
Some Historical Information about the Life and Mathematical Heritage of Beruni

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Abstract - the article discusses materials about the life and mathematical heritage of the famous Central Asian scholar Abu Raikhan Beruni. Beruniy wrote his first major work at the age of 27 in *Al-Asarul-bokiya (Remains of Ancient Peoples)*. In this work, the author reflects the achievements of scientists of that time in the field of mathematics, astronomy and geometry. Beruniy describes the ideas of the ancient Arabs, Iranians, Sogdians, Khorezmians, Greeks, Romans and other peoples cited in yearbooks, as well as information about popular months, weeks and days, holidays and traditions. Completed in 1031, Beruni's famous book, covering 80 chapters of "India," is devoted to various aspects of astronomical science, as well as the development of geometry, history and other objects in Indian society, about Hindu religious beliefs and customs.

Keywords: life, mathematical heritage, geometry, arithmetic, astronomy, geometric bodies, numbers, concepts, the Universe, celestial bodies, planets.

INTRODUCTION:

Abu Rayhan Muhammad ibn Ahmad Beruni was born on September 4, 973 in Kot, one of the oldest cities of the Khorezm oasis (currently the city of Beruni in Karakalpakstan). His childhood and youth passed in this city. In those days, Kot was one of the central cities of Central Asia. Beruni in his youth was interested in many sciences, and Abu Nasr ibn Iraq helped him in this. Ibn Iraq was a relative of the ruling circle of Khorezm, one of the greatest mathematicians and astronomers of the X-XI centuries.

After the events of 995, Beruni was forced to leave the homeland of Khorezm. At that time he was already known as a great scientist. These events were damaged in his scientific work, and he goes to the city of Dzhurdzhon, which is located southeast of the Caspian Sea. Along the way, he stopped in Raye, near Tehran, and met there with scientists from Central Asia, with the famous mathematician and astronomer Khujandi. Beruni is interested in a large astronomical instrument called "Honorary Sextant", made by Khujand at his observatory, and writes the work "A Statement of the Honorary Sextant (995-997).

In 997-998, Beruni again lives in the city of Kote. During the reign of Mamun II, in the House of Wisdom in Kot, many great scientists of that time gathered, such as the famous philosopher, naturalist, Doctor Ibn Sino, philosopher Abul Sahil, scientist and Doctor Abul Hassan Hamar, Mansur As-Saalibiy and other scientists. In the years 995-996, he carried out astronomical measurements in

the city of Kot in circles and other instruments with a diameter of 15 zira (the old unit of measurement of zira is about 49 centimeters).

A.R. Beruniy lived in Dzhurdzhon in 998-1004 and wrote his greatest work "Ancient manuscripts of ancient people." In 1010, the King of Khorezm, Mamun Beruni, was summoned to Khorezm and appointed his chief adviser in the field of science. Beruni at Mamun was a member of the House of Wisdom, where he spent 7 years researching and solving many scientific problems. Beruni also lived in India for many years, in 1031 he wrote a book called "India," based on data collected about the life and customs of people. This book was devoted to the research in mathematics and astronomy of Indian scientists.

Beruniy wrote his immortal work in the history of science, writing astronomy "The Law of Mashudi." In this work, he described the astronomical and mathematical knowledge of the time. Beruni also wrote many mathematical works. These include "Simplification of trigonometric figures", "Description of stars on the plains", "Design of spheres on the plains", "On the recognition of spherical arcs", "Comments on the work of Euclid."

Beruniy died in 1048 in Ghazn (now Afghanistan).

Beruni's mathematical achievements include:

1. Beruniy wrote his first major work at the age of 27 in Al-Asarul-bokiya (Remains of Ancient Peoples). In this work, the author reflects the achievements of scientists of that time in the field of mathematics, astronomy and geometry. Beruniy describes the ideas of the ancient Arabs, Iranians, Sogdians, Khorezmians, Greeks, Romans and other peoples cited in yearbooks, as well as information about popular months, weeks and days, holidays and traditions.
2. The famous book of Beruni, completed in 1031, covering 80 chapters of India, is devoted to various aspects of astronomical science, as well as others devoted to the development of geometry, history and other objects in Indian society, about Hindu religious beliefs and customs. Chapters XIII and XVI of this book discuss geometry, and Chapters XV, XXIII, and XXIV describe solutions to many geometric problems. This work was published in Arabic in 1887 in London, English re English translation was published in 1888, in 1910, in 1963 in Tashkent, in 1965 and in the Uzbek language.
3. Beruniy in his book At-at-Tahfim, written between 1029 and 1034, in addition to astronomy and geodesy, poses questions of geometry and arithmetic. Beruni's work was written in the form of questions and answers, unlike other works. The English version of this work was published in 1934 in London, in Persian, in 1939 in Tehran, in 1973 in Tajik in Dushanbe, in 1975 in Tashkent in Russian (translation by B. Rosenfeld and A. . Akhmedova).

The book contains 533 questions and answers, of which 119 are in mathematics. Questions 1-37- questions of planimetry, questions of theory- 38-56 questions, 57-71- questions of stereometry, 72-95- questions of the theory of music, questions 96-108 are devoted to questions of arithmetic, 109-115 questions to algebra and calculation by letters, the remaining The questions cover various astronomy issues and other subjects.

A brief overview of arithmetic, algebra and number theory. The first gave a definition of number - "this is a meeting of unity." Beruniy also describes fractions. Beruni describes 60-decimal fractions, as well as fractions based on the distribution of property, units of measure. Then it determines the natural numbers, the numbers of the species, the numbers of the species, the even-

even numbers. Mentioned are simple and complex numbers, square and cubic numbers, perfect numbers and others.

The geometry section describes the following bodies:

- A multifaceted body, the faces of which consist of 6 squares, is called "arziy", that is, earthen.
- A multifaceted body, the faces of which consist of 20 regular triangles (the icosahedron) is called "mine," that is, water.
- A many-sided body, the faces of which consist of 8 regular triangles, are called "hawoy", ie by air.
- A multifaceted body whose faces consist of 4 regular triangles (tetrahedron) is called a "noriya", ie fiery.
- A multifaceted body, the faces of which consist of 12 regular pentagons (dodecahedron), calls it "falaky," that is, heavenly.

4. Beruniy finished his work "Law of Mashoudi" in 1037. This work is devoted to astronomy and is the largest scientific treatise of Beruni. This work gives a lot of valuable information about the concept of the Universe, trigonometry, spherical trigonometry, geographical maps, knowledge about the Earth, planets, celestial bodies and the structure of the moon. The book "The Law of Masudi" is of great importance in the history of mathematics, especially in the history of trigonometry.

5. Beruniy describes the problems of geometry in his book, A Treatise on the Definition of the Chords of a Circle Using the Broken Lines Inscribed in It. The scientist wrote this work in 1027. This work includes The Ancient Problem of the Tree, The Ancient Problem of Two Birds and Fish.

6. Biruni's book, The Book of Indian Rosikh, is devoted to specific arithmetic issues.

7. In 1025, he published the pamphlet Defining Address Boundaries for Determining Distance between Rooms. This work was devoted to astronomy, mathematics, geometry and geodesy and was published in 1963 by the Soviet orientalist P.T. Bulgakov.

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