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FARḠĀNĪ, AḤMAD

FARḠĀNĪ, AḤMAD, b. Moḥammad b. Kaṯīr, Muslim astronomer. Farḡānī flourished at Sāmarrā during the period that it served as the capital of the ʿAbbasid caliphs (836-92 C.E.), though Ṣāʿed Andalosī (p. 141) states that he was one of al-Maʾmūn's astronomers. Nothing is known about his family nor much about his life beyond his authorship of a triad of influential works and his unsuccessful attempt to construct a canal, which was to run through the new city of al-Jaʿfarīya. This was entrusted by Motawakkel (847-61) to Moḥammad and Aḥmad, sons of Mūsā b. Šāker, who delegated the work to Farḡānī; the latter's error prevented the canal from carrying sufficient water (Ebn Abī Oṣaybeʿa, I, p. 207). It is also reported that Farḡānī restored the nilometer at Cairo (Wiet). Both of these projects were completed in 247/861, the year of al-Motawakkel's death. Farḡānī himself apparently died in Egypt and was buried in Cairo.

Farḡānī's principal work, the *Ketāb jawāmeʿ ʿelm al-nojūm wa oṣūl al-ḥarakāt al-samāwīya* (Book of generalities of astronomy and bases of celestial motions; ed J. Golius as *Fi'l-ḥarakāt al-samāwīya wa jawāmeʿ ʿelm al-nojūm*, Amsterdam, 1669) in thirty chapters, is a summary of Ptolemaic astronomy. Chapter 1 deals with the Arab, Syrian, Roman, Persian, and Egyptian calendars; chapters 2-5 with the celestial spheres and their two principal motions; chapters 6-9 with geography, the seven climes, and their principal cities (see Honigmann, pp. 134-55); chapters 10-11 with right and oblique ascensions of the zodiacal signs and with equatorial and seasonal hours; chapters 12-18 with the models and motions of the luminaries and the planets; chapters 19-20 with the fixed stars

and the lunar mansions; chapters 21-22 with the distances and sizes of the planets and the fixed stars; chapters 23-24 with the meridian transits, risings, settings, and occultations of stars and planets; chapter 25 with the phases of the moon; chapter 26 with the first visibilities of the planets; and chapters 27-30 with parallax and with solar and lunar eclipses.

Because of its simplicity and clarity the book enjoyed enormous popularity. Commentaries in Arabic were composed by Abu'l-Ṣaqr Qabīṣī (Sezgin, IV, p. 209), Abū ʿObayd Jūzjānī (ibid., p. 281), and Bīrūnī (Boilot, p. 181 [RG 14]). It was translated into Latin by John of Seville in Limia in 1135 (printed at Ferrara in 1493, at Nuremburg in 1537, at Paris in 1546; ed. F. J. Carmody as *Differentie scientie astrorum*, Berkeley, Calif., 1943), and by Gerard of Cremona in Toledo before 1175 (ed. R. Campani as *Il 'libro dell aggregazione delle stelle'*, Città di Castello, Italy, 1910). It was also translated into Hebrew by Jacob Anatoli, probably in Marseille, between 1231 and 1235 (ed. and tr. into Latin I. Christmannus as *Chronologica et astronomica elementa*, Frankfurt, 1590). There are several commentaries on the Hebrew translation, e.g., by Maimon of Montpelier, by Moshe Khandali, by Isaac b. Samuel in Padua (1496), and by Jehuda b. Verga of Seville in Lisbon (Steinschneider, pp. 554-57). Indeed, among readers of Latin and Hebrew in the medieval period, the theories of Ptolemaic astronomy were often known only through Farḡānī's compendium.

On the astrolabe Farḡānī wrote one of the earliest surviving treatises, *al-Ketāb al-kāmel fī ṣanʿat al-asṭorlāb al-šemālī wa'l-janūbī wa ʿelalehā be'l-handasa wa al-ḥesāb* (Complete book on the art of the northern and southern astrolabe and its principles in geometry and computation). This important book is unedited, but the preface has been translated into German by Eilhard Ernst Gustav Wiedemann (1984, II, pp. 886-88) and the tables to be used in constructing circles on the *omm* of the astrolabe have been described and illustrated by David King (pp. 53-55). There is a supplement to this treatise written by Aḥmad b. Moḥammad Azharī Ḵāneqī in the middle of the 14th century, and Farḡānī's opinion of the "melon-shaped" astrolabe is cited by Bīrūnī (Wiedemann, 1970, II, p. 523).

The third influential treatise by Farḡānī was his *Taʿlīl le-zīj al-Ḵᵛārazmī*, which is now lost but was extensively used ca. 890 by Hāšemī (pp. 102-9, 229-41) and in the 10th or 11th century by Ebn al-Moṭannā in his *Taʿlīl le-zīj al-Ḵᵛārazmī*, which is preserved in both Hebrew and Latin translations. Farḡānī's commentary was also referred to by Bīrūnī in his *Ketāb esteḵrāj al-awtār* (*Rasāʾel al-Bīrūnī*, Hyderabad, 1948, I, pp. 128 f. and 168 f.).

Farḡānī also wrote a *Ketāb ʿelal al-aflāk* (Book of the Principles of the spheres), from which an excerpt is given by Ebn Rosta (pp. 9-11; for German tr., see Wiedemann, 1984, I, pp. 326-28), and a *Ketāb ʿamal al-roḵāmāt* (Book of making horizontal sundials; Sezgin, IV, p. 151).

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