش), was found in 1967 in the city of Urgench. This manuscript was copied in 949 AH (1542 CE) by Hadi Muhammad ibn Ali ibn Ibrahim Astrobadi, a student of Ali Kushchi (died 879/1474), a major representative of the scientific school of Ulugh Beg. The inscription "Al-mulakhas fi-l-haya" is sewn on it. This manuscript of "Al-mulakhas fi-l-haya" is quite old and was written as a copy. This brochure is mentioned by H. Siddiqov in his article dedicated to the scientific heritage of Mahmud Chagmini, and it is in libraries of different countries of the world (Berlin, No. 5673; Gotha, No. 1387; Leiden, No. 1083; Algeria, №1453; Oxford, №2905; Paris, No. 2330, No. 2502, No. 224, №225), as well as in the Abu Rayhan Beruni, Saltykov-Shchedrin Oriental Studies Foundation; St. Petersburg University. He also notes that manuscripts of "-l-haya" (الحيثة في الملكش) have been preserved [7, p. Researchers who wrote about the manuscripts of the treatise, in addition to emphasizing the large number of its copies, also noted that they were not fully involved in scientific research, as a result of which a critical text of the treatise was not created [8, p. 37].

Research has shown that the oldest copy of the manuscript is copy No. 2141/II (the year of rewriting corresponds to 1246), which is currently stored in the Lolali Library in Istanbul [8, p. 37].

"Al-mulakhhas fi-l-haya" by Mahmud Chagmini (في الملكش الحيثة) has been studied, but very little work has been done in this direction in the Uzbek language. Speaking about the history of the study of the work, we believe that it would be correct first of all to touch upon the commentaries written on it and translations into other languages. Information about this is also available in existing studies [3, 216 p.; 8, p. 37]. First of all, we will analyze the comments written about it.

In the history of science, many commentaries have been written on Chagmini's treatise "Al-mulakhas fi-l-haya" (الملكش الهيثة في). Some of them belong to representatives of the exact sciences who lived in the 14th century, and the first belongs to the pen of Shamsiddin Muhammad ibn Mubarakshah Mirak al-Bukhari (died in 1340). There are also Kamoliddin at-Turkmani, who lived in the middle of the 14th century, Ali ibn Muhammad Said Sharif Jurjani (1340-1413) and Abdulwahid ibn Muhammad (second half of the 14th century). One manuscript of the commentary of Ali ibn Muhammad Sa'ed Sharif Jurjani is kept in the collection of the Abu Rayhan Beruni Institute of Oriental Studies, number 2655/III. It was rewritten in the 17th century in a beautiful manuscript, the volume of which is 52 pages (221 b - 272 a) [6, p. 248]. Qazizoda Rumi (761/1360 - 840/1437), a major representative of the scientific school of Mirzo Ulugh Beg (1394-1449), wrote a commentary on the Chagmini catastrophe in 1412. It is called "Sharh al-mulakhas fi-l-haya" (الحيثة في الملكش شرح). Because the commentary written by Qazizada Rumi on the treatise of Chagmini is more perfect in terms of the requirements of specific sciences than the commentaries written on this work earlier. It contains the full text of "Al-mulakhas fi-l-haya", and Gazizada's additions are placed inside the text and underlined. There are many manuscripts of Qaziza's commentary written by Rumi in the world's book treasuries.

20 manuscripts of "Sharh al-mulakhas" (الملخش شرح), written by Rumi in Gaziza, are recorded in the fund of the Institute of Oriental Studies of the UZR FA named after Abu Rayhan Beruni: No. 8217; 3935 / II; 10504 / I; 2655 / II; 8392; 8607 / II; 1162 / I; 9592; 7672; 7376/I, 117921; 5607; 9783/2; 3049/I; 8947/III; 9346/II; 5619/I; 2984I/IV; 1341; 6627 [6, p.83]. Among them, the oldest number 8217 was copied in 986 AH (1578 AD) from the calligraphy of the calligrapher Muhammad Momin ibn Muhammad Qasim. However, it has some shortcomings: there are copied sheets from later periods, the first eight sheets were also copied later. Among them, 3049/I (census of 1229/1813-1814, with clearly drawn drawings) and 2655/II (census of 1070/1659, with mixed copy-sul letters) stand out for their completeness and quality. Based on these two manuscripts, P. G. Bulgakov translated into Russian "Sharkh al-mulakhas fi-l-haya" (الهيئة في الملكش شرح) [3, 216 p.].

number of commentaries on Rumi's Sharh al-mulahhas fi-l-haya were also written in Gaziz. There are two such commentaries in the collection of this institute: the first was written by Nizamiddin Birjandi, this collection contains five of his manuscripts, the oldest of which was rewritten in 1007/1599 by the calligrapher Khushkhol, but only part of the work is cited [6, p. 248]; the second - manuscript No. 11792/2, written by Giyaziddin Mansur, was rewritten by Muhammad Tayyib Samarkandi in 1062/1651-1652 [6, p. 97]. In general, Mahmud Chagmini "Al-mulakhas fi-l-haya" (الحيثة في الملكش) There is enough information in the work of Haji Khalifa "Kashf az-Zunun" **(كشف الظنون)**. Full information about this can be found in the scientific research of the researcher G.K. Masharipova [10, 364 p.; 11, 144 p.; 12, 210 p.].

Conclusion. An important role in organizing students' free time, especially when preparing for exams, was played by Fakhriddin ar-Razi, who worked during the reign of the Anushtegini-Khorezmshahs. Because chess sharpens the mind and broadens the worldview. It is concluded that the period of his life corresponds to the last stage of political, economic and scientific development of the state of Anushtegini-Khorezmshahs (first quarter of the 13th century) and confirms that the capital was in Gurganj. The studies indicate the geographical extent of the city of Gurganj in relation to the direction of the city of Mecca (qibla) as evidence of this.

REFERENCES

[1] Ibadov J.H. Mathematical section of the encyclopedia "Collected Sciences of Fakhr ad-Din ar-Razi"/ - Tashkent: Izv. Academy of Sciences of the Republic of Uzbekistan 1988, No. 3.P. 29-31.

[2] Ibodov D.Kh. Classification of physical and mathematical sciences in the al-Razi encyclopedia. - Moscow, 1992. - P. 118-119.

[3] Rumi Kazi-Zadeh. Commentary on Chagmini's Collection of Astronomy. Preface, translation from Arabic, P.G. Bulgakov. - Tashkent: Science, 1993. - 216 p. (+Appendix 16 pages).

[4] Bulgakov P.G. Commentary by Rumi Kazi-zade to the "Collection of Astronomy" by Chagmini // From the history of the science of epoxy resin of Ulugbek. - Tashkent: Science, 1979. - P.163-175.

[5] Collection of oriental manuscripts of the Academy of Sciences of the Republic of Uzbekistan. T.VI. №4244; №4245. - Tashkent: Nauka, 1967. - P. 70-71.

[6] Collection of oriental manuscripts of the Academy of Sciences of the Republic of Uzbekistan. Exact and natural sciences. Composer A.B. Vildanova. - Tashkent: Nauka, 1998. - P.80- 83; 248.

[7] Siddikov H. Geometry in the works of scientists of Central Asia, the Near and Middle East (11th-16th centuries). - Tashkent: Nauka, 1981. - B. 180-195, 199.

[8] Boriev O., Toshev N. Jalaluddin Manguberdi. - Tashkent: Fan, 1999 (Period. Leadership activity. Sources). - Tashkent: Nauka, 1999. – 36 p.

[9] Matviyevskaya G.P., Rosenfeld B.A. Mathematics and astronomy of the Muslim Middle Ages and IX works (VIII-XVII). Book. 1-3. - Moscow: Nauka, 1983.

[10] Masharipova G.K. . The influence of the natural scientific, socio-philosophical and spiritual heritage of scientists of the Khorezm Academy of Mamun on the development of social thinking. Monograph. - Tashkent, Navruz Publishing House, 2019. - 364 p.

[11] Masharipova G.K. The role of the scientific, philosophical and spiritual heritage of Abu Ali ibn Sina in the life of society. Monograph. - Tashkent, Navruz Publishing House, 2020. - 144

[12] Masharipova G.K. Great discoveries of the Middle Ages - the contribution of Khorezm mathematicians to the development of science. Monograph . – Tashkent: Navruz Publishing House, 2021. – 210 p.