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Kūhī: Abū Sahl Wījan ibn Rustam [Wustam] al-Kūhī [al-Qūhī]

Len Berggren

Flourished **second half of the 10th century**

Kūhī attained distinction as an astronomer who was skilled in observational instruments, and his work was well known among the astronomers and mathematicians of his age working in the Būyid domains of ʿIrāq and western Iran. Born in Tabaristan, he was supported by three kings of the Būyid Dynasty: ʿAḍud al-Dawla, Ṣamṣām al-Dawla, and Sharaf al-Dawla, whose combined reigns cover the period 962–989. Thus, Kūhī probably did most of his work in the second half of the 10th century.

Ibn al-Haytham and **Bīrūnī** knew of several of Kūhī's works, and later **ʿUmar al-Khayyām** cites him as one of the "distinguished mathematicians of ʿIrāq" (Sesiano, p. 281). In 969/970 Kūhī assisted in **Ṣūfī**'s observations in Shīrāz to determine the obliquity of the ecliptic, as well as in other observations of the Sun's movement, done on the order of ʿAḍud al-Dawla. And in 988/989 he was director of the observatory that ʿAḍud's son, Sharaf al-Dawla, built in Baghdad, which was intended to observe the Sun, Moon, and the five known planets.

According to Bīrūnī, Kūhī constructed for solar observations a house whose lowest part was in the form of a segment of a sphere of diameter 25 cubits (approximately 13 m) and whose center was in the ceiling of the house. Sunlight was let in through an opening at that center point of the sphere, which was located in the roof.

Three of Kūhī's works deal directly with problems that might be called astronomical. They are: (1) *On What Is Seen of Sky and Sea* (published in Rashed), (2) *On Rising Times* (published in Berggren and Van Brummelen), and (3) *On the Distance from the Center of the Earth to the Shooting Stars* (published in Van Brummelen and Berggren). The first treats the visible horizon and shows how, knowing the height of a lighthouse on an island, one can calculate how far away its light can be seen (and related problems). In the second he shows how one can calculate the rising times and ortive amplitudes of the zodiacal signs by Menelaus's theorem. In the third he uses parallax to show how to calculate the distance to meteors. (Kūhī's technique was rediscovered in 1798 by **Johann Benzenberg** and **Heinrich Brandes** in Germany, who settled the ancient question of whether or not meteors were atmospheric phenomena.) In none of them, however, is any observational data cited, nor are any numerical examples worked. A fourth work, dealing with the astrolabe (published in Berggren), discusses the geometry of that instrument. In particular, it solves problems demanding the construction of certain lines or points of a planispheric astrolabe given other lines and points. A fifth work, applying a method for computing the direction of Mecca, which became

common in astronomical works known as *zīj*es, has been ascribed to Kūhī. But the detailed computations carried out are entirely out of character with his other works and so the attribution must, for the present, be regarded as spurious.

Although Kūhī's work was studied by Islamic scholars as late as the 18th century (notably Muḥammad ibn Sirṭāq in the first half of the 14th century and Muṣṭafā Ṣidqī in the 18th century), it – like that of many of his distinguished contemporaries and successors in the eastern regions – was unknown in the west.

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