

Biographical Encyclopedia of Astronomers

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Siji: Abu Said Ahmad ibn Muhammad ibn 'Abd al-Jalil al-Siji

Born Sijistan, (Iran), circa 945

Died circa 1020

Sijzī, well known for his contributions to geometry, was also a prolific astrologer and astronomer. We possess few details of his life; his name suggests that he was born in Sijistān. His father, Abū al-Hūsayn Muhammad ibn Abd al-Jalil, was also a mathematician and astronomer. Parts of Sijzī's life were spent in Sijistān and Khurāsān. In Shīrāz in 969/970, he was present (with Kūhi, Būzjānī, and others) for the famous observations of meridian transits of the Sun conducted by 'Abd al-Rahman al-Şūfi. Later in life he became a friend of Bīrūnī, who often quoted Sijzī's results in his own works

Of approximately 20 astrological and astronomical treatises composed by Sijzī, many were compilations and summaries of the works of others, enhanced and systematized by the addition of tables and commentary. His *Jāmi al-Shahī* contains 13 astrological works, three of which are summaries of treatises by Abū Ma'shar. One of these, the *Muntakhab Kitab al-ulūf*, is an important source of information on Abū Ma'shar's *Book of Thousands*. Another of Sijzī's works, the *Kitab al-qirānāt* (Book of Conjunctions), may be thought of as a supplement to the *Kitab al-uluf*. This material likely originated in Sasanian sources and deals with various topics, including astrological world history. Other astrological contributions include the *Kitab Zarādusht şuwar darajāt al-falak* (The book of Zoroaster on the pictures of the degrees of the zodiac) and *Zā'irjāt li-istikhrāj al-haylāj wa-'l-kadkhudah*, a book of horoscopes with tables based on Hermes, Ptolemy, Dorotheus, and "the moderns."

Sijzī seems to have had more than a passing interest in astro-nomical instruments. He wrote a treatise on the astrolabe that contains the geometric "method of the artisans" for drawing azimuth circles on an astrolabe, as well as descriptions of variations in the retes on astrolabes known to him. Bīrūnī describes three astrolabe variants invented by Sijzī, and in the *Exhaustive Treatise on Shadows* he discusses several of Sijzī's contributions to the theory and use of a gnomon. Sijzī's treatise *On [the Fact that] All Figures are Derived from the Circle* contains a geometric description of an instrument that could be used to find the direction of Mecca (the *qibla*). Finally, in his *Introduction to Geometry* he says:

In Sijistān, I made a great and important instrument, a model of the whole world, composed of the celestial spheres, the celestial bodies, the orbs of their motions with their sizes, distances, and bodies, and the form of the earth—the places, towns, mountains, seas, and deserts—inside a hollow sphere provided with a grid. I called it "the configuration of the universe."

Most of Sijzī's 40 mathematical works, including a unique medieval treatise on problem-solving strategies, focus on geometry in the Euclidean style. One of these treatises contains a systematic mathematical approach to establishing the 12 relations that emerge from the

transversal figure in spherical trigonometry (the theorem of Menelaus). Although the work is strictly mathematical, Sijzī is explicitly aware of its fundamental importance to mathematical astronomy.

Glen van Brummelen

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