AL-KHORAZMI'S TREATISE ON DEALING WITH MIRACLES

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ABSTRACT

The article describes the great mathematician, astronomer and geographer, the founder of the science of algebra, Muhammad ibn Musa al-Khwarazmi's treatise on dealing with astrologers. In the article, at first, it was written that this treatise was known as Ferghani's treatise for a long time.

Keywords: *al-Khwarizmi, asturlab, treatise, moon, sun.*

INTRODUCTION

Muhammad Musa al-Khorazmi, the great mathematician, astronomer and geographer, the father of algebra, lived and worked in the end of the 8th century and the first half of the 9th century. The scientist's full name is Abu Abdullah Muhammad ibn Musa al-Khorazmi. There is no accurate information about the scientist's birth and death years and life path. It is assumed that he was born in 783. Many of Khorezmi's works have not reached us. One of the well-known treatises of Muhammed Musa al-Khwarizmi is the treatise "On Dealing with Asturlabs"

METHODS

The text of the great mathematician, astronomer and geographer, the father of algebra, Muhammad Musa al-Khorazmi, "The Book of Acting with Astrologers", was included in the manuscript of an anonymous pamphlet in the Berlin Library. I. Frank published a partial German translation of it. Together with E. Wiedemann, I. Frank

published the translation of two of its sections. The treatise was also studied by K. Shoy. B.A. Rosenfeld and N.D. Sergeyeva published its Russian description.

The author of the treatise is not named in this manuscript. Chapter 5 of the manuscript begins with the phrase "Qola Muhammad ibn Musa al-Khwarazmi" ("Muhammad ibn Musa al-Khwarazmi said"). However, since the manuscript came after Ahmad ibn Kasir al-Farghani's Kitab amal al-usturlab (Book on Making Asturlab) and both were written by the same hand, researchers believe that this work is also al-Farghani's. was counting. Now it has been proven that the manuscript itself is the work of Khorezmi.[1]

The Berlin manuscript consists of two parts, the first part of which is called "San'at al-usturlab" ("Making the Asturlab"). According to the researchers, this part of the book is a reworked view of Khorezmi's treatise, which consists of four sections: 1) definition of the radii of parallels, 2) tables, 3) making almuqantarot, 4) making shadows in the asturlob zuhr. The second part of the manuscript is Khorezmi's work "The Book of Acts with Asturlobs".

RESULTS

The work consists of 48 sections, the 1st section of which describes the process of finding the height of lamps with the help of an astrolabe. Sections 2-3 describe toli and determining the time of day or night. In order to determine the height of the sun, al-Khorazmi finds the position of the sun in the asturlab spider using a dioptre and rotates the spider until it comes to the almuqantarot corresponding to the height of the found position. The degree of the ecliptic that intersects the horizon from the eastern side will be the desired fiber. The corner turned by the spider indicates the past part of the day. And for the past part of the night, the given area of the ecliptic is determined according to the opposite point instead of the Sun. In section 4, Khorezmi compares the result found using the astrolabe with the result calculated using the table and checks how accurate the astrolabe is. Sections 5-7 describe the determination of the night and day arcs. To determine the diurnal arc, the level of the Sun is set to the eastern horizon and the corresponding position in the cell is also

determined. The difference between the degrees of the two places is the day arc, and the difference between 360^0 and the day arc is the night arc. Sections 8-9 are about the constellations at the Earth's equator and in different places. To determine the matoli of the constellations on the earth's equator, Khorezmi places the head of the existing zodiac on the meridian of the sky, so that the degrees separated by the pointer in the cell are the degrees of the matoli. [2], [3], [4].

Sections 10-12 and 14-15 of the pamphlet define the ecliptic coordinates of the luminaries. To determine the ecliptic latitude of the luminary, Khorezm determines the height of the luminary and the height of its level, the difference of the two heights being the ecliptic latitude of the luminary. To determine the longitude of the illuminant, its mark is placed on the celestial meridian line, so that the level of the ecliptic corresponding to the celestial meridian line is the level of the illuminant. Sections 13 and 19 describe the method of determining the illuminant deviation. Chapters 16-18 limlar is dedicated to determining the level of the sunset and climax of the lighting fabric. To determine the level of the lamp cloth, its mark is placed on the eastern horizon and the position of the indicator in the cell is marked. Section 20 describes the method of determining day and night arcs based on illuminants. Section 21 describes the method of determining the gnomon shadow according to the altitude of the Sun, that is, the cotangent or tangent of the altitude of the Sun according to the "quadrant of shadows" on the astrolabe.

In section 22, Khorezmi describes the method of determining the extent of a place. The rule for determining its latitude using the astrolabe is $\varphi = 90^0 - h_{max} + \delta$ when the Sun is in the northern hemisphere and when it is in the southern hemisphere

corresponds to the formula $\varphi = 90^0 - h_{max} - \delta$ _max-d. Sections 23-24 and 26 describe the method of determining the height and time of the lamp by toli. [5], [6], [7].

In sections 25, 27-28, the height of the lamp is determined by time. For example, if you want to determine the height of the Sun by the hour, then its level is set to the

appropriate hour, so that the Sun's level will be at whichever almuqatarat from east or west corresponds to its height. Sections 29-30 describe the process of exchanging "straight hours" (1/24 of an evening) for "crooked hours" and vice versa. Chapters 31-33 describe house equalization and other astrological practices. Sections 34 and 40 compare the geographical coordinates of the two places. Sections 35-36 describe the determination of dawn, noon, evening and evening times, Section 37 determines the azimuth of the illuminant, Section 38 determines the time of Moonrise, and Section 39 describes the determination of the moon according to the moon. will be done. Sections 41-42 describe the famous circular (birkor) for determining the time of prayer. Chapters 43 and 45 deal with some astrological issues. Section 44 describes full, half, one-third, one-fifth, one-sixth, and other types of asturlobs with 90/n almuqantarots. 90 almuqantarot are depicted in the full astrolabe, and they are passed from the horizon to the zenith with 10 intervals. Section 46 describes the division of the administrative part of the earth into climates.

Sections 47-48 of the brochure describe the method of making a square. Section 47 describes how to make a sine quadrant. The description of the sine quadrant in Khorezmi's treatise is the first description of it as a separate astronomical instrument in the history of science. [8],[9],[10].

CONCLUSION

So, Khorazmiy is embodied in our eyes as the first scientist in all fields of medieval science, including as an inventor-constructor. In fact, Khorezmi continuously and directly participated in the scientific activities of "Baytul Hikmat" and was one of its most active members.

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