

# The Main Telescope of The Ulugbek Observatory

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**Abstract:** Our compatriots also made a great contribution to the study of celestial bodies. One of them is the grandson of Amir Temur Mirzo Ulugbek (1394-1449).

**Key words:** research, Ulugbek Observatory, Jamshid al-Kashi, Kazi-zade Rumi, Muyiniddin al-Kashi, Ali Kush chi, scientific heritage of the great



*Мирзо Улугбек.*



*Подземная часть обсерватории Улугбека.*

In the middle of the 15th century, Ulugbek invited famous astronomers Kazi-zade Rumi and Jamshid al-Kashi to Samarkand to get their opinion on the construction of an astronomical observatory planned by him with the largest instrument for observations. Scientists supported the idea of Mirzo Ulugbek, and in 1420 in Samarkand they began to build an instrument with a radius of 40.2 m for astronomical observations on the Kukhak hill. With the help of this tool, the coordinates of more than a thousand stars were determined and refined, the movements of the Sun were studied,

The moon and planets, the coordinates of many cities of Maverannahr were determined. In the length of the arc, 10 was approximately 70.2 cm, providing measurements with an accuracy of 10 " of the arc, along the length - 11.7 mm, the length of the arc - almost 50 m. The beginning of the arc lay at a depth of 11 m, and the upper part of the sextant towered above The Earth is almost 30 m. This unique astronomical instrument was destroyed as a result of wars, and its traces were lost.

The remains of the observatory were found and explored by archaeologist V. L. Vyatkin in 1908. The study of one of the documents of the 17th century helped to discover the exact description of the location of the observatory: a grant of land for the Darwin monastery. In 1948, the expedition of the Institute of History and Archeology of the Academy of Sciences of the Uzbek SSR, led by archaeologist V. A. Shishkin (1893-1966),

completed the last stage of excavations, exposing the foundations of the observatory and fragments of the building up to their foundation on a natural rock.

According to the reconstruction made, the observatory looked like a three-story cylindrical building 30.4 m high and 46.40 m in diameter, and contained a grandiose goniometer oriented from north to south - a sextant with a radius of 40.21 m, on which measurements were made of the height of celestial bodies above the horizon when passing them through the celestial meridian. The device was discovered by excavations and is well preserved in the underground part. It is assumed that its arc was one sixth of a circle with a working part from  $20^{\circ}$  to  $80^{\circ}$ .

The arc of the instrument is limited by two barriers lined with marble. At each degree of the circle, divisions and numbers are carved on the marble. Each degree corresponds to an interval of 70 cm. Brick stairs run along the barriers.

Azimuthal observations could be made using a horizontal circle on the roof of the building. The observatory also had other instruments that had not survived by 1437. The Gurgan zij was compiled - a catalog of the starry sky, in which 1018 stars were described. The duration of the sidereal year was also determined there: 365 days, 6 hours, 10 minutes, 8 seconds (with an error of + 58 seconds).

Ulughbek's observatory was the largest in the East in the Middle Ages and became famous for its precise measurements and impressive size. In addition to Ulughbek, outstanding astronomers Jamshid al-Kashi, Kazizade Rumi, Muyiniddin al-Kashi, Ali Kushchi worked at the observatory of Samarkand. The scientific heritage of the great scientists of that school is preserved in the famous work Zij.

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