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## Sijzī: Abū Sa‘īd Aḥmad ibn Muḥammad ibn ‘Abd al-Jalīl al-Sijzī

Glen van Brummelen

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**Born** Sijistān, (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-Ḥusayn Muḥammad ibn ‘Abd al-Jalīl, 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 **Kūhī**, **Būzjānī**, and others) for the famous observations of meridian transits of the Sun conducted by ‘**Abd al-Raḥmān al-Sūfī**. 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-Shāhī* contains 13 astrological works, three of which are summaries of treatises by **Abū Ma‘shar**. One of these, the *Muntakhab Kitāb al-ulūf*, is an important source of information on Abū Ma‘shar's *Book of Thousands*. Another of Sijzī's works, the *Kitāb al-qirānāt* (Book of Conjunctions), may be thought of as a supplement to the *Kitāb al-ulūf*. This material likely originated in Sasanian sources and deals with various topics, including astrological world history. Other astrological contributions include the *Kitāb Zarādusht suwar 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-kadkhudāh*, 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 astronomical 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:

I made in Sijistān 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, their distances and their 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.

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