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GUŠYĀR GILĀNI, ABU'L-ḤASAN B. LABBĀN

GUŠYĀR (Arabicized Kušyār) GILĀNI, ABU'L-ḤASAN B. LABBĀN b. BĀŠAHRI, an astronomer and mathematician from Gilān, whence his *nesba* Jili/Gilāni (fl. late 4th/late 10th-early 11th cent.). Next to nothing is known of his life; even his dates can only be determined approximately. Though it has been stated (Sezgin, *GAS* V, p. 343) that he wrote his *al-Zij al-jāmeʿ* in 353/964, the catalogue of stars in it is for 1293 of the Era of Alexander/982 (Kennedy, 1956, p. 157), and the manuscript of the *Zij* at Alexandria was copied from a manuscript that Gušyār himself transcribed in 393/1002-3 (see Mazahéri, p. 41; Sezgin, *GAS* VI, p. 248). Since he is cited by Biruni (*Ketāb fi efrād al-maqāl fi amr al-aẓlāl*, see below) and by Neẓāmi ʿArużi (*Čahār maqāla*, ed. Qazvini, text, p. 89), Gušyār's works must have become authoritative by the end of the first quarter of the 11th century.

Works. Mathematics (Sezgin, *GAS* V, pp. 343-45): Gušyār's most significant contribution to mathematics was his *Ketāb fi oṣul ḥesāb al-Hend*. A manuscript (Meqāt 213) in the Dār al-kotob al-meṣriya in Cairo claims to contain the first chapter (*maqāla*) out of an original four, but the Istanbul manuscript (Aya Sofya 4857, fol. 263v-78; see Krause, pp. 472-73) says that the work contains only two *maqāla*s. There is a facsimile of the Aya Sofya copy together with an English translation in Levey and Petruck (pp. 44-105) and a French translation in Aly Mazahéri. The first *maqāla* is on using "Hindu" numerals in performing the operations of adding, subtracting, multiplying, and dividing decimal

numbers and in taking their square and cube roots, the second on the same operations using sexagesimal numbers. The first *maqāla* was translated into Hebrew and commented on by Shōlōm ben Joseph ʿAnābi in Istanbul in about 1450 or 1460. There also exists from Gušyār's hand an *ʿOyun al-oṣul fi'l-ḥesāb* in a manuscript kept at the Central Library of the University of Tehran (Dānešgāh 2092, fols. 30-35, facs. reprod. in Qorbāni, pp. 184-94).

Astronomy (see Sezgin, *GAS* VI, pp. 246-49): Gušyār is the author of two astronomical tables (*zij*). The more important one is *al-Zij al-Jāmeʿ* in four chapters (*maqā-lāt*): the canons, the tables, theoretical astronomy, and proofs (Kennedy, 1956, p. 125, no. 9, with an abstract of the Berlin copy on pp. 156-57; King, p. 45). The preface was translated into German by Eilhard Wiedemann (*Gesammelte Schriften* II, pp. 894-95). A *Resāla fi al-abʿād wa al-ajrām*, apparently extracted from this *zij*, was published as text number four in the *Rasāʾel al-motafarreqa fi'l-hayʾa* (see Sezgin, *GAS* VI, p. 248), while Gušyār's description of the chronological tables was discussed by Ludwig Ideler (II, pp. 623-33) and his two sine tables were described by Carl Schoy (pp. 395-96). Other technical aspects of Gušyār's tables have been investigated by John Berggren (spherical trigonometry) and Glen van Brummelen (planetry tables). The true solar longitude table analyzed by Berno van Dalen is not with certainty attributed to Gušyār. *Al-Zij al-Jāmeʿ* is cited several times by Biruni in his *Ketāb fi efrād al-maqāl fi amr al-aẓlāl* (treatise number two in the *Rasāʾel al-Biruni*, p. 42 ll. 15-19, p. 52 ll. 8-11, p. 57 l. 13-p. 58, l. 1, and p. 62, ll. 13-16; for tr. and comm. see Kennedy, 1976). Aṯir-al-Din Mofażżal b ʿOmar Abahri wrote a compendium of astronomy which contains excerpts on cosmology from Gušyār (see Krause, p. 493); this is presumably based on "al-Bāb al-mofrad fi jawāmeʿ ʿelm al-hayʾa" from *al-Zij al-jāmeʿ* (see King, p. 45). This *zij* was translated into Persian by Moḥammad b. ʿOmar b. Abi Ṭāleb Tabrizi in 483/1090 during the reign of Sultan Malekšāh Sal-juqi (465-85/1072-92; Storey, II, p. 43; the sole known manuscript contains only the first *maqāla*). There may be a commentary on *al-Zij al-jāmeʿ* by Moḥammad b. ʿAbd-al-Karim Daḵāli in a manuscript in Tunis.

Much less well known is *al-Zij al-bāleg̃* (see Kennedy, *Survey*, p. 125, no. 7). All that survives seems to be a fragment at Bombay (Sezgin, *GAS* VI, p. 248) and perhaps some tables mixed up in copies of Gušyār's other *zij*.

There exist numerous copies of Gušyār's *Ketāb fi ṣanʿat al-asṭorlāb wa'l-ʿamal behe* (Sezgin, *GAS* VI, pp. 248-49), but it has never been studied.

Finally, Ẓahir-al-Din ʿAli Bayhaqi (*Tatemma ṣewān al-ḥekma*, p. 43; Wiedemann, 1970, I, p. 650; Meyerhof, pp. 157-58) attributes to Gušyār a work called *Eṣlāḥ taʿdil al-merriḵ*, about which nothing more is known.

Astrology (see Sezgin, *GAS* VII, pp. 182-83): Gušyār's principle treatise on astrology was his *Ketāb al-modḵal fi ṣenāʿat aḥkām al-nojum*, also known as the *Ketāb al-mojmal fi oṣul ṣenāʿat al-nojum*. It consists of four *maqāla*s, modeled on and sometimes closely following the four books of Ptolemy's *Apotelesmatika*. It was composed in about 361/992, the date for which the coordinates of the thirty significant fixed stars are given (Storey, II, p. 42; Yano, 1984, p. 67). Michio Yano has edited the Arabic text with an English translation (Tokyo, 1997); the first chapter of the first *maqāla* with an English translation has been published seperately (Yano, "Apology"). It is to be noted that in it Gušyār refers to his two *zij*es by name as separate works already completed. Yano has also edited the Chinese translation, which was made in 1383 by Wu Potsung. The *Mojmal al-oṣul* was commented on by Moḥammad b. Abi ʿAbd-Allāh Sanjar Kamāli in 703/1303-04 (see Storey, II, p. 65), and there exist both a Persian translation by Moḥammad b. Abi Ṭāleb Monajjem Tabrizi and a Turkish translation by Moḥammad b. Ḵosrow Miḵāliji (Storey, II, pp. 42-43; Sezgin, *GAS* VII, p. 183). Neẓāmi ʿArużi recommended the *Mojmal al-oṣul* to anyone aspiring to be an astrologer (*Čahār maqāla*, ed. Qazvini, text, p. 89, tr. p. 796).

Gušyār wrote three other tracts on astrology, namely *Resālat dalālāt al-kawākeb*, *Ketāb al-qerānāt*, and *Ketāb al-eḵtiārāt* on catarchic astrology (Sezgin, *GAS* VII, p. 183). None of these have been studied yet.

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