From: Thomas Hockey et al. (eds.). *The Biographical Encyclopedia of Astronomers*, *Springer Reference*. New York: Springer, 2007, pp. 548-549

http://dx.doi.org/10.1007/978-0-387-30400-7_672

Ibn Abī al-Shukr: Muḥyī al-Milla wa-'l-Dīn Yaḥyā Abū ʿAbdallāh ibn Muḥammad ibn Abī al-Shukr al-Maghribī al-Andalusī [al-Qurṭubī]

Mercè Comes

Alternate name

Abī al-Shukr

Died **Marāgha, (Iran), June 1283**

Ibn Abī al-Shukr carried out a large-scale project of systematic planetary observations, which led to the determination of a number of new astronomical parameters. He belonged to the group associated with the Marāgha Observatory, several of whose members developed new planetary models whose influence on **Nicolaus Copernicus** has been clearly demonstrated. These models were meant to deal with the criticisms of Ptolemaic astronomy that had been previously set forth in Egypt (11th century) and al-Andalus (12th century). Ibn Abī al-Shukr also compiled Arabic versions of the most important Greek trigonometric treatises and made some useful innovations.

We know little of Ibn Abī al-Shukr's early life, but his name suggests an Andalusī origin. It is also known that he studied the religious law of the Mālikī School, a school with a wide influence in al-Andalus. As for the eastern part of his life, we know that he lived in Damascus at least until the year 1258, where he is believed to have written the *Tāj al-azyāj* (The crown of astronomical handbooks), or at least the first version of it. Furthermore, he himself told **Bar Hebraeus** that his knowledge of astrology had saved his life when the Mongols invaded Damascus (*circa* 1258). According to Ibn al-Fuwaṭī, the librarian of the Marāgha Observatory, he joined **Naṣīr al-Dīn al-Ṭūsī**'s team at Marāgha at an unknown date, though clearly before 1262, the year that Ibn Abī al-Shukr himself mentions as the date of some astronomical observations that he conducted at the Marāgha Observatory. In fact, he probably joined the team before 1260, because at that date his *Taḥrīr al-uṣūl* (Recension of Euclid's *Elements*) was being copied in Marāgha, perhaps by his own hand. According to the sources, Ibn Abī al-Shukr worked for some 20 years in Marāgha, and in 1275 he composed his second *zīj*, entitled *Adwār al-anwār madā al-duhūr wa-'l-akwār* in which he introduced the results of the astronomical observations he carried out in Marāgha.

Ibn Abī al-Shukr was a good mathematician, and his writings on trigonometry contain certain original elements. After traveling at least once to Baghdad with Naṣīr al-Dīn al-Ṭūsī's son, he went

back to Marāgha, where he devoted his life to teaching. Ibn Abī al-Shukr died in Marāgha, where he enjoyed an excellent reputation.

Ibn Abī al-Shukr's work deals with three different subjects: astronomy, astrology, and mathematics (geometry and trigonometry). Most of his work has not yet been studied, so for the moment no definitive account of his contribution to Islamic science is possible.

Ibn Abī al-Shukr's astrological works are mainly devoted to horoscopes and planetary conjunctions used to tell the future.

His known works on astronomy include three *zījes*; three commentaries on the *Almagest*; a description of the construction and use of the astrolabe (*Tasṭīḥ al-asṭurlāb*); a description of the geometrical methods used to determine the meridian line, the rising amplitude, and the revolution of the sphere (*Maqāla fī istikhrāj taʿdīl al-nahār wa saʿat al-mashriq wa-'l-dā'ir min al-falak bi-ṭarīq al-handasa*); and a chronological work on the Chinese and Uighur calendars (*Risālat al-Khaṭā wa-'l-īghūr*). Hūlāgu and his brother Qubilai, rulers of Marāgha and Beijing, respectively, were both interested in astronomy and had their astronomers translate works on the subject from Arabic and Persian into Chinese.

Two of the *zījes*, the *Tāj al-azyāj wa-ghunyat al-muḥtāj* (= *al-muṣaḥḥaḥ bi-adwār al-anwār maʿa* al-raṣad wa-'l-i'*tibār*, according to Escorial MS 932) and the *Adwār al-anwār madā al-duhūr wa-'l-akwār*, represent a break in the Andalusī–Maghribī tradition. The only Andalusī materials preserved are the tables of geographical coordinates. According to the author, in the second *zīj* he included the results of the astronomical observations he carried out in Marāgha. However, we find some of these results in the Maghribī copies of the *Tāj* for which, according to the title of one of the manuscripts, the *Adwār* was used. Echoes of these *zījes*, especially of the *Tāj*, resonate not only in al-Maghrib but also in Hebrew and Latin European sources, especially in Barcelona. One example is the abandonment of the trepidation models, which are found in all the Andalusī and Maghribī *zījes*, and the proposal of a new parameter for precession. The only extant copy of the third *zīj*, entitled *ʿUmdat al-ḥāsib wa-ghunyat al-ṭālib* and compiled in Marāgha (*circa* 1262) after the *Tāj* and before the *Adwār*, is a mixture of different *zījes* and has nothing to do with Ibn Abī al-Shukr's work.

With regard to the *Almagest*, he wrote the *Talkhīṣ al-Majisṭī* (Compendium of the *Almagest*), based on his observations carried out between the years 1264 and 1275; the *Khulāṣat al-Majisṭī* (Summary of the *Almagest*), different from the *Talkhīṣ*; and the *Muqaddimāt tataʿallaq bi-ḥarakāt al-kawākib* (Prolegomena on the motion of the stars), which contains five geometric premises on the planetary motions in the *Almagest*.

Selected References

Comes, Mercè (1994). "The 'Meridian of Water' in the Tables of Geographical Coordinates of al-Andalus and North Africa." *Journal for the History of Arabic Science* 10: 41–51. (Reprinted in *The Formation of al-Andalus, Part 2: Language, Religion, Culture and the Sciences*, edited by Maribel Fierro and Julio Samsó, pp. 381–391. Aldershot: Ashgate, 1998.)

——— (November, 2000). "A New Manuscript of Ibn Abī 'l-Shukr's *Tāj al-Azyāj*." Paper presented at the VII International Symposium on the History of Arabic Sciences, Al-Ain, United Arab Emirates.

——— (2000). "Islamic Geographical Coordinates: Al-Andalus' Contribution to the Correct Measurement of the Size of the Mediterranean." In *Science in Islamic Civilisation: Proceedings of the International Symposium "Science Institutions in Islamic Civilisation" and "Science and Technology in the Turkish and Islamic World,"*

edited by Ekmeleddin Ihsanoğlu and Feza Günergun, pp. 123–138. Istanbul: IRCICA.

——— (2002). “Some New Maghribī Sources Dealing with Trepidation.” In *Science and Technology in the Islamic World*, edited by S. M. Razaullah Ansari, pp. 121–141. Proceedings of the XXth International Congress of History of Science (Liège, 20–26 July 1997), vol. 21. Brepols: Turnhout.

——— (May–June 2002). “The Localities in al-Maghrib and the Meridian of Water in the *Tāj al-Azyāj*.” Paper presented at the 7e Colloque maghrebin sur l'histoire des mathématiques arabes, Marrakech. (Proceedings forthcoming.)

——— (2002). “Ibn Abī ʾl-Šukr al-Magribī, Abū ʿabd Allāh.” In *Enciclopedia de al-Andalus. Diccionario de autores y obras andalusíes*. El Legado andalusí Vol. 1, pp. 381–385 (no. 207). Granada.

Dorce, Carlos (2002–2003). *El* Tāy al-Azyāy *de Muḥyī al-Dīn al-Magribī*. Barcelona: Universitat de Barcelona–Instituto “Millás Vallicrosa” de Historia de la Ciencia Árabe.

Kennedy, E. S. (1956). “A Survey of Islamic Astronomical Tables.” *Transactions of the American Philosophical Society*, n.s. 46, pt. 2: 121–177, no. 41 and 108. (Reprint, Philadelphia: American Philosophical Society, 1989.)

Kennedy, E. S. and M. H. Kennedy (1987). *Geographical Coordinates of Localities from Islamic Sources*. Frankfurt am Main: Institut für Geschichte der Arabischen-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität.

Saliba, George (1983).“An Observational Notebook of a Thirteenth-Century Astronomer.” *Isis* 74: 388–401. (Reprinted in Saliba, *A History*, pp. 163–176.)

——— (1984). “Arabic Astronomy and Copernicus.” *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften* 1: 73–87. (Reprinted in Saliba, *A History*, pp. 291–305.)

——— (1985). “Solar Observations at the Maraghah Observatory before 1275: A New Set of Parameters.” *Journal for the History of Astronomy* 16: 113–122. (Reprinted in Saliba, *A History*, pp. 177–186.)

——— (1986). “The Determination of New Planetary Parameters at the Maragha Observatory.” *Centaurus* 29: 249–271. (Reprinted in Saliba, *A History*, pp. 208–230.)

——— (1987). “Theory and Observation in Islamic Astronomy: The Work of Ibn al-Shātir of Damascus.” *Journal for the History of Astronomy* 18: 35–43. (Reprinted in Saliba, *A History*, pp. 233–241.)

——— (1994). *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam*. New York: New York University Press.

Samsó, Julio (1992). *Las ciencias de los antiguos en al-Andalus*. Madrid: Mapfre.

——— (1998). “An Outline of the History of Maghribī Zijes from the End of the Thirteenth Century.” *Journal for the History of Astronomy* 29: 93–102.

Tekeli, S. (1974). “Muḥyī ʾl-Dīn al-Maghribī.” In *Dictionary of Scientific Biography*, edited by Charles Coulston Gillispie. Vol. 9, pp. 555–557. New York: Charles Scribner's Sons.