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# THE LEGACY OF AL-BIRUNI: HIS DISCOVERIES THAT CONTRIBUTED TO THE DEVELOPMENT OF SCIENCE

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**Abstract**
This article vividly highlights the early years of the Qamusi scholar Abu Rayhan Beruni, his interest in science, the scientist's contribution to the development of world science, the scientific legacy and educational significance of his works.

**Keywords**: Alloma, scientific heritage, civilization, mathematics, geometry, catastrophe, chronology, cartography, philosophy, medicine, education.



## Introduction

Thousands of manuscripts of scholars who have come from our country have been scattered abroad during conflicts and wars, but despite this, tens of thousands of manuscripts and various documents are stored in our Institute of Manuscripts. The most urgent issue at present is the study of these on a large scale, the assimilation of their meaning, the development of scientific thought, and their use in accelerating today's reforms. Today, the main part of the manuscript heritage is stored at the Abu Raykhan Beruni Institute of Oriental Studies of the Academy of Sciences of the Republic of Uzbekistan. It is noteworthy that the fund, which consists of 26 thousand volumes of manuscripts written in Arabic, Persian, Old Uzbek and other Oriental languages, 39 thousand volumes of lithographed books and about 10 thousand historical documents, was included in the UNESCO World Cultural Heritage List in 2000 as one of the unique scientific and cultural objects. It is precisely the study of the scientific heritage of great scientists in the fields of science, ensuring the integration and interconnection of all sciences, that will begin the revival of centuries-old traditions. At the same time, there is not enough information about hundreds of scientists who have lived in our country, and we do not even know the names of some of them. The above-mentioned resolution puts on the agenda the issue of “preserving our rich historical, scientific, spiritual intellectual heritage, conducting scientific analysis, providing detailed information about its content and significance to specialists in the field, pupils and students studying in relevant educational areas, widely promoting the works of our great scientists and thinkers among the world community, effectively using them in the development of modern science, spirituality and practice, and passing them on to future generations.” The encyclopedist Abu Raykhan Beruni was a great scientist of the Renaissance.

The fact that the era in which the scholar lived is called the "Age of Beruni" in science itself indicates the scientist's place in the development of world science. Ancient Khorezm has been a nation that has rocked the cradle of great people since time immemorial. It is no exaggeration to say that Khorezm is a land where the Creator's gaze fell. Because did this land produce the sultan of arithmetic, Al-Khwarizmi, Mahmud Az-Zamakhshari, who was described as "the companion of Allah in wisdom and knowledge", Abu Raykhan Beruni, who was considered the "King of Sciences", and Umar Chagmani, a scholar of cosmology?

The fact that Khorezm received 8 patents from the international UNESCO organization indicates the high level of science and culture of Khorezm.

As we know from history, in 1973, the 1000th anniversary of Abu Raykhan Beruni was widely celebrated by scientists. Scientists who studied the scholar's scientific activities participated with their interesting articles. Abu Raykhan Beruni made a worthy contribution to the development of almost all fields of science, including mathematics, geometry, history, astronomy, geodesy, geography, cultural studies, philosophy, linguistics, and cartography. Beruni was interested in astronomy from a young age. At the age of 16, he determined the height of the sun's highest ascent on the Armilla instrument he made. Since the scholar loved nature, he also had information about medicinal plants, and this knowledge prompted him to write his work "Saydana". In 994-995, the scientist made the "Kurrai Arz" globe in Khorezm, which was 7 gas in size. One of the works that introduced Beruni to the world is the work "Monuments of Past Nations". In this work, the scientist says to scientists that by serving the emirs, you leave an invaluable scientific legacy. The scientist wrote this work in 1000. The scientist observed a solar eclipse near the Nandna fort in India and accurately indicated the time of the eclipse. Here he found the geographical extension of Nandna to be 32 degrees. For the same extension, he also determined the dimensions of the Earth and found the length of 1 degree of the meridian to be 55P 531 15 11 in the decimal system to be 55P 887 miles1.

Beruni measured the radius of the Earth close to the current calculation. It turned out that the radius of the Earth according to Beruni's calculation was 6315886 km. The Americans considered this calculation to be incorrect and, when observing the Earth through their satellites, found that it was very close to the current calculation. According to the current calculation, it was found to be 6400 km2. During Beruni's time, scientists of the world highly appreciated the scholar's scientific thinking. Muhammad ibn Mahmud an-Naysaburi, remembering Beruni, says: “He achieved such great success in mathematics that the camel drivers could not break through his dust, the advanced racers could not catch up with him on the field, God made the four directions subservient to him, the clouds donated their rain for him, and the fruit trees shook their ripe fruits for Beruni.3”

How many collections of Beruni’s books do they have that shade the garden of stars, and the dew falls in the middle of the sky. I was informed that when Beruni finished writing “Al-Qanun al-Ma’sudi”, he sent him an elephant’s load of reward, but Abu Raykhan apologized and

1 Law Masudi. Translation Tashkent, 1973. P.338

2 Usmanov T. 9th grade. Physics additional manual. "Science". 2002

3 1000th anniversary of the birth of Beruni. Tashkent. "Science" 1993. P.-32.

returned it so as not to get used to getting rich with such rewards. The scholar was afraid of the scourge of the soul. Our grandfather Abu Raykhan only took leave of work twice a year, on the holidays of Nowruz and Mehrjan, to get enough food and some clothes for his livelihood. In the article by O.M. Akromkhodjaev, published on the occasion of the 1000th anniversary of the scholar, he gives the following information about Beruni's book on gems. The manuscript of this book of Beruni is kept in the Excurial Library of Spain. In the 20s of the 20th century, manuscript copies of the book were found in the personal library of a person from Kayseri (Turk), and shortly after that in the Palace Library in Istanbul. The copy found in the Palace Library is more complete than other copies4.

Our grandfather Beruni also founded the fountain, that is, he determined the movement of liquids in turbines before Bernoulli. Before Archimedes, Abu Raykhan proved this law in practice. Liquids displace a liquid equal to the volume of the body immersed in them. The scholar created an instrument that measures the volume of the body. Beruni measured the specific gravity of 18 liquids, 18 minerals and other bodies. Thus, before Archimedes, Beruni explained this law by comparing the relative weights of salt and fresh water.

Abu Raykhan Beruni introduced the concepts of light water and heavy water into science and created a water scale. He placed heavy water (sea water) in one part of the water scale and light water (spring water) in the same amount (volume). In this case, he saw that the part where the heavy water stood was heavier, and the scientist proved that heavy water can carry loads compared to light water.

The scientist introduced the “Automatic lamp” and “Automatic sprinkler” devices to science. These devices are important for their use in the economy today.

Our grandfather Abu Raykhan proved the existence of the American continent before Christopher Columbus. The scientific heritage of Abu Raykhan Beruni is being studied by scientists around the world today. Eastern and Western scholars have highly appreciated the encyclopedist Abu Raykhan Beruni. There is no work in the West or the East that is equal to Beruni’s “Hindistan”.

Academician Victor Rosen said that before and after Beruni, there was no work as perfect as his “Hindi work.” ‘‘Jawaharlal Nehru, the statesman of the Indian people. Beruni knew the originality of the language of the Indian author so well that it was a rare event even for such people to emerge from the Indian people, the owners of that language.’’

Professor S.K. Chatterjee of the University of Calcutta expressed the following opinion:

‘‘In the 1000s of our era, as far as we know, there was only one person in the world of culture who knew the Indian, Muslim and Hellenic cultural heritage equally deeply and comprehensively, and that was Beruni.’’

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