



SCIENTIFIC ACTIVITY AND CREATIVITY OF ABU RAYKHAN BERUNI AT THE KHOREZM MA`MUNA ACADEMY

(Dedicated to the 1050th anniversary of the birth of Abu Rayhan Beruni)

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Abstract

The article provides information about the scientific activities and creativity of Abu Raikhan Beruni at the Khorezm Ma`mun Academy. In the 9th-12th centuries, scientists traveled to other countries to engage in scientific creativity and improve their knowledge. However, not all rulers liked their free-thinking and truthfulness. This forced the devotees of science to leave their homeland and seek refuge from the rulers of other countries.

Keywords: Ma`mun, academy, scientists, natural sciences, philosophical heritage, great discoveries.

In the 9th-10th centuries, several independent states arose on the territory of our country, and from the point of view of political and economic development, Khorezm had a greater advantage than other countries. Gurganch flourished in the 10th century. He was surrounded by the strong walls of a white castle six meters high. Newly constructed beautiful buildings add to the beauty of the city. Muqaddasiya (10th century): “Gurganch is expanding day by day, there is



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nothing in Khorasan that could compare with the gates of the palace built by Mamun in front of the Khojaj gates. Mamun's son Ali built a palace in front of him. There is a square in front of the palace, like in Bukhara," he writes [p. 15, 22].

Ali ibn Mamun built hospitals, mosques and madrassas in Gurganj. The city streets are clean and tidy. During this period, cleanliness was taken seriously. The laying of polished stones on the roads and the excellent organization of city life led to a special order of streets in the 9th-12th centuries. Also in the 10th century, Khorezm Shah Ali ibn Mamun carried out many landscaping works in Khorezm and provided direct material support to scientists.

Cities had internal rules that all residents had to follow. According to a written source, their implementation was controlled by a special government official-specialist. In particular, his responsibility was to monitor the cleanliness of the streets [2, p.69].

Sometimes the gathering of scientists in one place happened much faster. The same thing happened in the 9th-11th centuries, when scientists of different skill levels and interests acted in different directions. Although they were scattered across different regions, they gathered in the palaces of rulers who provided them with a comfortable life in exchange for their knowledge. In those turbulent times, it was not easy to find such a convenient place for creative activities. At the end of the 10th and beginning of the 11th centuries, Gurganch was free from such upheavals, and there were favorable conditions for devotees of science.

At the Academy of Khorezmshah Ma'mun ibn Ma'mun ("Majlisi Ulema") Abu-l-Khair Hammar (X-XI centuries), Abu Muhammad ibn Khidra al-Khojandi (X-XI centuries), Ma'mun ibn Ma'mun (d. 1017), Abu Rayhan Beruni, Abu Sahl Isa



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ibn Yahya al-Jurjani al-Masihi (d. 1011), Abu Nasr ibn Iraq, Abu Sa'id ibn Ahmad ibn Muhammad ibn Miskawaih (d. 1030), Ahmad Muhammad al-Sakhri (d. 1015), Zainuddin Jurjani (10th-11th centuries), Abulkarim Zirgali (10th-11th centuries), Abu Ali ibn Sina, Abu Abdullah al-Biyan al-Naysaburi (d. 1004) Ahmad ibn Muhammad al-Sakhri al-Khwarizmi (d. . 1015), Abu Mansur al-Salibi (961-1038), Abu Abdullah Ilaqi (d. 1038) and other scholars. They studied various fields of science, such as mathematics, astronomy, psychology, al-chemistry, logic, medicine, philosophy, history, linguistics, pedagogy (raising children), literature, music, geography, topography, mechanics, geodesy.

Mamun held scientific discussions with scientists in his palace. They expressed their opinions on various issues in various fields and argued. The winners of this scientific conference were awarded valuable gifts.

The scientists were led by Abu Rayhan Beruni, the Prime Minister of Khorezmshah, the patron of science, Abu Mansur al-Sakhri, who did not spare his services in creating a truly creative environment for scientists. Scientists studied in the rich library of Gurganch, deepened the knowledge of their students and expanded their thinking. Representatives of the Academy made a worthy contribution to the rise of science not only in Central Asia, but also in all countries of the East and West [14, p.158]. They served to further increase his influence in Movarunnahr and Khorasan.

The head of the Khorezm Academy Mamun Abu Raikhan Beruni studied with the famous scientist of his time Abu Nasr ibn Iraq. This teacher wrote several works on disasters, geometry and mathematics, dedicating 12 of them to Abu Rayhan Beruni. He introduced him to the geometry of Euclid and Ptolemy's doctrine of the apocalypse.



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Abu Nasr Mansur ibn Iraq wrote in one of his scientific works that Abu Rayhan Beruni, despite being very young when he lived in Khorezm, made important observations of disasters in the city of Kot in 384-385 (994-995). AD). He himself invented instruments for these observations. But he was able to determine the farthest, highest point of the ecliptic and the ecliptic without azimuth only for the village located south of Khorezm on the left bank of Jeyhun (Amu Darya).

Abu Rayhan Beruni was educated by Abu Nasr ibn Iraq and became a mature scholar. At a young age, he had a deep knowledge of mathematics, astronomy and other sciences. First of all, it is noteworthy that he knows many languages. Judging by the fact that all the scientist's works were written in Arabic, Arabic was the common scientific language in the countries where Islam was spreading at that time, and he knew the grammar of this language deeply. His "Mineralogy", "India" and other works testify to his deep knowledge of Arabic poetry and its meanings [7, p.24].

His works such as "Monuments of Ancient Peoples", "Kanuni Masudi" and "Saydana" show that Abu Raikhan Beruni knew the Sogdian and Persian-Dari languages very well. According to Saidan, he studied Greek from a young age. He began to learn Sanskrit from Indian merchants in his youth in Khorezm [20, p. 194-195].

The fact that Abu Rayhan Beruni in his youth was familiar with historical treatises written in these languages is reflected in his first major work (written in 1000-1003) "Relics of Ancient Nations".

His scientific, theoretical and experimental studies of the disaster are of great scientific importance. They study "the positions, movements and celestial processes of celestial bodies" as follows: 1) Fire spheroid of the Sun and stars



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[10, p. 114], movement of stars [10, 115], 2) Movement of the earth's crust [9, 183 - p.], (floating and returning) [8, p. 432], 3) Rotational movement of the Earth around its axis [8, p. 255; 16, p. 30], 4) Earth [p. 9, 245] that the Sun and stars have a spherical shape, 5) The movement of the Sun [p. 16, 29], 6) rainbow rain [p.11, 6], fences [p.9, 120], morning and evening dawns [p.16, 30, 112], 7) crown of the Sun [p.16, 114].], their rain [5, p. 235], 11) determining the position of stars [3, p. 59], 12) the inclination of the ecliptic to the equatorial plane [16, p. 46], 13) opinions about the zodiac [9, p. 216].

Abu Rayhan Beruni, in the direction of practical disaster, expressed his views on determining the geographical latitude and longitude of places [16, p. 77], compiling calendars [17, p. 44].

In his "Cartography" he mentions two treatises: the first is "The Book on Compiling a Globe," mentioned only in "Cartography," and the second is "The Book on Determining the Longitude and Latitude of Places on Earth." "They are included in the list of scientific works of the encyclopedist.

Abu Rayhan Beruni writes about lunar addresses in his work "Memorials of Ancient Nations": "In those days when I was away from the high court and deprived of the happiness of honorable service, I saw a man ranked among the scientists of science and astrology in the city of Ray" [6, With. 399]. The "high dargah" mentioned here is, of course, the palace of Khorezmshah Abu Abdullah in Kot, and the "honorable service" is his service to Khorezmshah. The deprivation of this by Abu Raikhan Beruni means the execution of the Khorezmshah and his departure from Khorezm. After this incident, the scientist came to Ray in "Mineralogy" with the words "I had a friend from the Isfahan



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merchants in Ray, sometimes I was a guest in his house,” in “Geodesy” “But Abu Mahmud told me his measurements from his own mouth. . . said that an error had crept in and that he was not happy to discover the largest deviation,” this is fully confirmed by his lines.

The scientist spent his entire life collecting information for Abu Rayhan Beruni’s work “Mineralogy”. During his childhood in Khorezm, and then during his stay in Iran, India and Afghanistan, he collected stories, stories and information about the properties of precious stones, the lands where they were mined and such minerals, and studied their physical and chemical properties. It describes the results of almost 60 years of research in the field of mineralogy. In the treatise, he gives an idea of the weight and volume of objects, for the first time in the history of science, with modern accuracy, he calculates the density and specific gravity of more than 50 substances, and makes special instruments for measuring the specific gravity of solids. and liquids and gives their description [13, 292-402; 4, pp. 402-418; 1, pp. 32-63; 19, p. 179-197].

The scientist remained devoted to his love of science until the last moments of his life. Even on his deathbed he tried to learn. During his life, Abu Rayhan Beruni wrote 155 works on mathematics, astronomy, its instruments, geography, philosophy, mineralogy, pharmacognosy, history, ethnography, chronology and philology.

At the suggestion of Abu Rayhan Beruni, the Khorezmshah, the patron of knowledge in Khorezm, began to gather many great scientists of the East in Gurganj. Among them were famous doctors, philosophers, poets, mathematicians, astronomers, historians and linguists.



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About one of them, Ahmad ibn Muhammad al-Sakhri, Abu Rayhan Beruni writes the following: “Sakhri collaborated with Mamunshah. He was a scholar and wrote poetry with a very beautiful and refined taste. The wide range of knowledge that interested Khorezm scientists at that time is surprising. These are jurisprudence, geology, grammar, narrative, theory of poetry, history, philosophy, logic, medicine, arithmetic, geometry, astronomy, music, mechanics, optics, chemistry, astrology, physiognomy, interpretation of words, geodesy, topography, measures and weights. and precisely they studied the knowledge of measuring instruments, the mixing of water and chemistry, as well as the knowledge of magic, education, spirituality and witchcraft. All scientists were teachers and students of each other. Abu Nasr ibn Iraq made a great contribution to the development of mathematical sciences at the Khorezm Mamun Academy. According to Abu Rayhan Beruni, Abu Nasr ibn Iraq was the first to introduce the mughan form in the form of “permission” musallasati kurravi.

Abu Nasr ibn Iraq wrote several treatises on disasters, geometry and mathematics, dedicating 12 of them to Abu Rayhan Beruni. These works are as follows [12]:

1. «Kitab as-sumut» (كتاب السموت) (“Book of azimuths”).
2. «Kitab fi'illati tansif at-ta'dil'inda ashhab as-Sind» (كتاب في علة تصفيف التعديل عند أصحاب السند) (“A book on the reason for dividing an equation into equal halves according to Sindhi authors”).
3. «Kitab fi tashihi kitab Ibrahim ibn Sinan fi tashihi ikhtilaf al-kawaqib al-ulwiya» f alkwaq b al-lawya (كتاب في تصحيح كتاب ابراهيم ابن سنان في تصحيح اختلاف الكواكب)



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12. “Risala fi khall shubha” arada lahu fi-l-makalaas-salasa ‘ashara min kitab” (رسالة في حل الشبهة أراد له في المقالات الثلاثة عشر من كتاب) (“[Uklidis “Al-Usul”] “The Book of Beginnings” Treatise on the resolution of the doubt that arose in the thirteenth [chapter]).

In conclusion, it should be said that the study of the scientific heritage of Abu Rayhan Beruni clarifies that the scientist recognizes observation as the first stage of scientific knowledge, and also raises observation to the level of conducting active experiments, which he widely used in his scientific and creative activities. Abu Rayhan Beruni believes that scientific truth should be a certain criterion. He knew that the complex and difficult problem of proving the unfoundedness of false, unexamined, heartbreaking, intrusive myths and unsubstantiated claims could be solved through experience and practice. At the same time, we have every right to say that he is a great scientist who understood the importance of logical conclusions and taught us to see the concepts of “intuitive knowledge” and “mental knowledge” together.

The natural scientific heritage of Abu Raikhan Beruni, the problems posed by specific sciences, play an important role in creating a general picture of the world, that is, in the formation of a philosophical worldview. In his astronomical table, Beruni put forward the heliocentric hypothesis that the center of the Universe is not the Earth, but the Sun and that all planets, including the Earth, revolve around the Sun. Alloma's scientific conclusion was scientifically confirmed 500 years later in the heliocentric system of the great astronomer Copernicus. In a conversation with Abu Ali ibn Sina, Beruni came to the conclusion that the planets in the Universe, including the Earth, have mutual attraction. His scientific assumption was scientifically substantiated by the law of universal gravitation,



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discovered by the English scientist Newton at the beginning of the 18th century. With his socio-political views, Abu Rayhan Beruni developed the advanced traditions of not only Central Asian, but also ancient Indian, Greek and Iranian thinkers, and became known to the world as a historical sociologist.

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