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Mīram Čelebī: Maḥmūd ibn Quṭb al-Dīn Muḥammad ibn Muḥammad ibn Mūsā Qāḍīzāde

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Born **Istanbul, (Turkey), 1475**

Died **Edirne, (Turkey), 1525**

Mīram Čelebī, one of the most important Ottoman mathematicians and astronomers, attempted to reconcile the mathematical (Ptolemaic) and natural philosophical (Aristotelian) traditions concerning astronomy, while writing astronomical texts that were widely used in the Ottoman Empire.

Mīram Čelebī's grandfather Muḥammad was **Qāḍīzāde**'s son; he married **ʿAlī Qūshjī**'s eldest daughter in Samarqand. His father, the scholar Quṭb al-Dīn Muḥammad, came with his grandfather ʿAlī Qūshjī to Istanbul, where Quṭb al-Dīn married Mīram Čelebī's mother, who was the daughter of Khōja-zāde, a famous scholar and philosopher of that time. His father, who had been a teacher at the Manāstır *madrasa* (school) in Bursa, died at a young age, and so Mīram Čelebī was raised by his grandfather Khōja-zāde. Mīram was educated not only by his grandfather but also by other leading scholars of the time such as Sinān Pasha. Upon his graduation, he taught at several *madrasas* (the Gelibolu, the Edirne ʿAlī Bey, and the Bursa Manāstır), becoming the most prominent figure of his time in the mathematical sciences. Indeed Sultan Bāyazīd II (died: 1512) asked him to be his teacher. Mīram Čelebī was appointed as Qāḍī ʿaskar (a high official in the Ottoman judiciary) of Anatolia during the reign of Yavuz Sultan Selīm I (reigned: 1512–1520); however, shortly thereafter he was dismissed from his post and retired. Towards the end of his life, he went on the pilgrimage to Mecca; upon his return he settled in Edirne. He was buried in the courtyard of the Qāsīm Pasha Mosque.

Mīram Čelebī, most famous for his many works in astronomy, optics, and astrology, was also well known in the fields of history and literature. (He even wrote an important work on hunting.) He wrote in Arabic and Persian (the scientific languages of his time) as well as in Turkish. Among his many students were **Muṣṭafā ibn ʿAlī al-Muwaqqit** and the famous philosopher and historian Ṭashköprülüzāde.

Mīram Čelebī inherited the scientific tradition of the Samarqand School of mathematics and astronomy represented by his great-grandfathers Qāḍīzāde and ʿAlī Qūshjī. He was also greatly influenced by **Ibn al-Haytham**'s methodology in the field of optics (*ʿilm al-manāẓir*) and tended to favor his approach of combining mathematics and natural philosophy over the more mathematical

approach of both great-grandparents. In addition, Mīram Čelebī was well informed of the opinions of Kamāl al-Dīn al-Fārisī, **Ibn Sīnā**, and **Fakhr al-Dīn al-Rāzī**, among others.

One of Mīram Čelebī's most important astronomical works is his commentary on the Persian *Zīj-i Ulugh Beg*, also known as *Dustūr al-ʿamal fī taṣḥīḥ al-jadwal*, which was completed in 1499 and dedicated to Sultan Bāyazīd II. Mīram Čelebī incorporated findings from **Jamshīd al-Kāshī**'s *Zīj-i Khāqānī* and ʿAlī Qūshjī's *Sharḥ Zīj-i Ulugh Beg*. The work, written in a didactic style, provided five examples of solutions for calculating the sine of 1°. More than 30 extant copies of the *Dustūr* attest to its widespread use by Ottoman astronomers. Mīram Čelebī's mathematical bent is also indicated by a work in which he calculated the ratio of the highest mountain in the world to the diameter of the Earth, a problem going back to **Naṣīr al-Dīn al-Ṭūsī**.

The most noteworthy work written by Mīram Čelebī on the subject of theoretical astronomy is a commentary on ʿAlī Qūshjī's work *al-Fatḥiyya fī ʿilm al-hayʾa*. Unlike his great-grandfather, who sought to eliminate Aristotelian natural philosophy from astronomy, Mīram Čelebī sought to reconcile the mathematical and the natural philosophical in astronomy as he had done in optics. He completed it in 1519 following the request of many of Mīram Čelebī's students when he was teaching *al-Fatḥiyya*. The commentary was both practical and theoretical and was used as a supplementary textbook in the Ottoman *madrasas*. Mīram Čelebī stated his intention to write an appendix to his commentary in which he would analyze the problems pertaining to the models of Mercury and the Moon. Although there is no extant copy of this appendix, it is an indication of the importance of the subject as well as an example of a continuous astronomical tradition to solve difficulties related to **Ptolemy**'s planetary models.

Many of Mīram Čelebī's other astronomical works deal with instruments, including a variety of quadrants. His *Risāla dar Shakkāzī wa Zarqāla az ālāt-i raṣadiyya* (in Persian) examines two astronomical instruments invented by **Zarqālī** and their use in astronomical observations. He also wrote on the calendar, the determination of the direction to Mecca (*qibla*), and various other astronomical problems. His *Risāla fī samt al-qibla* is a comprehensive study on the determination of the *qibla* using astronomical and mathematical calculations. Moreover, in accordance with the tendencies of his time, he wrote original works in the field of astrology, such as *al-Maqāsid fī al-ikhtiyārāt* and *Masāʾil-i Mīram Čelebī* (in Turkish).

Throughout his work, Mīram Čelebī placed great importance on rational and empirical evidence for the subjects he investigated. His work in theoretical astronomy was an extension of the Samarqand tradition that his great-grandfather ʿAlī Qūshjī continued with his colleagues and students in Istanbul. Mīram Čelebī especially enriched its mathematical character. His relationships with other members of the Samarqand School who came to Istanbul (such as Sayyid Munajjim and **ʿAbd al-ʿAlī al-Birjandī**) await further research. More information is also needed on his contribution to studies on observations conducted in Istanbul at the time of Sultan Bāyazīd II.

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