

**A Supplement to *Mathematicians,*
Astronomers, and other
Scholars of Islamic Civilisation and their Works
(7th - 19th c.)**

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This article contains additions and corrections to the book¹ published in 2003 by the Research Centre for Islamic History, Art and Culture (IRCICA) at Istanbul. In this supplement I refer to other works published by IRCICA, all of them related to the history of astronomical, mathematical, geographical and musical literature in the Ottoman Empire. The abbreviations used are:

OALT: Ihsanoğlu, E., Şeşen, R., İzgi, C., Akpınar, C., & Fazlıoğlu, I., *Osmanlı Astronomi Literatürü Tarihi (History of Astronomy Literature during the Ottoman Period)*. 2 vols. Istanbul: IRCICA, 1997. CCIII + 1146 pp.

OMLT: Ihsanoğlu, E., Şeşen, R., İzgi, C., *Osmanlı Matematik Literatürü Tarihi (History of Mathematical Literature during the Ottoman Period)*. 2 vols. Istanbul: IRCICA, 1999. CXII + 720 pp.

OCLT: Ihsanoğlu, E., Şeşen, R., Bekar, M.S., Gunduz, G. & Furat, A.H., *Osmanlı Coğrafya Literatürü Tarihi (History of Geographical Literature during the Ottoman Period)*. 2 vols. Istanbul: IRCICA, 2000. LXXXIX + 912 pp.

¹ Rosenfeld, B. & Ihsanoglu, E. *Mathematicians, astronomers and other scholars of Islamic civilisation and their works (7th -19th c.)*, Istanbul: IRCICA, 2003, 833 pp.

OMULT: Ihsanoğlu, E., Şeşen, R., Bekar, M.S. & Gunduz, G. *Osmanlı Musiki Literatürü Tarihi*. Istanbul: IRCICA, 2003, LXXVII + 479 pp.

ABBREVIATIONS

Add to ACIHS (*Actes du Congrès International d'Histoire des Sciences*) (p. 9):

XXI (Mexico City 2001), Mexico City, 2001.

MAIN PART

§6. IBRĀHĪM AL-FAZĀRĪ

- A3 (p. 14): Replace "plane astrolabe" by "melon-shaped astrolabe" and "al-musattaḥ" by "al-mubattaḥ". Add: KF and TH called this astrolabe "al-musattaḥ". Suter in MAA mentioned both names (*al-musattaḥ* and *al-mubattaḥ*) and understood the second as referring to the standard astrolabe: see Kennedy, Kunitzsch & Lorch [1].
- A4 (p. 14): the "astrolabe with rings" is an armillary sphere described by Ptolemy in the *Almagest* under the name *astrolabon*.

§32. AL-MA'MŪN.

- See (p. 20): Add *GAS* X, 80-88, 111-113
- G1 (p. 20): Add: reproduced in *GAS* XII, 2-3. Research: Castelló [1].

§ 34. AL-ḤAJJĀJ IBN MAṬĀR.

- See (p. 20): De Young [17].

§ 41. AL-KHWĀRIZMĪ.

- See (p. 22): *GAS* X must be *GAS* X, 83-93, 102-104, 117-119.
- M1 (p. 22): Research - Folkerts [1]; Romo Santos [1].
- A1 (p. 23): Research - Casulleras [3].
- G1 (pp. 25-26): Add: The maps are reproduced in *GAS* XII, 8-10.
- H2 (p. 26): Replace "al-Ṭabarī (No. 58)" by "al-Ṭabarī (838-923)".

§ 46. ḤABASH AL-ḤĀSIB.

- A12 (p. 28): The title should be "Book on the construction of the

melon-shaped astrolabe" (*Kitāb ṣanʿat al-aṣṭurlāb al-mubattāḥ*). Sometimes *al aṣṭurlāb al-mubattāḥ* (melon-shaped astrolabe) appears as *al aṣṭurlāb al-musaṭṭaḥ* (plane astrolabe) in the title of this work. Add MS Paris (2457, ff. 141r-149v). Research: Kennedy, Kunitzsch & Lorch [1]; Kennedy & Lorch [1].

§ 61. ʿABD AL-MALIK AL-QURṬUBĪ.

- A1 (p. 31): Add Kunitzsch [60]. Reprint of Kunitzsch [48] & [60] in Fierro & Samsó [1] (277-304).

Insert between § 61 and § 62:

§ 61a. AL-ḌABBĪ, ʿABD AL-WĀḤID IBN ISḤĀQ.

Magician and astrologer (fl. ca. 788-c. 852) from Algeciras who became a court astrologer in Cordova in the time of emirs Hishām I (788-796), al-Ḥakam I (796-822), ʿAbd al-Raḥmān II (821-852) and Muḥammad (852-886). Muḥammad ordered his execution in Tortosa in or after 852.

- A1 Didactic poem in *rajaz* metre on the predictions related to the changes of weather and vicissitudes of kings according to the ancient system of the crosses (*Rajaz fī 'l-aḥkām ʿalā aḥdāth al-jaww wa aḥwāl al-mulūk ʿalā tarīqat al-aḥkām al-qadīma ... aḥkām al-ṣulub*) of which only 39 verses are extant in Escorial 916, 195r-196r. The system of the crosses seems to have a late Latin origin and it was used in Spain until the 13th c. when it was translated into Spanish (Alfonso X [2] on the basis of an Arabic text revised in Toledo in the 11th c. Edition and Spanish translation in Samsó [18a] (reprinted in Samsó 26, n° III). Research: Castells [3], Samsó [10], [12], [38]; Vernet [14].

§ 67. AL-FARGHĀNĪ.

- See (p. 32): - Rosenfeld and Sergeyeva [2], al-Farghani [8] (9-12, by Rosenfeld).

- A1. (pp. 32-33): Add - Complete Russian translation by Dobrovol'skiy: al-Farghani [8] (13-120). Research by Rosenfeld and Dobrovol'skiy: al-Farghani [8] (191-209).

- A2. (p. 33): Add: - Complete Russian translation by Sergeyeva: al-Farghani [8] (121-190). Research by Rosenfeld and Sergeyeva: al-Farghani [8] (209-233). In chapter 7 al-Farghānī criticises the melon-shaped astrolabe: see Kennedy, Kunitzsch & Lorch [1].

§ 74. BANŪ MŪSĀ ʿ

- A11 (p. 36): Add: In this treatise the melon-shaped astrolabe is considered. See Kennedy, Kunitzsch & Lorch [1].

§ 75. NU^cAYM IBN MUḤAMMAD IBN MŪSĀ.

- M1. (p. 36): Add - Research: Hogendijk [44].

§ 82. AL-MAHĀNĪ.

- M1. (p. 42): Add - Research: Hogendijk [43].
- M2. (p. 42): Add- French translation and research: Ben Miled [1].
- M5. (p. 43): Add - Research: Lorch [20].

§ 88. ABŪ MA^cSHAR

- A4 (p. 44): Add - Research: Burnett [3].
- A5 (p. 44): Add - edition of the Arabic text, Latin translation and English translation in Yamamoto & Burnett [1].

§ 103. THĀBIT IBN QURRA.

- See (p. 48): Add - Morelon [6].
- M9. (p. 50): Add - Edition with French translation by Kara Todorī (Caratheodory, § 1424) of al-Ṭūsī [10] (155-157, 200-202); edition, English translation and research by Lorch: Ibn Qurra [12]. Research: Bellosta [5], Crozet [2].

§ 120. IBN KHURDADHBĪH.

- G1 (p. 60): Replace "provinces" by "countries".

§ 135. AL-NAYRĪZĪ.

- A2. (p. 64): Add - Research: Hogendijk [41].

§ 137. AL-BATTĀNĪ.

- See (p. 64): Add - GAS X, 211-214, 257-258.

§ 156. AL-BALKHĪ.

- See (p.69): GAS X should be GAS X, 346.

§ 174. IBN SINĀN.

- M1 (p. 73): Add - Research: Rashed and Bellosta [1]
- M6 (p. 74): Add - Research: Jaouiche [6].

- A2 (p. 74): Annotated German translation by Luckey, edited by Hogendijk: Ibn Sinan [5].

§ 182. QĀSIM AL-QAṬṬĀN AL-ANDALUSĪ.

- A1 (p. 79): Add - Research Casulleras [2] & [4], Comes [2c] & [2d]

§ 198. IBN ^cADĪ.

- Add: -PH9 (p. 83) Treatise on place and void (*Risāla fī makān wa-ṣifr*): MS reproduced in Giannakis [2]. Edition, English translation, and research: Giannakis [2]. Criticism of John Philoponus' opinion.

§ 201. AL-JAYHĀNĪ.

- See (p. 84): *GAS* X should be *GAS* X, 346.

§ 205. AL-QABĪṢĪ

- A1 (p. 85): Add - edition of the Arabic text, the Latin translation by Iohannes of Seville and English translation in Burnett, Yano & Yamamoto [2]. Research: Burnett [3].

§ 212. AL-ṢŪFĪ.

- See (p. 86): Add - Matviyevskaja [42].
- A1 (p. 86): Add - Research: Kunitzsch [37a], [40], [61] (reprinted in [62], Samsó & Comes [1], Comes [1a])
- M1 (p. 86): The title should be "Treatise on the construction of polygons with equal sides by [compasses of] one opening" (*Risāla fī ʿamal al-ashkāl al-mutasāwiya al-aḍlāʿ kullu-hā bi fatha wāḥida*). Mashhad 5535/1, 12121. Edition and research: Mirabolghassemi and Bagheri [1]. Treatise on the construction of regular polygons by compasses with fixed opening.

§ 213. AL-ISTAKHRĪ.

- See (p. 87): *GAS* X should be *GAS* X, 346-347.
- G1 (p. 87): Replace "provinces" by "countries". Add - The world map is reproduced in *GAS* XII, 31.

§ 214. IBN ḤAWQAL.

- See (p. 87): *GAS* X should be *GAS* X, 346.
- G1 (p. 87): Replace "provinces" by "countries". Add - The world

map is reproduced in *GAS* XII, 32; a regional map is reproduced in *GAS* XII, 33.

§ 215. AL-MUQADDASĪ.

- See (p. 87): - *GAS* X should be *GAS* X, 346.
- G1 (p. 87): Add - A regional map is reproduced in *GAS* XII, 33.

§ 223. AL-ṢAGHĀNĪ

- A1 (p. 89): Replace "Hogendijk [40]" by "Hogendijk [42]".

§ 224. AL-KARĀBĪSĪ.

- M2a (p. 89): Add - Research: Brentjes [14].

§ 249. AL-QURṬUBĪ.

- A1 (p. 95): Add - Edition of a 13th c. Latin translation in Martínez Gázquez & Samsó [1]. Research: Forcada [3] & [6], Samsó [18] (reprint in Samsó [26]), Samsó & Martínez Gázquez [1], Viladrich [7].

§ 256. AL-BUZJĀNĪ.

- M3 (p. 97): Add - Research: Neugebauer and Rashed [1].
- M4 (p. 97): Add - Edition, French translation, and research: Sesiano [33].

§ 260. IBN NAWBAKHT.

- A1 (p. 98): Add - Research: van Brummelen [2].

Insert between §269 and §270 (p. 101):

§ 269a. AL-MUHALLABĪ.

Ḥasan ibn Aḥmad al-Muhallabī (10th-11th c.). Syrian geographer who worked at the court of the Fāṭimid emir al-ʿAzīz (975-996).

- See: AGL (234-236).
- G1. Book on roads and countries (*Kitāb al-masālik wa'l-mamālik*), often quoted by Yāqūt (§ 557) in G1. Its Persian translation is included in Ḥāfiz-i Ābrū (§ 799a) in G1.

§ 277. AL-KŪHĪ.

- See (p. 103): Add - Abgrall [2], Berggren [20], Rashed [59].
- M8 (p. 103): Insert before "French translation" the words "Edition and". Replace "Woepcke [26] (145-175)" by "Woepcke [26] (144-173

and 68-111)". Research: Add - Bergren & Van Brumelen [5], Krasnova [1,5], Rashed [61], Woepcke [26] (1-15).

- M23 (p. 104): Add - Edition, English translation and research: Berggren and Van Brummelen [4].

- A2 (p. 104): Replace "Rashed [53]" by "Rashed [60]".

- Me1 (p. 105): Add - Research: Rashed [54].

§ 280. AḤMAD IBN FĀRIS AL-QAZWĪNĪ.

- A1 (p. 105): Add - Edition: Forcada [7]. Research: Forcada [3].

§ 281. AL-MAJRĪTĪ.

- See (p. 106): Add Samsó [25b] (84-98).

- A1 (p. 106): Add Comes [2e], [2f], [3a], [3c] on the correction of the size of the Mediterranean documented, for the first time, in al-Majrītī's revision of al-Khwārizmī's *zīj*.

- M1 (p. 106): Edition Vernet & Catalá [5], Kunitzsch & Lorch [2]. Research: Kunitzsch [46], [49] (both reprinted in Kunitzsch [62]).

- A2 (p. 106): Add - Research: Samsó [11] & [34f]

- A5 (p. 106): Add: the attribution of the *Ghāyat al-Ḥakīm* to Maslama al-Majrītī seems to be inadequate. GAS IV (294-298) ascribes it to a certain Abū Maslama Muḥammad b. Ibrāhīm b. 'Abd al-Dā'im al-Majrītī. Fierro [1] argues convincingly that the author was Abū 'l-Qāsim Maslama b. Qāsim al-Qurṭubī (d. 964). Ritter edited critically the Arabic text in al-Majrītī [1]. The Latin translation has been edited by Pingree in al-Majrītī [3]. Research: add Pingree [25b] & [25c].

§ 290. ʿABD ALLĀH AL-THAQAFĪ.

- A1 (p. 109): Partial edition, Spanish translation and research in Forcada [1].

§ 296. AL-SIJZĪ.

- See (p. 110): Add Crozet [1]

- M.3 (p. 110): Insert after "fragments" the words "on perfect compass". Replace "Woepcke [7] (222-223), [17] (112-115)" by "Woepcke [26] (174 -175 and 112-115)". Research: Rashed [61]; Berggren & Hogendijk [1].

- M18 (p. 111): Add - Research: Hogendijk [39].

§ 299. IBN ʿIRĀQ.

- A9 (p. 115): Replace "Hogendijk [40]" by "Hogendijk [42]".

§ 301. AL-ṬABARĪ.

- M2 (p. 116): Add - Research: Bagheri [4].

§ 308. KŪSHYĀR IBN LABBĀN

- A8 (p. 119): Add - edition and English translation in Yano [3].

§ 310. AŞBAGH IBN AL-SAMḤ.

- M2: the title should be: "Perfect [treatise] on mental calculation".
- A4 (p. 120): Comes [2] (27-78, 169-188); Samsó [17]; Mancha [2].

§ 312. AḤMAD IBN AL-ŞAFFĀR AL-GHĀFIQĪ.

- A1 (p. 121): Edition of the Escorial MS in Millás Vallicrosa [10], 47-76 (of the Arabic part of the journal). Catalan translation in Millás Vallicrosa [1], 29-48. The Latin translation by Johannes Hispalensis was edited by Millás Vallicrosa [4], 261-284. Another Latin translation by Plato de Tivoli (ascribed in § 577 to Muḥammad ibn al-Şaffār d. 1241/42) has been edited by Lorch, Brey, Kirschner & Schöner [1].

§ 317. IBN SĪNĀ.

- See (pp. 122-123): Add Ihsanoğlu [2, 13].
- E1 (pp. 123-124): Add - Research: Rashed [56-56a].
- E3 (p. 124): Add - Research: Luter [8].

§ 321. AL-ḤASAN IBN AL-BAGHDĀDĪ

- M1 (p. 129): Add - Research: Matvyevskaya [43].

§ 327. MUḤAMMAD IBN AL-HAYTHAM.

Replace "(10-11 c.)" by "965-1039". Replace "philosopher" by "during his youth he was vizier at Basra, but resigned this position and became a scholar-philosopher".

Add - M16 (p. 130): Book of Deals (*Kitāb al-muʿāmalāt*)

- A5 (p. 131): Book on the Form of the Universe (*Kitāb fī hayʾat al-ʿālam*) (see § 328 AL-ḤASAN IBN AL-HAYTHAM - A16, p. 136).

§ 328. AL-ḤASAN IBN AL-HAYTHAM.

P. 131 After (965-1041) add: "apparently, the brother-twin of Muḥammad ibn al-Haytham (§ 327)". Replace M2 by Me2 in the 3rd and 5th lines of

the biographical note. In the 5th line replace "Egypt, where" by "Egypt. Al-Ḥasan ibn al-Haytham came to Egypt in 1005, where".

Add before "See" (p. 131) - Facsimile edition by N. Terzioglu of his autograph manuscript Istanbul (SM AS 2762), : Apollonius [4].

- See (p. 131): Replace - "Rashed [19, 36-37], [49]" by "Rashed [19, 36-37, 49, 55]". Add - Hamedani [1]; Hogendijk [45].

- M1 (p. 132): Before "Quliyeva [1-3]", add - Bouzoubaa Fennane [1] (continuity principle).

- M31 (p. 134): Replace "Hogendijk [8] (311-382)" by "Hogendijk [8] (311-382), [42]".

- A.16 (p. 136): Add: This treatise, apparently, is a revision of A5 of Muḥammad ibn al-Haytham (§ 327). Edition of the Latin Alfonsine translation: Mancha [4]. Research Ragep [8]; Samsó [25a] (reprint in Samsó [26], n° XVIII).

- Me2 (p. 137): Add: Possibly, that book is the revision of Me1 of Muḥammad ibn al-Haytham § 327).

- Ph1 (p. 137): Add - Edition of books IV-V in Ibn al-Haytham [15]. Research: Rashed [57], Sabra [42].

§ 340 MUḤAMMAD AL-JAYYĀNĪ.

- A1 (p. 140): Add - Research: Samsó & Mielgo [2].

- Me1 (p. 140): Add - Research: Casals [1]. See below § 388.

- Mt1 (p. 140): Add - Research: Goldstein [13], Saliba [16], Smith & Goldstein [1], Smith [6].

§ 348. AL-BĪRŪNĪ.

- See (p. 144): GAS X should be GAS X, 154-161.

- M1 (p. 145): Add - Research: Saʿīdān [40].

- A5 (p. 150): Edition by Akbar: al-Biruni [50]. Edition of the section on the melon-shaped astrolabe with English translation and research: Kennedy, Kunitzsch & Lorch [1]. Chapters 51-52) deal with the "construction of the melon-shaped astrolabe" (see al-Fazārī - §6 - A3) and not with the "construction of the "flat astrolabe" based on approximate stereographical projection".

- Insert (p. 154): A57 "Book on the motion of the lots of happiness and of secret" (*Maqāla fī sayr saḥmay al-saʿāda wa'l-ghayb*) - Oxford (Seld A. 11, ff. 85v - 92v). Edition, English translation, and research: Haddad, Pingree & Kennedy [1].

- G2 (p. 154): Add - The round world map is reproduced in GAS XII, 34.

- G3 (p. 154): Add - Research: King [82].
- Me1 (p. 155): Replace "Abridgement of the Reasoning of Abū'l-Rayḥān in His Treatise" by "Book of Abū'l-Rayḥān Muḥammad ibn Aḥmad al-Bīrūnī". Replace "and Weight" by "[and Weight]". Replace "(Talkhīṣ kalām dhakara-hu Abū'l-Rayḥān fī risāla la-hu)" by "(Maqālat Abī'l-Rayḥān Muḥammad ibn Aḥmad al-Bīrūnī)". Replace "wa'l-wazn" by "[wa'l-wazn]". Replace "Separate manuscript of this chapter: Mashhad 392/2" by "another abridged exposition of this treatise is extant in manuscript Mashhad 392/2 entitled "Abridgement of the reasoning by Abū'l-Rayḥān on ratios between metals and precious stones by volume and weight" (Talkhīṣ kalām dhakara-hu Abū'l-Rayḥān fī nisab al-filizzāt wa'l-jawāhir fī'l-ḥajm wa'l-wazn)". Research: Rozhanskaja [23].

Insert between § 379 and § 380 (p. 161):

§ 379a. ^cALĪ AL-QURASHĪ.

Abū 'l-Ḥasan ^cAlī ibn al-Khiḍr al-Qurashī (1030-1067), jurist and mathematician, born and lived in Damascus.

- M1 Memorandum on the Principles of Arithmetic and Inheritance, their Elements and Amplifications (*Kitāb al-Tadhkira bi-uṣūl al-ḥisāb wa 'l-farā'id wa-awwali-hā wa-taṣḥīḥi-hā*) - manuscript reproduced in al-Qurashi [1]. Facsimile edition, German translation, and commentary by Rebstock: al-Qurashi [1]. Research: Rebstock [6].

Insert between § 384 and § 385 (p. 161)

§ 384a IBN KHALAF AL-ISTIJĪ, ABU MARWAN ^cABD (or ^cUBAYD)

ALLĀH.

Astronomer and astrologer. Fl. in Toledo and Cuenca in the second half of the 11th c. Ṣā'īd (see § 384) mentions him as one of the young astronomers working in Toledo when his *Ṭabaqāt* were published in 1068. He participated in the Toledan team, led by Ṣā'īd, that made observations towards the middle of the century and compiled the *Toledan Tables* (see § 402, A6).

- A1: "On accession and recession" (*Risālat al-iqbal wa 'l-idbār*), mentioned by Ibn al-Hā'im in his *Kāmil Zīj* (see § 531). Research: Comes [4], 318-322.
- A2: an unnamed *zīj*, also mentioned by Ibn al-Hā'im. Research: Comes [4], 309 and 367.

- A3: "On progressions, projection of rays and justification of some fundaments of this technique" (*Risāla fī 'l-tasyīrāt wa-maṭāriḥ al-šū'ā'at wa ta'līl ba'd uṣūl al-šinā'a*). Extant in Escorial 939. This work is a brief text on world astrology and it was written in Cuenca and dedicated to Šā'id. Research Samsó & Berrani [1].

§ 388 ^cABD AL-RAḤMĀN AL-MURĀDĪ.

- Me1: Research: Add - Casals [1], Casulleras [1].

§ 391. AL-MU'TAMAN.

Add (p. 162) - Memorial collection: "al-Mu'taman" [1]

- M1 Add: Fragmentary editions with French translations and commentary in Rashed [42] (975-1027) & [62] (843-899). Research: Djebbar [13].

§ 395. AL-KĀSHGHARĪ.

- See (p. 163): Add - GAS X, 530-532.

- L1 (p. 163): Add - The world map is reproduced in GAS XII, 35.

§ 402 IBRĀHĪM AL-ZARQĀLĪ.

- See (p. 164): Add - Comes [2b], Samsó [25b] (166-240), [26] (reprint of [21]), [37].

- A1 (pp. 164-165). Replace the first paragraph by the following one: "A1 in the original publication corresponds to two different works by al-Zarqālī which I will call A1 and A1a:

A1: "Book of Operations by Means of Tympanum of Zijes" (*Kitāb al-ʿamal bi'l-ṣafīḥa al-zījīyya*) which is a treatise on the use of the equatorium. The Arabic text (British Museum 426, Add. 1473) has been edited, translated and commented by Comes [2] (189-236); there is also a second treatise on the construction of the equatorium only extant in a Castilian Alfonsine translation: Alfonso X [1] vol. 3 (272-284). Research: Comes [2] (79-138), [3b], Hartner [20], Samsó & Mielgo [1].

- A1a: This work bears different titles in the MSS: "Treatise on the Astrolabe Zarqala, on the Construction of the Tympanum ascribed to him [= al-Zarqālī], and Operations with it" (*al-Risāla al-zarqāliyya fī ʿamal al-ṣafīḥa al-mansūba ilay-hi wa 'l-ʿamal bi-hā*), "Book of Operations by Means of the Astrolabe Zarqala Applicable for all Horizons" (*Kitāb al-ʿamal bi'l-ṣafīḥa al-zarqāliyya al-muʿadda/ al-mushtaraka li-jamīʿ al-āfāq/ al-ʿurūd*). Amsterdam (50/1), Brussels

(50), Leiden (993/1, 1870/3), Istanbul (SM AS 2671/1), Escorial (II 962), Cairo (*mīqāt* 647), Istanbul (SM Esat 3804/3).

Add to the second paragraph: Spanish translation (based on MS Escorial 962) with commentary in Puig [4]. Research: delete "Tibbon [1]". Add: Puig [5a], [5b] & [5c], Samsó [21a] (reprint in Samsó [26], n° XV).

- A2 (p. 165): Hebrew translation: add Tibbon [1].

- A3 (p. 165): Add at the end: "A2 and A3 are the same work, describing a simplified version of A1a in the face of the instrument, while the back is entirely different and equivalent to that of a standard astrolabe"

- A4 (p. 165): Add: "It is a treatise on talismanic magic, which was translated into Latin (Vienna lat. 5239), and includes a great number of magic squares" Delete "Research: Cimino [2], Comes [2], Hartner [20], Toomer [2-3]". Add: Research: Millás [8] (480-483).

- A6 (p. 165): Critical edition of the extant Latin versions in Pedersen, F.S. [1]. Research: delete "Boutelle [1]", "Curtze [6] (377-378)" and "Hartner [20]". Replace "Delambre [2]" by "Delambre [1]", "Goldstein [3]" by "Goldstein [4]". Add: Toomer [3].

Add, after A8 (p. 165):

- A9: A treatise on the construction of the armillary sphere, extant in an Alfonsine Castilian translation (Alfonso X [1] vol. 3, 1-24).

- A10: A lost treatise on solar theory the title of which was either *Fī sanat al-shams* ("On the solar year") or *al-Risāla al-jāmi'a fī 'l-shams* ("A comprehensive epistle on the Sun"), written - probably ca. 1075-1080 - after twenty-five years of solar observations. Its contents are known through secondary sources. Research: Samsó [26] (n° X, 1-35) Toomer [2] & [6].

- A11: A treatise on the motion of the fixed stars, written ca. 1085, extant in a Hebrew translation. Facsimile edition of the Hebrew MS and Spanish translation in Millás [8] (247-343). Research: Comes [3] & [4]; Goldstein [4]; Samsó [21] (reprint in [26] n° IX) & [26a].

§ 411. AL-ṢARDAFĪ.

M1 (p. 166): Replace "Rebstock [4]" by "Rebstock [5]".

§ 420. KHAYYĀM.

- See (p. 168): Add - Bagheri [3], Djebbar [14], Jalali-Naini [1].

- M2 (pp. 168-169): Add - Research: Chawushi [9], Sharaf al-Din [1].

- M3 (p. 169): Add - Research: Hogendijk [43], Kanani [1], Vitrac

[1].

- M4 (p. 169): Add - Research: Chawushi [6].
- Me1 (pp. 169-170): Add - Research: Chawushi [8].
- Mu1 (p. 170): Add - Research : Chawushi [7].

§ 458. IBN AL-SURĀ.

- M1 (p. 177): Add - Research: Lorch [22].

§ 470. AL-IDRĪSĪ.

- See (p. 180): Add - GAS X, 134-136, 288-291, 306-308, 328-332, 348-350, 524-528, 550-552; XI, 3-5, 18-21, 34-37, 83-85, 117-119.
- G1 (p. 181): Add - The round world maps are reproduced in GAS XII, 13, 18-19. Some regional quadrilateral maps are reproduced in GAS XII, 20-24.

§ 476. AL-KHĀZINĪ.

- A1 (p. 182): Add - Research: Giahi Yazdi [2], Pingree [70].
- Me1 (pp. 182-183): Add: MS Longboat Key 389.

§ 512 IBN RUSHD.

- See (p. 190): Add Forcada [4] & [5].

§ 526 AL-BIṬRŪJĪ.

- A1 (p.193): Add - Research Mancha [5], Samsó [26b]

§ 530. IBN AL-KAMMĀD.

- A1 (p. 194): Add - Research: Mancha [4], Calvo [14].

§ 531. IBN AL-HĀ'IM.

- A1 (p. 194): Add - Research: Calvo [11], Puig [7a], Samsó [27].

§ 532. AL-ḤAṢṢĀR.

- M1 (p. 194) Add after the title: "= Book of Explanation and Memoir on the Art of Operations with Ghubār" (*Kitāb al-bayān wa'l-tadhkār fī ṣan'at 'amal al-ghubār*). Add MSS: Damascus (9760), Longboat Key (293), Rabat (Q 917). In the Longboat Key MS the name of the author is given as Abū Bakr ibn Muḥammad ibn °Ayyāsh instead of Abū Zakarīyā Muḥammad ibn °Abd Allāh ibn °Ayyāsh. Add: Research of the Longboat Key MS: Kunitzsch [58]. Exposition

of the arithmetic with Western Arabic figures "ghubar" containing 2 chapters: 1) On operations with integers, 2) On operations with fractions.

§ 541. SHARAF AL-DĪN AL-ṬŪSĪ.

- See (p. 197): Add Rashed [53]

§ 547. AL-JAGHMĪNĪ.

- A2 (p. 199): Add MS Longboat Key 388.

§ 557. YĀQŪT AL-RŪMĪ

- See (p. 200): Add *GAS* (X 77-78).

§ 572. MUḤAMMAD IBN AL-ḤUSAYN.

- M1 (p. 203): Replace "Compasses" by "Compass", "Woepcke [17] (16-67, 116-144)" by "Woepcke [26] (116-144 and 16-67)". Research should be: "Krasnova [1,5], Woepcke [26] (1-15)".

§ 573 AL-SHAYBĀNĪ.

- A1 (p. 203): Add - it was used in India. Research: Van Dalen [4].

§ 577 MUḤAMMAD IBN AL-ṢAFFĀR.

- A1 (p. 204): see above § 312 A1.

§ 578 AḤMAD AL-TAMĪMĪ, known as IBN ISḤĀQ

- A1 (p. 205): Research - Add: Samsó [34b], Samsó & Mielgo [2], Samsó & Millás [2] & [3].

§ 606. AL-ṬŪSĪ.

- See (p. 212): Add - Rozhanskaja, Matviyevskaja & Lyuter [1]; *GAS* X, 138-140, 177-179, 315-317, 608-611.
- M1 (p. 212): Add - MS Longboat Key 286.
- M4 (p. 213): Add - Research: Lyuter [6].
- A8 (p. 216): Add - Research on lunar crescent visibility: Giahi Yazdi [1].
- A10 (pp. 216-217): Add - The world map is reproduced in *GAS* XII, 36.

§ 635. AL-MAGHRIBĪ.

- See (p. 226): Add Comes [6].
- A1 (p. 227): Add MSS Barcelona (Univ.), Dublin Beatty (4129).

Add: Research of the three other manuscripts: Dorce [1].

§ 641. AL-URMAWĪ.

- Mu1 (p. 228): Add MS Longboat Key 294.
- Mu2 (p. 228): Add MS Longboat Key 295.

§ 654. IBN BĀṢO.

A1 (p. 230): Add - Research: Calvo [2a] & [12].
 Add: - A2: "Treatise on the plate of sines provided with chords" (*al-Risāla fī-l-ṣaḥīḥa al-mujayyaba dhāt al-awtār*). MS Tunis National Library (5550, 50r-81v). 59 chapters. Research: Calvo [13].

§ 668. AL-SHĪRĀZĪ.

- M5 (p. 234): Add - MS Istanbul (TK 3336). Replace "Facsimile edition of the Istanbul manuscript" by "Facsimile edition of the Yeni Cami manuscript". Research: Add - Lyuter [6].

§ 670. MUḤAMMAD IBN AL-RAQQĀM.

- A2 (p. 235): Add - the *Qawīm Zīj* is also extant in MS Rabat General Library 260. Research Kennedy [55], Samsó [25b], 421-427; Vernet [30a].
- Add: A2a (p. 235) - another *zīj* by Ibn al-Raqqām ("A Comprehensive *Zīj* which corrects [Ibn al-Hā'im's] *Kāmil Zīj*" / *al-Zīj al-Shāmil fī Tahdhīb al-Kāmil*) is extant in MS Istanbul Kandilli 249. Research Kennedy [55], Samsó [25b], 421-427. On Ibn al-Hā'im see above § 531.
- A3: a complete copy is extant in MS Rabat General Library 2461.

§ 674. AL-FĀRISĪ.

- M2 (p. 236) Add - Research: Agarkun [1], Mawaldi [1].
- Ph1 (p. 236) Research: Add Sabra in Ibn al-Haytham [15].

§ 680. ABŪ'L-FIDĀ

- See (p. 237): Add *GAS* X, 174-176; XI, 103-107.
- G1 (p. 237): Some regional maps copied by al-Isfahānī (§1112) in E1 are reproduced in *GAS* XII, 40-45, 47-48.

§ 696. IBN AL-BANNĀ'.

- See (p. 241): - Aballagh [2] must be [5-6]. Add: Aballagh & Djebbar [2], Comes [2a].

- M1 (p. 242): Add - Research: Rozhanskaya & Hamza [1]?
- M2 (p. 242): Add - Research: Aballagh [5].
- M8 (p. 242): Add - Edition and research: Aballagh [3]; French translation and research: Aballagh [4]; research: Aballagh [1-2].
- A1 (p. 242): Add - Research: Samsó & Millas [1], [2], [3].
- A8 (p. 243): Add - edition and French translation in Ibn al-Bannā' [2]. Research Forcada [0a].
- A10 (p. 243): Add - edition and research Calvo [1a]; edition Khattābī [1] (136-174).
- A11 (p. 243): Add - edition Aballagh & Djebbar [2] (185-190); research Rius [2] (225-230).
- Add - A13: "Epistle on the Zarqāliyya tympanum"- Edition and research Puig [3a]

Insert between § 696 and § 697 (p. 243):

§ 696a IBN ʿAZZŪZ AL-QUSANṬĪNĪ.

Abū'l-Qāsim ibn al-Ḥajjāj ʿAzzūz al-Qusanṭīnī, expert in *Farā'id*, Māliki *fiqh* and other religious sciences, as well as astronomy and astrology. Born in Constantina where he died in 1354, although he spent part of his life in Fez.

- A1: *al-Zīj al-Kāmil*: a note by the astronomer Muḥammad ibn Abī Yaḥyā al-Ḥabbāk (d. Tlemcen 1463) in MS Rabat General Library D2461 (p. 355) ascribes this *zīj*, apparently not extant, to Ibn ʿAzzūz.
- A2: *al-Zīj al-Muwāfiq*. MSS Rabat General Library D2461 and Hassaniya 8772. Excerpts (geographical coordinates, chronology, solar model) in MS Zāwiya Ḥamzawiyya (Ait Ayache) 80 (pp. 197-202). This *zīj* was compiled when the author realized the failure of the horoscope he cast to predict the outcome of the battle of El Salado in 1340 (see below A4) calculated with the *zīj* of Ibn Ishāq (§ 578). Then he made observations in Fez c. 1344 with an armillary sphere and established a new set of planetary mean motions which he checked and corrected using astrological evidence. Research: Samsó [34a].
- A3: "Epistle on the cycles of the two luminaries" (*Risāla fī adwār al-nayyirayn*). MS Salé Ṣubayḥiyya Library 509. It contains materials copied from a chapter of A2.
- A4: "Chapters containing the fundamental principles" (*Kitāb al-Fuṣūl fī jamʿ al-uṣūl*). MSS Rabat Hassaniyya Library 1110 (second book) and Rabat General Library D2128 (pp. 42-44, chapter 3 of the second book). The extant part of this astrological work is concerned with year

transfers (*tahwīl al-sinīn*), conjunctions and oppositions and it ends with two extremely detailed horoscopes related to the battle of El Salado (1340), recast using A2. Research Samsó [34c].

§ 698. AL-KĀSHĪ.

- M2 (p. 243): Add - manuscript Longboat Key 296.

§ 708. AL-QAZWĪNĪ.

- See (p. 245): Add - GAS X, 199-201,
- G1 (p. 245): Add - The world map is reproduced in GAS XII, 37. A regional map appears in GAS XII, 38.

§ 717. AL-^cUMARĪ.

- See (p. 247): Add - GAS X, 20-22, 88-92; XI, 52-54.

§ 761. AL-ṬĪBUGHĀ AL-BAKLAMISHĪ.

- A2 (p. 257): Add - Research Samsó [4a], Samsó & Catalá [1].

§ 771. IBN KHALDŪN

- See (p. 260): Add - GAS X, 130.
- H2 (p. 260): The world map is reproduced in GAS XII, 30.

§ 780. AḤMAD IBN AL-QUNFUDH AL-QUSANṬĪNĪ.

- (p. 262) IBN AL-QUSANṬĪNĪ should be QUSṬANṬĪNĪ.
- A2: Add - Research: Hermosilla [1].

§ 783. AḤMAD IBN AL-HĀ'IM

- M13 (p. 264): Edition and commentary by M. ^cAbd al-Jawād: Ibn al-Hā'im, A. [1]

Insert between § 790 and § 791:

§ 790a. ABŪ ^cABD ALLĀH [MUḤAMMAD?] AL-BAQQĀR

Moroccan astrologer active in Fez in 1418.

- A1: "Book on cycles for the progression of the luminaries" (*Kitāb al-adwār fī tasyīr al-anwār*): astrological treatise with a lot of information on trepidation in late Maghribī astronomy. MSS Escorial 916, Rabat Hassaniya 826 and 5372. Partial edition and research in Díaz Fajardo [1]. Research: Comes [5], Samsó [34b] and [35].
- A2: "Book on rains and prices" (*Kitāb al-amṭār wa'l-as'ār*) on

meteorological astrology. One of the rare Arabic sources containing information about the old astrological "system of the crosses" (see § 61a). MS Escorial 916. Research: Comes [5], Vernet [14], Samsó [10] & [18a]

- A3: "Correction for the planet Venus" (*Iṣlāḥ kawkab al-Zuhra*), not extant. Mentioned in the *Kitāb al-adwār* (A1): the *zīj* of Ibn Ishāq (§ 578) was not adequate for the computation of the position of Venus and that of al-Battānī should be used instead.

Insert between § 799 and § 800 (p. 269):

§ 799a. ḤĀFĪZ-I ĀBRŪ

Shihāb al-Dīn °Abd Allāh ibn Luṭf Allāh al-Khawāfī al-Bihdadānī, known as Ḥāfīz-i Ābrū (d. 1430). Historian and geographer who worked at the court of Tīmūr and his grandson Shāhrukh. He was a skilful chess-player. He wrote the Persian continuation of al-Ṭabarī's "History of prophets and kings" (*Ta'rīkh al-rusul wa'l-mulūk*), as well as the continuation of H1 by Rashīd al-Dīn (§ 656), the "History of sultan Shāhrukh" and other historical works.

- See: AGL (514-519), GAS (X 132, 308), PL (I 86-87, 1235-1236; II, 132-133, 818-819), PL2 (341-349), Barthold [0], [6a]

- G1. Book on roads and countries (*Kitāb al-masālik wa'l-mamālik*)- London (I 421b, Ind. 3874), Oxford (P. 33). The world map is reproduced in AGL (517) and GAS (XII 39).

- H1. Continuation of the Collection of Chronicles (*Zail-i Jāmi' al-tawārīkh*) P. Partial editions with French translations by Bayani: Ḥāfīz-i Ābrū [1-2]. Partial edition with Russian translation: Tiesenhausen, Romaskevich & Volin [1] (139-143, 243-247).

§ 802. AL-KĀSHĪ.

- M1 (p. 269): Add - Research: Azarian [1], Dold-Samplonius [24]

- M4 (p. 270): Delete - Edition: al-Kāshī [1] . Add - Research: Rozenfeld [64].

- M5 (p. 270): Replace "Edition: in al- Kāshī [1]" by "Tehran (Mahdawi 482/10). Edition: al-Kashi [1] (50-57)".

- M7 (p. 270): Replace by "Consequences from Truths (*Natā'ij al-ḥaqā'iq*) - Tehran (Mahdawi 482/11). Edition: al-Kāshī [1] (58-59). Trigonometrical treatise."

- A1 (p. 270): Add - Research: Kennedy [56] and [60].

- A4 (p. 271): Add - "Tehran (Mahdawi 482/8). Edition: al-Kāshī [1]

(1 -37)."

- A7 (p. 271): Delete - "Edition in al-Kāshī [1]".
- A8 (p. 271): Replace by "[Treatise on the depression of the visible horizon] - Tehran (Senate 89/2). Edition and English translation: Bagheri [5] (364-367). Research: Bagheri [5] (357-363). In this treatise the dependence of the size of the visible horizon on the altitude of the observer is found. The manuscript is ascribed to the mystic poet Bābā Afdal al-Dīn al-Kāshī, but Bagheri has proven that the treatise was written by Jamshīd al- Kāshī."

§ 807. AL-MARĀGHĪ.

- See (p. 272): Add - *OMULT* (5-9).
- Mu1-Mu4 (p. 272): - Add MSS quoted in *OMULT* (No 3).
- Mu4 (p. 272): - Add to the title: P.
- Add: Mu5. Commentary on "Book of cycles" (*Sharḥ Kitāb al-Adwār*) - MS Longboat Key 235 and 8 other MSS quoted in *OMULT*. Commentary by al-Urmawī (§ 641, Mu1).

§ 808. AL-RŪMĪ.

- M2 (p. 273): Add MSS quoted in *OMLT* (N° 1).
- M3 (p. 273): Delete in the title - "by Operations . . . al-Kāshī".
- A1 (p. 273): Add MSS quoted in *OALT* (N° 5).

§ 816. ULUGH BEG.

- See (p. 277): Add: Kennedy [57-58].
- M1 (p. 278): Add MSS Tehran (3180, 3536/1, Mahdawi 482/9, Malik 1531, Tabatabai 791). Edition: al-Kashi [1] (38-49). This edition is a copy of the Mahdawi manuscript. Replace "the first three" by "the first three and the eighth". Replace "the last two" by "the other five". Insert before "al-Birjandi (No 938, M1)" "in his Zīj (A1) Ulugh Beg wrote that he composed a treatise on the determination of the sine of one degree by mathematical proof (Ulugh Beg [4, p. 83])". Replace "al-Birjandi (No 938, M1)" by "al-Birjandi (No 938, M4)". Insert between "[Tashkent manuscript 457, f. 77a]" and "Turkish": "No doubt that the original text of this treatise was signed by Ulugh Beg, but his death and destruction of his observatory, al-Qushjī (§ 845) copied this treatise without the name of Ulugh Beg took it into Istanbul. All extant manuscripts of this treatise are copies of this text and therefore do not contain the name of Ulugh Beg." Replace

"Turkish translation" by "Turkish summary". Replace "Rosenfeld [64]" by "Rosenfeld and Hogendijk [1]".

- A1 (p. 278): Add - Research: Saliba [31], Samsó [42].

§ 865. AL-QALAṢĀDĪ.

- See (p. 291): edition of his *Rihla* (Qalaṣādī [4]) and the paper of M. Marín in this volume of *Suhayl*.

- M7 (p. 291): Edition, French translation and research by Bentalib: al-Qalasadi [3].

§ 904. IBN MĀJID

- See (p. 307): Add - *GAS* XI, 163-165, 168-174.

§ 923. ZACUTO.

- See (p. 311): Chabás & Goldstein [2]

- A1 (p. 311): Add "The actual *nisba* of Aḥmad b. Qāsim was al-Ḥajarī, not al-Jahdarī". Add - Research: Samsó [34e] & [41].

§ 936. AL-KHAFRĪ.

- Replace "15-16th c." (p. 313) by "d. 1550".

- A1 (p. 314): Add MS Longboat Key 279.

- A2 (p. 314): Add - Research: Saliba [30].

§ 954. AL-MIṢRĪ.

- A2 (p. 314): Add - Research: Charette [2].

§ 969. PĪRĪ RAĪS.

- See (p. 323): Add - *GAS* XI, 42-49.

- AG1 (p. 323): Add - MSS are quoted in *OCLT* (No 11). Some pages of MSS are reproduced in *GAS* XII, 79.

Before "Research of the map...", insert:

- G1. [Atlas of maps] T - Istanbul (TK Revanköşk 1633). Some regional maps are reproduced in *GAS* XII, 80-85.

- G2. [Map of the Atlantic Ocean] - Istanbul (Haz. 1824). The map is reproduced in *GAS* XII, 78.

§ 977. SEYDI REIS.

- See (p. 325): Add - *OCLT* (35-38), *GAS* X, 581-582; XI, 265-268, 329-330.

- A1, A2 (p. 325): Add MSS quoted in *OALT* (No 71).
- A5 (p. 325): Replace by "Treatise on the Sine-quadrant (*Risāla-i rub^c mujayyab*) T". MSS are quoted in *OALT* (No 71).
- A6 (p. 325): The title should be - "Treatise on the Equatorial Circle (*Risāla-i dā'irat al-mu'addil*) T". List of MSS in *OALT* (No 71).
- A7 (p. 325): The title should be - "Treatise on the Astrolabe (*Risāla-i Astūrlāb*) T". List of MSS in *OALT* (No 71).
- AG1 (p. 326): The title should be - "Envelopping [Book] on the Science of Celestial Spheres and Seas (*al- Muḥīṭ fī 'ilm al-aflāk wa'l-abḥur*) T". List of MSS in *OCLT* (No 16) and Naples (Univ), Vienna (1277).
- G1 (p. 326): The title should be - "Mirror on Lands (*Mir'āt al-mamālik*) T". List of MSS in *OCLT* (No 16).

Insert between § 977 and § 978:

§ 977a MAJAR RAIS.

°Alī Majār Rā'īs (d. 1567), Turkish navigator.

- See: *GAS* X, 413; *OCLT* 46-48
- G1: Maritime atlas (*Deniz atlası*) T.- Istanbul (Haz. 644), world map. Some regional maps are reproduced in *GAS* XII, 96-98.

§1112 AL-IṢFAHĀNĪ.

- See (p. 361): Add *GAS* (X, 352-353, 595-598; XI, 75-84, 183-184).
- E1 (p. 361): Add "Collection of fragments of works of different authors. Five chapters: 1) Religion, 2) Politics, 3) Art, 4) Good and evil, 5) History and cosmography". Replace "English translation of two parts...al-Iṣfahānī [1]" by "The fifth chapter contains two sections: 1) "A more precise definition of the forms of the names of cities and countries" (*Tahqīq al-i'rāb fī asmā' al-bilād*) based on al-Ṭūsī's A8 (§ 606) and Ulugh Beg's A1 (§ 816); and 2) "Ordering of countries" (*Taqwīm al-buldān*) based on Abū'l-Fidā's G1 with the same title (§ 680). The list of cities and countries in the first section is supplemented by new names, such as *Yeni dünya*, "New World", for America, borrowed from Turkish sources. English translation of these two sections: al-Iṣfahānī, Sadiq [1]. Some regional maps in the second aforementioned section are reproduced in *GAS* XII (40-45, 47-48)".

§ 1134. AL-QALYŪBĪ.

- See (p.365): Add *OCLT* (No 98).

§ 1145. ḤAJJĪ KHALĪFA.

- See (p. 367): Add *OCLT* (No 85-98); *GAS* X. 510-511, Ihsanoğlu [12].
- G1, G2 (p. 367): List of MSS in *OCLT* (No 45). Some regional maps of G2 are reproduced in *GAS* XII, 102-104.

§ 1167. EVLIYĀ CHELEBĪ.

- See (p. 371): Add *OCLT* (No 101-107).
- G1 (p. 371): List of MSS in *OCLT* (No 50).

§ 1169. SANJAQDĀR.

- A1 (p. 372): Add - Research: Samsó [42].

§ 1193. AL-ṢAFĀQUSĪ.

- See (p. 377): Add - *GAS* X, 515.
- AG1 (p. 377): Add - The world map is reproduced in *GAS* XII, 25, 27.

§ 1322. JAY SINGH.

- See (p. 400): Add Pingree [71].

§ 1328. AL-MUTAFARRIQA.

- See (p. 402): Replace "OALT (415-418)" by "*OALT* (416-418)". Add: *GAS* X, 458-459.
- Replace A1 (p. 402) by AG1: Collection of old and new Cosmography (*Majmūʿat al-hayʾa al-qadīma waʾl-jadīda*). T-Istanbul AM74. Edition: al-Mutafarriqa [2]. The map of Egypt is reproduced in *GAS* XII, 101.

* Add (p. 420):

§ 1424. ALEKSANDR KARA TODORI.

Aleksandr Pāshāa Kara Todori (Alexandre Pacha Caratheodory, 1833-1908). Ottoman diplomat and historian of mathematics, the chief of the delegation of the Ottoman empire at the Berlin Congress (1878).

- See: *OMLT* (No 412-413).

In 1891 Kara Todori published al-Ṭūsī [10] which contained the Arabic edition of al-Ṭūsī's M12 (§ 606), with a French translation and commentary, as well as the Arabic edition and French translation of Thabit ibn Qurra's M9 (§ 103).

ANONYMOUS MANUSCRIPTS

FRANCE

Paris National Library

- 2457 (p. 457). Add: [Collection of geometrical manuscripts]
Research: Bellosta [2].
- 2457/6. Research: Matviyevskaya [42].
- 2457/7. French translation and research: Ben Miled [1].
- 2468 (p. 458).
- 2468/1 (p. 458) Book of Archimedes on the construction of a Clock (*Kitāb Arshūmidis fī ʿamal sāʿāt*). Revision of the treatise of Archimedes.
- 2468/2 should be - Treatise on the construction of [an instrument provided with] a flute (*Risāla ṣanʿat [ālāt] al-zamr*). The treatise is dedicated to an architect and it contains the description of a hydraulical horary instrument with a flute. This treatise was ascribed to Apollonius because the Roman architect Vitruvius Pollio described an astronomical instrument called "spider" (*arachne*) invented by Apollonius, which was a prototype of medieval astrolabes, could be used as horary instrument, and was rotated by a hydraulical machine (see Rosenfeld [45] (123)). German translation: Wiedemann [54]. Research: Carra de Vaux [10] and Sezgin GAS (V 143).

INDIA

Aligarh Azad Library

- Sulayman 522/32 (p. 465). "Asfuruz-i" should be "Asfiruz-i". Add - "Asfiruz is an old Persian name of Venus, deriving from the old Greek name Hesperos, used for Venus as an evening star. This is clear because in the Classical Georgian poem "Knight in tiger skin" (*Vepkhis tqaosani*) by Shota Rustaveli, which was written under a strong Persian influence, all the planets except Venus are called by their Arabic names, while Venus was called Aspirozi".

LEBANON

Beirut University of St. Joseph (p. 477)

- Add MS 223/16 = Paris 2468/2.

UNITED KINGDOM

London. Brit. Library.

- Sup. 23391 (p. 491) should be - Add 23391/1 = Paris 2468/1. Add. 23391/2 = Paris 2468/2.

MANUSCRIPT LIBRARIES

IRAQ

Baghdad (p. 504).

- Add: National Library. Research: Rebstock [7].

UNITED STATES OF AMERICA

- Add (p. 511): Longboat Key, Florida. Collection of F.J. Schoenberg.

UZBEKISTAN

- Tashkent. Institute for Oriental Studies (p. 512). Descriptions: Add - Matviyevskaya and Yusupova [1,3].

SURVEYS

- Arabic science (p. 513): Bellosta [3], Brentjes [15], al-Hassan, Ahmed, & Iskandar [1], Rashed [55].
- Central Asian science (p. 513): Yusupova, G. [6].
- Ottoman science (p. 513): Sabban [1], Ihsanoğlu [3-11].
- Medieval astronomy (p. 513): Ahmedov [33], Charette [1] and [2], Cook [1], Dallal [7], Forcada [0] & [3] King [80, 81, 83], King & Samsó [1], Kunitzsch [62], Morelon [5], Rius [2], Sabra [39-41], Saliba [28 -29], Samsó [25b], [34b], [39], [40], Schramm [6].
- Medieval Geography (p. 514): *GAS* X-XII.
- Medieval Mathematics (p. 514): Berggren [18-19], Djebbar [11-12, 15-16], Endress [7], Guergour [3], Hogendijk [39-40], Kennedy [59], Kunitzsch [59], [62], Matviyevskaya & Yusupova [2], Mushtaq [1],

- Ozdural [1], Rebstok [4], Rozhanskaya [22], Sesiano [32, 34-35].
- Algebra (p. 514): Plofker [1], Rashed [58].
- Astrolabes (p. 515): Abgrall [2], Charette [2], Kennedy, Kunizsch & Lorch [1], Kunitzsch [56-57], Martí & Viladrich [2].
- Azimuth of Qibla (p. 515): King [80], Rius [2].
- Burning instruments: Bellostà [4].
- Clocks and Timekeeping (p. 515): King [83]
- Geometry (general): Djebbar [17], Luter [7].
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Add:

- ʿAlī ibn al-Khiḍr al-Qurashī - § 379a.
- ʿAlī Majār Raʾīs - § 977a.
- al-Baqqār, Abū ʿAbd Allāh - § 790a.
- Al-Ḍabbī - § 61a.
- Ibn ʿAzzūz al-Qusanṭīnī - § 696a.
- Ibn Khalaf al-Istijī - § 384a.

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- *Natāʾij al-ḥaqāʾiq* should be M7 from § 802.
- *K. ṣanʿat al-aṣṭurlāb al-musattaḥ* should be : *K. ṣanʿat al-aṣṭurlāb al-mubattaḥ*.

Add:

- *R. fī adwār al-nayyirayn*: A3 in § 696a.
- *K. al-adwār fī tasyīr al-anwār*: A1 in § 790a
- *R. fī ʿamal al-ashkāl al-mutasāwiya al-aḍlaʿ kullu-hā bi fathā wāḥida*: M1 in § 212.

- *K. al-amṭār wa'l-as'ār*: A2 in § 790a.
- *K. Arshimidis fī 'amal sāt*: Paris Bibliothèque Nationale N° 2468/1.
- *K. al-bayān wa'l-tadkhār fī ṣan'at 'amal al-ghubār*: M1 in § 532.
- *Deniz atlası*: G1 in § 977a.
- *K. al-Fuṣūl fī jam' al-uṣūl*: A4 in § 696a.
- *R. al-iqbal wa 'l-idbār*: A1 in § 384a.
- *Iṣlāḥ kawkab al-Zuhra*: A3 in § 790a.
- *al-R. al-jāmi'a fī 'l-shams*: A10 in § 402.
- *R. fī makān wa-ṣifr* - PH9 in § 198.
- *K. al-mu'āmalāt*- M16 in § 327.
- *Rajaz fī 'l-aḥkām 'alā aḥdāth al-jaww wa aḥwāl al-mulūk 'alā ṭarīqat al-aḥkām al-qadīma ... aḥkām al-ṣulub*: A1 in § 61a.
- *R. fī-l-ṣafīḥa al-mujayyaba dhāt al-awtār*: A2 in § 654.
- *Fī sanat al-shams*: A10 in § 402.
- *R. ṣan'at [ālat] al-zamr* - Paris Bibliothèque Nationale N° 2468/2.
- *Sharḥ Kitāb al-Adwār*: Mu5 in § 807.
- *M. fī sayr saḥmay al-sa'āda wa'l-ghayb* - A57 in § 348.
- *K. al-Tadkhira bi-uṣūl al-ḥisāb wa'l-farā'id wa-awlihā wa-taṣḥīḥā* - M1 in § 379a.
- *R. fī 'l-tasyīrāt wa-maṭāriḥ al-ṣu'ā'at wa ta'līl ba'd uṣūl al-ṣinā'a*: A3 in § 384a.
- *al-Zīj al-Kāmil*: A1 in § 696a.
- *al-Zīj al-Muwāfiq*: A2 in § 696a.
- *al-Zīj al-Shāmil fī Tahdhīb al-Kāmil*: A2a in § 670.

OTHER ADDITIONS:

We also suggest to check other sources which were not available to us, such as the entries in the last volumes of the *Islam Ansiklopedisi* (IA), in the second edition of the *Encyclopaedia of Islam* (EI2), in vols. IV and ff. of the *Encyclopaedia Iranica* (EI_r), as well as in *Safina* and in other important Turkish encyclopaedias.

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