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## Birjandī: ‘Abd al-‘Alī ibn Muḥammad ibn Ḥusayn al-Birjandī

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*Died* **1525/1526**

Birjandī, a pupil of Maṣū‘ ibn Mu‘īn al-Dīn al-Kāshī (who was a staff member of the Samarqand Observatory) and of Sayf al-Dīn Taftāzānī, was known for his numerous astronomical commentaries and supercommentaries. He wrote several commentaries on the works of **Naṣīr al-Dīn al-Ṭūsī**, including Ṭūsī's *al-Tadhkira fī ‘ilm al-hay’a*, his *Tahrīr al-Majistī* (recension of **Ptolemy's** *Almagest*), and Ṭūsī's book on astrolabes. In the preface to the last book Birjandī mentions some tables of the positions of stars that he calculated for the year 853 Yazdigird (1484). In addition, Birjandī wrote a commentary on **Kāshī's** *Zīj-i Khāqānī*, which was Kāshī's attempt to correct Ṭūsī's *Īlkhānī Zīj*. Birjandī was also known for his commentary on the *Zīj* of **Ulugh Beg** (the last date provided in it being 929 H = 1523) as well as for his supercommentary (*ḥāshiya*) on **Qādizāde's** commentary (*sharḥ*) to **Mahmūd al-Jaghminī's** *al-Mulakhkhaṣ fī ‘ilm al-hay’a al-basīṭa*.

In addition to these commentaries, Birjandī wrote several independent astronomical works, whose subjects included cosmology, ephemerides, instruments of observation, as well as a treatise on the distances and sizes of the planets that was dedicated to Ḥabīb Allāh, and another work on the construction of almanacs completed in 1478/1479.

Birjandī completed his *Sharḥ al-Tadhkira* (Commentary on the *Tadhkira*) in 1507/1508. Nayanasukha translated the 11th chapter of the second book of this work into Sanskrit. This is the chapter in which Ṭūsī deals with the device called the “Ṭūsī couple” and its applications, mainly to the lunar theory. From the colophon of the Sanskrit translation we learn that a Persian, Muḥammad Ābida, dictated it (presumably in a vernacular language) to Nayanasukha as he composed it in Sanskrit. Muḥammad Ābida had been at **Jai Singh's** court since at least 1725.

Birjandī's commentary on the *Tadhkira* is a good example of the commentary tradition within Islam. In analyzing Ṭūsī's work, Birjandī provides the reader with explanations of meanings, shows variants, provides grammatical explanations, and engages in philosophical discussions. He also provides different interpretations and examines the objections of his predecessors against Ṭūsī. In Book II, Chapter 11, Birjandī cites the following authors and works: Ṭūsī's *Risālah-i mu‘īniyya*; Ptolemy's *Almagest*; **Ibn al-Haytham**; Euclid's *Elements*; **Qutb al-Dīn al-Shīrāzī's** *Tuḥfa* and *Nihāya*; **Theodosius's** *Sphaerica*; **Menelaus**; and **Autolycus**.

In his commentary, Birjandī seems to follow Shīrāzī's opinions and his devices. For example,

Birjandī mentions an objection against the application of the Ṭūsī couple to the celestial spheres regarding the necessity of rest between two motions; such a discussion about rest between ascending and descending motions is given by Shīrāzī as well as **Shams al-Dīn al-Khafri** (Ragep, pp. 432-433). Also when Birjandī discusses an application of the curvilinear or spherical version of the Ṭūsī couple, he mentions that this version produces a slight longitudinal inclination, which had been discussed by Shīrāzī in his *Tuḥfa* (Kusuba and Pingree, pp. 246-247). Finally we note that Birjandī gives a proof for a device that G. Saliba has called the “‘Urḍī lemma,” after **Mu’ayyad al-Dīn al-‘Urḍī**, but the proof is similar to that given by Shīrāzī rather than ‘Urḍī’s original in his *Kitāb al-Hay’a*.

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