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Jūzjānī: Abū ʿUbayd ʿAbd al-Wāḥid ibn Muḥammad al-Jūzjānī

Alnoor Dhanani

Flourished **(Iran), 11th century**

Jūzjānī was one of the earliest Islamic scientists to provide an alternative to **Ptolemy**'s equant model. Very little is known about his life. He probably was already a jurist (*faqīh*) in Jurjān when he met **Ibn Sīnā** in 1012. He became one of his students and tells us that he studied Ptolemy's *Almagest* and logic with Ibn Sīnā. He aided Ibn Sīnā with the compilation of the *Cure* (*al-Shifā'*) and added the sections on geometry, arithmetic, astronomy, and music from Ibn Sīnā's earlier works to the *Salvation* (*al-Najāt*) as well as the *Philosophy* for ʿAlā al-dawla (*Dānishnāme-I ʿAlā'ī*). Jūzjānī commented on the difficult passages of Ibn Sīnā's *Canon of Medicine* (*al-Qānūn fī al-ṭibb*) and translated the "Book on Animals" of the *Cure* from Arabic into Persian. He completed Ibn Sīnā's *Autobiography* after his death. Jūzjānī is also the author of *The Manner of Arrangement of the Spheres* (*Kitāb Kayfiyyat tarkīb al-aflāk*), which has not survived, as well as a surviving *Summary* (*Mulakhkhaṣ*) of this work. Finally, he is the author of *Summary of the Arrangement of the Spheres* (*Khilāṣ tarkīb al-aflāk*), which is a commentary on **Farghānī**'s influential *Elements of Astronomy and Celestial Motions* (*Jawāmiʿ ʿilm al-nujūm wa-'l-ḥarakāt al-samāwiyya*).

In his *Summary of The Manner of Arrangement of the Spheres*, Jūzjānī tells us of his abiding interest in astronomy and his difficulty comprehending the equant and the components of motion in latitude (inclination, twisting, and slant of the epicycle). He turned to Ibn Sīnā for guidance and was told: "I came to understand the problem after great effort and much toil and I will not teach it to anybody. Apply yourself to it and it may be revealed to you as it was revealed to me." Jūzjānī was skeptical of Ibn Sīnā's claim for he states: "I suspect I was the first to achieve an understanding of these problems." Jūzjānī's issue with the equant is that "we know that the motions of celestial bodies cannot be nonuniform, so that they are at times faster and at times slower. This has been demonstrated in physics (*al-ʿilm al-ṭabīʿī*)." Jūzjānī proposes to "solve" the equant problem with a model in which all spheres (the deferent, the epicycle, and a secondary epicycle) move at uniform speeds around their centers. However, the model is unworkable.

The significance of Jūzjānī's critique of the equant does not lie in his unworkable solution but rather in the fact that his contribution is independent of the critique of the equant in the work of his elder contemporary **Ibn al-Haytham** entitled *Doubts against Ptolemy* (*Shukūk ʿalā Baṭlamyūs*). These represent the earliest known critiques of Ptolemy's equant hypothesis, which ultimately led to alternative models formulated by **Naṣīr al-Dīn al-Ṭūsī** and others (sometimes referred to as the "Marāgha School") regarding planetary motion that did not resort to the equant. While Ibn al-Haytham's critique seems to have been more influential, the Marāgha astronomers were aware of

Jūzjānī's contribution. In his polemical *You Did It, So Don't Blame Me!* (*Faʿalta fa-lā talum*), **Quṭb al-Dīn al-Shīrāzī** preserves an extensive reference to Jūzjānī's effort.

Selected References

Al-Bayhaqī, Ẓāhir al-Dīn (1996). *Tārīkh ḥukamāʾ al-islām*. Cairo: Maktabat al-thaqāfa al-dīniyya.

Gohlman, William E. (1974). *The Life of Ibn Sīnā: A Critical Edition and Annotated Translation*. Albany: State University of New York Press.

Gutas, Dimitri (1988). *Avicenna and the Aristotelian Tradition*. Leiden: E. J. Brill.

Ragep, F. J. (1993). *Naṣīr al-Dīn al-Ṭūsī's* Memoir on Astronomy (*al-Tadhkira fī ʿilm al-hayʾa*). 2 Vols. New York: Springer-Verlag.

Saliba, George (1994). "Ibn Sīnā and Abū ʿUbayd al-Jūzjānī: The Problem of the Ptolemaic Equant." In *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam*. New York: New York University Press, pp. 85–112. (Originally published in *Journal for the History of Arabic Science* 4 [1980]: 376–403.)

——— (1994). "Arabic Astronomy and Copernicus." In *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam*. New York: New York University Press, pp. 291–305. (Originally published in *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften* 1 [1984]: 73–87.)

Sezgin, Fuat (1978). *Geschichte des arabischen Schrifttums*. Vol. 6, *Astronomie*, pp. 280–281. Leiden: E. J. Brill.