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Ibn al-Majdī: Shihāb al-Dīn Abū al-‘Abbās Aḥmad ibn Rajab ibn Ṭaybughā al-Majdī al-Shāfi‘ī

François Charette

Born Cairo (Egypt), August 1366

Died Cairo (Egypt), 27/28 January 1447

Ibn al-Majdī was one of the major Egyptian astronomers during the first half of the 15th century. He occupied the positions of *muwaqqit* (timekeeper) at al-Azhar Mosque and of “head of the teachers” at the Jānibakiyya *madrassa* (privately endowed religious college).

Ibn al-Majdī received a traditional religious education in the fields of Quranic studies, the prophetic traditions (*ḥadīth*), jurisprudence (*fiqh*), and Arabic grammar and philology. He also became an expert in arithmetic, geometry, the algebra of inheritance, theoretical astronomy (*ḥay‘a*), and applied astronomy (*mīqāt*, literally, the science of timekeeping). He learned the latter discipline under Jamāl al-Dīn al-Māridīnī, who had been a student of the celebrated astronomer of Damascus, **Ibn al-Shāṭir**. Later, Ibn al-Majdī himself became a highly regarded teacher in most of the above-mentioned traditional disciplines as well as in the mathematical sciences. Virtually all of his younger contemporaries and immediate successors who were active in astronomy in Cairo were his pupils at one time or another. A prolific and competent writer, Ibn al-Majdī played an important role as a didactic author; his writings were still read and commented upon in Egypt in the late 19th century.

Ibn al-Majdī's numerous astronomical treatises deal with a wide range of topics. Several of them are devoted to the compilation of annual ephemerides but have yet to be carefully studied, notably his important treatise *Jāmi‘ al-mufīd fī bayān uṣūl al-taqwīm wa-‘l-mawālīd* (which also deals with arithmetic, chronology, and astrology) and his *Ghunyat al-fahīm wa-‘l-ṭarīq ilā ḥall al-taqwīm*. However, his important set of auxiliary tables for facilitating the calculation of planetary positions, entitled *al-Durr al-yatīm fī tashīl ṣinā‘at al-taqwīm*, has been investigated by E. S. Kennedy and D. King. These tables contain numerical entries for the Sun, Moon, and planets and make a clever use of periodic relations very similar to those that are at the core of Babylonian astronomy combined with an intelligent application of the methods and parameters of Ptolemaic *zīj*es (astronomical handbooks). An anonymous set of such auxiliary tables based on the same principle is known from 11th-century Iran, so we are witnessing an older tradition that reappeared in Cairo, *circa* 1400. Ibn al-Majdī's auxiliary tables, supplemented by his contemporaries and successors, were extremely popular in Egypt up to the 19th century and inspired other, more extensive sets of tables based on the same methods and on the newer parameters of the *zīj* of **Ulugh Beg**.

Ibn al-Majdī's activities dealt intensively with astronomical instruments. He composed numerous

works, often didactical in character, dealing with the astrolabe, the theory of stereographic projection, the use of the standard astrolabic and sine quadrants as well as several unusual varieties of quadrants (most of which had been invented by his 14th-century predecessors), and works on sundial theory. Among his writings we also find treatises on the determination of the lunar crescent visibility, a topic of prime importance to Muslim religious practice since the Islamic calendar is lunar. Ibn al-Majdī also dealt with the applied problems of finding the *qibla* (the holy direction toward Mecca) and the orientation of roof ventilators.

Ibn al-Majdī's contributions to arithmetic and algebra deserve further investigation. His treatise on sexagesimal arithmetic, a topic of fundamental importance for astronomers, was praised by his former pupil [Sibt al-Māridīnī](#) as being the only satisfactory treatment of the subject known to him.

As a rule, astronomers during the Mamluk period in Egypt and Syria (1250–1517) did not engage in astrology because of their associations with religious institutions — either as *muwaqqits* in mosques or as teachers in *madrasas* or Sufi convents. Ibn al-Majdī was something of an exception: A noted religious scholar, he nevertheless treated the topic of mathematical astrology in his *al-Jāmi‘ al-mufīd* and even cast a horoscope for a Mamluk amīr.

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