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The Origin of the Astrolabe According to the Medieval Islamic Sources

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THE MEDIEVAL ARABIC *aṣṭurlāb* or *aṣṭurlāb* for astrolabe was derived from the Greek ἀστρολάβος (or ἀστρολάβον ὄργανον), name of several astronomical instruments serving various purposes, including the demonstration and graphical solution of many problems of spherical astronomy.¹ As Otto Neugebauer has shown in a section on the early history of the astrolabe published in his monumental *History of Ancient Mathematical Astronomy*, the underlying theory of stereographic projection was known in the time of Hipparchus (ca. 150 B.C.) and the astrolabe as it was known in medieval times was probably first described by Theon (ca. 375 A.D.).²

The purpose of this study is to draw attention to a series of statements in the medieval Islamic sources about the etymology of the Arabic word *aṣṭurlāb* or *aṣṭurlāb* and about the invention of the instrument. These statements

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It is a pleasure to record my gratitude to the Egyptian National Library, where most of the manuscripts used in this study are preserved, and also to the Municipal Library in Alexandria, the Suleymaniye Library in Istanbul, the Universiteitsbibliotheek in Leiden, the British Library in London, Columbia University Library in New York, and the Bibliothèque Nationale in Paris. Prof. Franz Rosenthal of Yale University and Dr. Michael Carter of the University of Sydney kindly read this paper in its penultimate form, and their valuable comments on certain linguistic and stylistic matters have been incorporated in the present version. Further comments of a more technical nature by Prof. Paul Kunitzsch of the University of Munich have also been included. Any shortcomings are of course my own responsibility.

The passage on the invention of the astrolabe in the Taymūr *ḥikma* manuscript was noticed by my friend Dr. Dimitri Gutas in the Egyptian National Library one bitterly cold day in the winter of 1975. The other passages recorded in these pages were collected on more lonely occasions since then. This paper is dedicated to the memory of the happy times spent with Dr. Gutas in Cairo.

1. In general, *aṣṭurlāb* is preferred in early treatises, even in late copies thereof, and *aṣṭurlāb* is standard in late treatises. On the Greek name for the astrolabe see also *Segonds*, pp. 18-25.

2. See Neugebauer 2, II, pp. 868-879, and also Neugebauer 1. Here and elsewhere references by author or short title are to the bibliography at the end of the paper.

are discussed in chronological order, as far as possible. The original Arabic and Persian texts are presented in the appendix to this paper. A few of the statements I have been discussed previously by E. Wiedemann (1909),³ F. Rosenthal (1950),⁴ S. Pines (1964),⁵ S. Maher (1968),⁶ E. S. Kennedy (1976),⁷ and F. Sezgin (1978).⁸ Also S. Gandz (1927) has surveyed the references to the astrolabe and its terminology in medieval Jewish literature.⁹

In some early Arabic texts, such as the one attributed to Mashā'allāh (spurious?) and an anonymous one (by al-Zarqāllū?), we find the statement that *asṭurlāb* means *akhdh al-kawākib*, literally "taking the stars". This corresponds to an interpretation of the Greek, assuming that the second element λαβον comes from the verb λαμβάνειν, "to take", past stem λαβ. In Persian the phrase *akhdh al-kawākib* can be conveniently rendered *sitāra yāb*, the Indo-Iranian *sitāra* meaning "star" and *yāb* being from the verb *yāftan*, meaning "to find" or "to take". Ḥamza al-Iṣfahānī states that *asṭurlāb* is an Arabization of this Persian phrase.

Kūshyār explains *asṭurlāb* as meaning *mizān al-shams*, "balance of the sun". This is curious not least because *mizān al-shams* is attested in early scientific Arabic as referring to a special variety of sundial.¹⁰ Abū 'Abd Allāh al-Khwārizmī and al-Bīrūnī explain *asṭurlāb* as meaning *mir'āt al-shams*, "mirror of the sun", asserting that λαβον means "mirror", which is not the case. Nevertheless, the reference to the notion of a mirror is interesting not least because of the resemblance between the basic shapes of an astrolabe and a hand-mirror. In this connection I have not found any medieval Arabic

3. E. Wiedemann records the etymologies of al-Bīrūnī, Abū 'Abd al-Khwārizmī *Mafātīḥ al-'ulūm*, and Ḥajjī Khalifa (*Wiedemann* I, I, p. 551, and II, p. 459).

4. F. Rosenthal, in an article on al-Samaw'al and Hibat Allāh al-Aṣṭurlābī published in 1950, mentioned the derivation of *asṭurlāb* from *asṭur* and *Lāb* suggested by Abu 'Abd 'Allāh al-Khwārizmī and Ibn Khallikān (*Rosenthal*, p. 555).

5. S. Pines, in a study of the terms "astronomy" and "astrology" according to al-Bīrūnī, discussed the etymologies of al-Khwārizmī and al-Bīrūnī (*Pines*, pp. 346-347).

6. S. Maher, in her book on the navy in Muslim Egypt, cited and reproduced the text of the derivations in the marginalia by Ishāq al-Zaqālī to the anonymous treatise in 15 'aṣls, and in the fifth *maqāla* of the treatise by Munajjimak (*Maher*, pp. 255-256 and 386-387).

7. E. S. Kennedy discussed the statements of al-Bīrūnī in the *Shadows* in his recently-published commentary thereon (*al-Bīrūnī* 2, text, p. 69, trans., p. 111, comm., p. 53).

8. F. Sezgin in his monumental bio-bibliographical survey of early Islamic literature discusses the attribution of the astrolabe to Hipparchus in the treatise *al-Miqyās al-murajjaḥ* which is falsely attributed to al-Bīrūnī (*Sezgin*, VI, p. 78).

9. *Gandz* contains references to the etymologies of Māsha'allāh, Ḥajjī Khalifa, and Lane. The reference to an etymology by 'Alī b. 'Isā (p. 475) is in fact a reference to the etymology of Abū 'Abd Allāh al-Khwārizmī.

10. Cf. *Dozy*, II, p. 809, where no specific medieval context is mentioned. See, however, E. S. Kennedy's translation and commentary of a passage on an instrument for reckoning time of day called *mizān* which is described by al-Bīrūnī in his book on shadows (*al-Bīrūnī* 2, I, pp. 153-156, and II, pp. 82-83), and also the remarks in *King* 2, pp. 49-50.

explanations of the curious term *kursi* (whence English "throne") for the part of the astrolabe which projects outward from the main body of the instrument to bear the ring and cord by which the astrolabe can be held or suspended. The *kursi* of the astrolabe perhaps derives from the handle of a hand-mirror.¹¹

The popular medieval Islamic attribution of the invention of the astrolabe to an individual named Lāb, a son of Idrīs (= Enoch), is pure fiction. This attribution occurs in the writings of Abū Naṣr al-Qummī, and is criticized already by his late contemporary Abū 'Abd Allāh al-Khwārizmī. There are other stories about Idrīs in Islamic folklore, which credit him with the invention of geomancy, the art of writing, and the craft of making garments.¹² The association with Lāb was popular because it provided a purely Arabic etymology of the name *asṭurlāb*. The first element *asṭur* is the plural of *saṭr*, "line", so that *asṭurlāb* means "lines of Lāb". In the later Arabic sources on *asṭurlāb* Lāb becomes a son of Hermes.¹³ W. H. Morley, in the introduction to a monograph published in 1856 which remains one of the most valuable studies on Islamic astrolabes, wrote rather unkindly: "the fables of (the) invention (of the astrolabe) by Abraham, Solomon, Enoch, or by a certain person named Lāb, are unworthy of notice."¹⁴

The anecdote recorded by Ibn Khallikān about the invention of the astrolabe by Ptolemy is also fiction. Ptolemy is said to have been riding on some animal carrying a celestial sphere in his hand; he dropped the sphere, the beast trod on it and squashed it, and the result was the astrolabe. The anecdote, which I find as charming as the story of Newton and the apple, is not new to the modern literature, because it occurs in the published text and translation of Ibn Khallikān's biographical dictionary, but it has hitherto been overlooked by historians of science. I have no information on the origin of this anecdote.

Of greater historical interest is the statement attributed to Thābit ibn Qurra that the astrolabe was invented by Hipparchus. This is the first instance in the Arabic sources of a reference to Hipparchus in this connection. I have attempted to trace Thābit's source for this information to a Greek treatise on the astrolabe which has hitherto been overlooked in discussions of the early history of the astrolabe. But the statement about Hipparchus attributed to Thābit also includes a reference to Lāb, which would hardly occur in a Greek source. A Persian text discovered after this paper was completed associates the invention of the astrolabe with Aristotle, which is again fiction.

11. This connection was first noted by Prof. Derek de Solla Price of Yale University.

12. Cf. the article "Idrīs" by G. Vajda in *EI*₂.

13. Cf. the article "Hirmis" by M. Plessner in *EI*₂.

14. *Morley*, p. 5. On the astrolabe in Jewish Bible exegesis and in the Talmud and Halakhah see *Gandz*, pp. 480-482.

I make no claim to have exhausted the available Islamic sources on the origin of the astrolabe and the etymology of its name. I have not ventured further than the standard lexicographical sources, although since *asṭurlāb* is not an Arabic word it is not listed in the most famous medieval Arabic dictionaries such as the *Lisān al-ʿArab* and the *Tāj al-ʿarūs*. However, I have checked all the medieval Islamic treatises on the astrolabe currently available to me.¹⁵ Most medieval Muslim writers on the astrolabe do not broach the subject of the origin of *asṭurlāb*. The following are the exceptions.

15. The only list of medieval Islamic works on the astrolabe is *Awwad*, but it is severely incomplete and needs to be supplemented with various additional works listed in *Suter, Brockelmann, Krause, Renaud, Storey, Sezgin, and King* 1. *Kunitzsch* 2, based on some three dozen texts in Greek, Syriac, Arabic, and Latin, deals with the Arabic technical terminology of the component parts of the astrolabe but not the term *asṭurlāb* itself.

Table of Contents

The following is a list of the ancient and medieval authorities cited in the main part of this paper. I have numbered those for whom direct quotes are available concerning the etymology of *asṭurlāb* and the invention of the instrument. The corresponding Arabic and Persian texts presented in the appendix are similarly numbered.

	Ab	See no. 31
	Hermes	See nos. 24, 28
	Idris	See nos. 2, 16, 24, 31, 34
	Lāb	See nos. 2, 3, 8, 10, 15, 16, 19, 23, 24, 28, 34
	Alexander (= Iskandar)	See no. 34
	Aristotle	See no. 34
	Hipparchus	See nos. 4, 8
	Ptolemy	See nos. 4, 8, 9, 12, 14, 25, 27, 30, 31, 33
	Abywn	See nos. 4, 7, 8
	al-Fazārī	See nos. 4, 27
1	Māshā'allāh	
	Thābit ibn Qurra	See nos. 4, 7, 8
2	Abū Naṣr al-Qummī	See also nos. 10, 24, 28
3	Abū 'Abd Allāh al-Khwārizmī	See also no. 27
4	Ibn al-Nadīm	See also nos. 1, 4, 7
5	Kūshyār	See also nos. 10, 11, 24, 25, 27
6	Ḥamza al-Iṣfahānī	See also nos. 7, 10, 24
7	al-Bīrūnī	See also nos. 4, 5, 6, 10, 24, 27
8	Anonymous (<i>al-Miqyās al-murajjaḥ</i>)	
9	al-Zarqāllū	See also no. 1
10	al-Ḥarirī and commentators	See also nos. 2, 5, 6, 7, 24, 34
	Ibn al-Ṣaffār	See nos. 1, 19
	Maslama al-Majritī	See no. 1
	Hibat Allāh al-Asṭurlābī	See nos. 11, 12

11	Abū Naṣr ibn Zarīr	
	Sharaf al-Dīn al-Ṭūsī	See no. 12
	Kamal al-Dīn ibn Yūnus	See no. 12
	al-Jaghminī	See no. 10
	Naṣīr al-Dīn al-Ṭūsī	See no. 24
	Ibn al-Qifṭī	See no. 4
	Ibn Khallikān	See also no. 31
12	Anonymous (Maghribi or Andalusian)	
13	Mūsā ibn Ibrāhīm	
14	Ibn Jamā'a	
15	Abū 'Alī al-Fārisī	
16	al-Nuwayrī	See also no. 26
17	al-Mizzī	See also no. 19
	Shams al-Dīn al-Khalīlī	See no. 20
19	Anonymous (<i>Tuḥfat al-ṭullāb</i>)	See also no. 18
20	Sharaf al-Dīn al-Khalīlī	
21	Anonymous (spherical astrolabe treatise)	
	Geoffrey Chaucer	See no. 1
22	al-Damirī	
23	al-Firūzābādī	See also no. 10
24	al-Birjandī	See also nos. 10, 28, 29
25	al-Suyūṭī	
26	al-Khafājī	See also no. 17
27	Ḥājji Khalifa	
28	Munajjimak	See also no. 24
29	Ishāq al-Zakālī (?)	See also no. 24
30	al-Fāsī	See also no. 31
31	Muḥammad Bannānī	See also nos. 12, 22, 30
32	Miscellaneous	
33	Aḥmad Bāshā Mukhtār	
34	Ibrāhīm Fārūqī	

1. Māshā'allāh

The treatise on astrolabe construction attributed to the late eighth-/early ninth-century Baghdad astrologer Māshā'allāh¹ is no longer extant in Arabic, but the Latin translation² begins: *astrolabium nomen grecum est cuius interpretatio est acceptio stellarum...*, that is, "astrolabe is a Greek word whose meaning is taking the stars". This last expression corresponds to Arabic *akhdh al-kawākib*, which is also attested in various later Arabic sources. The Latin version of Māshā'allāh's treatise on the use of the astrolabe, which is also no longer extant in Arabic, has a different *incipit*.³ Likewise, no etymology is offered by Geoffrey Chaucer in his treatise on the use of astrolabe, which is closely related to that of Māshā'allāh.⁴

1. On Māshā'allāh see D. Pingree's article in *DSB*, and *Sezgin*, VI, pp. 127-129, and VII, pp. 102-108. His treatise dealing with both the construction and use of the astrolabe is mentioned in *Ibn al-Nadīm*, p. 273.

2. Cf. *Steinschneider*, p. 18, cited in *Gandz*, pp. 475-476. See also *Carmody*, pp. 23-25 and *Skeat*, p. xxv. 3. Cf. *Skeat*, p. 88. 4. Cf. *Skeat*, pp. 1-14.

Note added after the completion of this paper:

Prof. Paul Kunitzsch informs me that the Latin treatises on the astrolabe ascribed to Messahalla appear to be based on Western Islamic compilations based on treatise by Maslama al-Majrīṭī or some of his disciples such as Ibn al-Ṣaffār. In the Latin texts there seems to be a confusion between Mezleme, etc. for Maslama and Messahalla for Māshā'allāh. Thus the Latin phrase *acceptio stellarum* and the equivalent *akhdh al-kawākib* used by al-Zarqāllu seems to derive from a western Arabic tradition. See further Kunitzsch 3.

2. Abū Naṣr al-Qummī

Abū Naṣr al-Ḥasan ibn 'Alī al-Qummī was an astronomer of the late tenth century.¹ His major work was an extensive treatise entitled *al-Mudkhal ilā 'ilm al-ḥkām al-nujūm*, dealing mainly with astrology but also containing sections on theoretical astronomy. In the second *faṣl* of the third *maqāla* al-Qummī wrote about the astrolabe and presented an etymology of *aṣṭurlāb* which was quoted by several later writers (see no. 10). No doubt the fact that al-Qummī was an astronomer gave authority to his derivation of *aṣṭurlāb*, which was that the instrument was invented by Lāb, a son of Idrīs, and that when his father asked who had drawn the lines on it (*man saṭarahu?*) he was told that Lāb had drawn the lines on it (*hādha aṣṭuru Lāb* or *saṭarahu Lāb*), whence the name *aṣṭurlāb*. There is no lexical evidence for the IVth form (*af^cala*) of the root s-ṭ-r, which occurs in one version of the text consulted.

In one of the copies of al-Qummī's treatise that I have used there is the additional fiction that *aṣṭur* is Greek for *mizān* (= balance) and *lāb* for the sun, whence *aṣṭurlāb*, meaning *mizān al-shams* (= balance of the sun). This etymology also occurs in later sources (see nos. 10 and 22).

1. On al-Qummī see Suter, no. 174; Krause, no. 174; Brockelmann, I, p. 253, and SI, pp. 388 and 398; and Sezgin, VII, pp. 174-175.

I have used MSS Cairo Dār al-Kutub Ṭal'at *mīqāt* 222,2 (fols. 60r-177r, 619H) and Istanbul Fatih 3427,1 (fols. 1v-113v, 708H) of al-Qummī's treatise, in which the texts of the passage are rather different. In a third copy consulted, MS Cairo Dār al-Kutub Muṣṭafā Fāḍil *mīqāt* 208 (91 fols., ca. 1150H), this section has been left out: in the introduction to the third *maqāla* (fol. 34v) it is stated that the section has been omitted because it could be done without (*turika li-l-istighnā' 'anhu*).

3. Abū 'Abd Allāh al-Khwārizmī

Various etymologies of *aṣṭurlāb* are given by the tenth-century encyclopaedist al-Khwārizmī (not to be confused with the ninth-century astronomer) in his *Mafātih al-ʿulūm*. He first states that the word means *miqyās al-nujūm*, "instrument for measuring the stars," and derives the Greek *asturlabon* from *astar* = *najm* = star and *lābōn* = *mir'ā* = mirror, drawing a parallel in the Greek word *astronomia* for astronomy. He then speaks contemptuously of those who claim that *Lāb* is the name of a man and that *aṣṭūr* is the plural of *saṭr* =

khatt = line, stressing that the word is Greek and that its derivation from an Arabic root indicates stupidity and folly.

1. I have used the Cairo edition of his treatise: see *al-Khwārizmī* in the bibliography. This appears to be based on the edition of van Vloten, as the "English" title page is in Latin. On the author see the article "al-Khwārizmī" by J. Vernet in *DSB*.

4. Ibn al-Nadīm

The tenth-century scholar Ibn al-Nadīm, author of the bibliographical compendium known as *al-Fihrist*,¹ states that Ptolemy was the first to make (*amal*) the astrolabe, and adds that it is said that it may have been made before him although this cannot be known with certainty.² He goes on to say that the first person to make an astrolabe plane (*saṭṭah*) was Abywn (= Apion) the Patriarch, whom he lists elsewhere as the author of a treatise on the planispheric astrolabe and states that he lived "a little before (the advent of) Islam or a little after."³ Elsewhere he says that the mid-eighth-century Baghdad astronomer al-Fazārī was the first person in Islam to make (*amal*) an astrolabe. Ibn al-Nadīm also notes that astrolabes were made in the city of Harran and that they spread from there throughout the Abbasid Empire in the time of the Caliph al-Ma'mūn, that is, in the early ninth century.

The identity of Abywn al-Baṭriq is by no means certain,⁴ although it seems probable that he was a Coptic patriarch, since the name Abywn is well attested in Coptic.⁶ The only other reference to Abywn known to me in the later Arabic scientific literature, apart from a remark by the thirteenth-century historian of science Ibn al-Qifṭī,⁷ which is based on Ibn al-Nadīm, is in the introduction of a treatise on the use of the astrolabe by the eleventh-century scientist al-Bīrūnī (see no. 7). This treatise differs from al-Bīrūnī's other two treatises on the astrolabe, the *Istī'āb* and *Ikhrāj mā fi quwwat al-asturlāb ilā l-fi'l*, and is extant in a unique copy in MS Paris B. N. ar. 2498,1.⁸ The text is corrupt and indeed the name Abywn al-Baṭriq miscopied.⁹ However, al-Bīrūnī states that he had seen Abywn's treatise on the astrolabe (in its Arabic translation), and notes that it contained 157 chapters and that it was translated by Thābit ibn Qurra, the celebrated scholar and translator of Baghdad at the end the ninth century.¹⁰ Al-Bīrūnī further observes that the text used for the translation was corrupt and that Thābit had improved it where possible and that the chapters in the book did not correspond to those listed in the table of contents. Abywn has previously been overlooked in studies of the early history of the astrolabe. In the section on al-Bīrūnī (no. 7) I shall present evidence that Abywn ascribed the invention the astrolabe to Hipparchus.

1. On Ibn al-Nadīm see the article in *EI*₂ by J. W. Fück.

2. *Ibn al-Nadīm*, p. 284.

3. *Ibn al-Nadīm*, pp. 270 and 284.

4. *Ibn al-Nadīm*, p. 273.

5. See *Sezgin*, VI, p. 103. The orthography *Abywn* seems acceptable. Flügel's critical apparatus indicates variant readings from two manuscripts: *Aynwn* and *Abnwn* in the first instance (p. 24) and *Abnwn* and *Axxwn* (where each *x* indicates a letter which can be read as a *b*, *n*, *y*, etc.) in the second (p. 26). I assume that *Abywn* is found in the other two manuscripts used by Flügel for this section (on which see p. 3). Flügel suggested on original Απλων (p. 24).

J. Lippert, in his edition of Ibn al-Qifṭī's *Ta'rikh al-ḥukamā'* (p. 71) gave the name as *ʿnbnw* and listed no variants. The unique copy of al-Bīrūnī's treatise on different types of astrolabes, MS Paris B. N. ar. 2498, 1 gives the name as *ahwn al-fryq* (fol. 1r).

Dodge, pp. 670-671, translates Ibn al-Nadīm's remark thus: "The first [Muslim] to make a plane astrolabe was *Abīyūn al-Baṭriq*", despite the fact that elsewhere (p. 644) he translates; "*Abīyūn al-Baṭriq*: I believe that he lived a little before or a little after the advent of Islam", and elsewhere (p. 649); "*al-Fazārī*... was the first person in Islām to make the astrolabe..." Dodge's own notes on *Abīyūn* (p. 943) are a mess: "He was the first person in Islām to make an astrolabe of the planisphaerum or flat type. The name may be confused with that of Abū Yahya al-Baṭriq, who may have helped al-Fazārī to introduce the astrolabe. The name may be for Apion".

6. Private communication from my friend W. J. Fulco, S. J. I had previously wondered whether *Abywn* might be identical with Ahron al-Qiss "the priest", who wrote on medicine in Syriac about the time of the birth of Islam (cf. *Sezgin*, III, pp. 166-168) and who is also mentioned by Ibn al-Nadīm (p. 297). Although the names *Abywn* and Ahon could conceivably be confused in unpointed Arabic, this identification seems highly improbable.

7. See note 5 above.

8. Both *Suter*, p. 99, and *Boilot*, no. 47, suggest that this work is the same as that found in MS Berlin Ahlwardt 5794, which is not the case.

9. See note 5 above.

10. On Thābit see the article in *DSB* by A. B. Rosenfeld and A. T. Grigorian, and *Sezgin*, V, pp. 264-272, and VI, pp. 163-170, especially p. 169, no. 22. Dr. Richard Lorch has drawn my attention to the coincidence that al-Šūfī's treatise on the sphere also contained 157 chapters.

5. *Kūshyār ibn Labbān*

Kūshyār was an astronomer and mathematician of some distinction who lived in Iran ca. 1000 A. D. In the introduction to his treatise on the use of the astrolabe Kūshyār says that *aṣṭurlāb* is a Greek word and that the most common explanation of its meaning is *mizān al-shams*, "balance of the sun".

1. On Kūshyār see *Sezgin*, V, pp. 343-345, and VI, pp. 246-249, and VII, pp. 182-183. I have used MS Paris B. N. ar. 2487 (copied 679H) of his treatise on the use of the astrolabe.

6. *Ḥamza al-Iṣfahānī*

Al-Bīrūnī (no. 7) informs us that the literary scholar Ḥamza al-Iṣfahānī (893 - ca. 970)¹ discussed the etymology of the word *aṣṭurlāb*, and also the word *awj* (= apogee).² Al-Bīrūnī specifically cites al-Iṣfahānī's work *al-Muwāzana* as the source for his information. The full title of al-Iṣfahānī's treatise is *al-Khaṣā'iṣ wa'l-muwāzana bayn al-ʿarabiya wa'l-fārisiyya*, and unfortunately the only known copy thereof³ is incomplete and there is no reference in the surviving text of either of the terms *aṣṭurlāb* or *awj*. According to al-Bīrūnī,

Ḥamza stated that *aṣṭurlāb* is an Arabicization of the Persian, *sitāra yāb*, "taker of the stars".

1. On Ḥamza al-Iṣfahānī see *Brockelmann* I, p. 152, and *SI*, p. 221; *Sezgin* I, pp. 336-337; and also the article in *ET* by F. Rosenthal.

2. Al-Bīrūnī cites al-Iṣfahānī's etymology of *awj* in his treatise *On Transits* (1, text, p. 17, trans., pp. 20-21).

3. Namely, MS Cairo Dār al-Kutub lugha 90 (49 fols., ca. 700H).

7. *al-Bīrūnī*

The great eleventh-century scientist Abū'l-Rayḥān al-Bīrūnī mentioned the etymology of the word *aṣṭurlāb* at least twice in his writings.¹ In the first instance that has come to my attention, namely, in his treatise on astrology entitled *al-Taḥḥīm fī sināʿat al-tanjīm*, he states that the astrolabe was a Greek instrument called *aṣṭurlābōn* meaning "mirror of the stars", which was why Ḥamza al-Iṣfahānī (see no. 6) had explained it as being from Persian *sitāra yāb*. Al-Bīrūnī was not happy about this explanation, as we learn from his book on shadows entitled *Ifrād al-maqāl fī amr al-ẓilāl*. Here he states that Ḥamza in his book *al-Muwāzana* had stated that *aṣṭurlāb* is an Arabicized Persian word, the origin being *sitāra yāb*, "taker of the stars". Al-Bīrūnī adds that this Persian name may very well have been derived from the special function of the instrument or may have been adapted (*ʿarraba* here does not mean "to render into Arabic" but rather "to borrow a word into any language") from the Greek, in the same way that Ḥamza maintains that the Arabic word is an adaptation of the Persian. Al-Bīrūnī indicates his knowledge that the Greek name is *aṣṭurlābōn* and that *astur* means "star" in Greek, as in the Greek words *astronomia* and *astrologia*.² He adds that he has found ancient books on its construction and operation by the Greeks but not by other peoples, and that the people of the east (the Indians) do not know about the astrolabe and use only shadows.

As noted in the section on Ibn al-Nadīm (no. 4), al-Bīrūnī was familiar with the treatise of *Abywn* in the translation of Thābit. See also the next section.

1. On al-Bīrūnī see the article in *DSB* by E. S. Kennedy, and *Sezgin*, V, pp. 375-383, VI, pp. 261-276, and VII, pp. 188-192.

2. See further *Pines*.

8. *Anonymous (al-Miqyās al-murajjaḥ)*

MS Cairo Ṭalʿat *miqāt* 155 is a very unusual compendium of Arabic works on the astrolabe and quadrant, some of which merit detailed study. The manuscript was copied in Egypt about 1650 A. D. and several of the treatises are of Maghribi origin. The first treatise (fols. 1r-15v) is entitled *Kitāb al-Miqyās al-murajjaḥ fī l-ʿamal bi'l-aṣṭurlāb al-musaṭṭaḥ* and is attributed to

Abū'l-Rayḥān, that is, al-Bīrūnī, but this attribution is called into question by the fact that al-Bīrūnī is mentioned in the text.¹ The treatise is divided into two *maqālas*, parts, the first of which contains six *fuṣūl*, sections, but the Cairo manuscript breaks off in the first *faṣl* of the second *maqāla*.

The anonymous author asserts in his discussion of the origin and meaning of the word *aṣṭurlāb* that Abu'l-Ḥasan Thābit ibn Qurra (see no. 4) in a book on the use of the astrolabe had stated that Hipparchus before Ptolemy had invented (*waḍaʿa*) the astrolabe and had made it plane (*saṭṭaḥa*) in the same way as Lāb had done. The writer continues with a discussion of the reason why Hipparchus had chosen a northern projection. Now the only work on the astrolabe known to have been written by Thābit is a translation of the treatise by Abywn al-Baṭrīq (see no. 4), but it seems unlikely that a scholar of the calibre of Thābit would himself have subscribed to the story of Lāb, or have mentioned it without critical comment. We may perhaps conclude that the reference to Hipparchus was found already in the treatise of Abywn, but how could this Greek treatise have contained the nonsense about Lāb?

1. On this treatise see already Sezgin, VI, pp. 78 and 169.

9. al-Zarqāllu

MS Istanbul Aya Sofia 2671,5, fols. 133v-151v, copied in 1224, is a unique copy of an anonymous treatise on the planispheric astrolabe,¹ whose author can be identified as the eleventh-century Toledo astronomer al-Zarqāllu (Azarquiel).² At the beginning of the treatise al-Zarqāllu states that *aṣṭurlāb* is a Greek word which means *akhdh al-kawākib*, "taking the stars", because by means of it the derived knowledge of the positions of the stars can be obtained. Al-Zarqāllu quotes Ptolemy as stating that the astrolabe is like the celestial sphere made into a plane, with the visible pole made to be its centre. al-Zarqāllu is probably referring to the introduction of the Arabic version of Ptolemy's *Planisphaerium*, a copy of which precedes his treatise in the Aya Sofia manuscript.³

1. This work, falsely attributed to Euclid on fol. 1r of the manuscript, is listed in Krause p. 525, no. 15.

2. On al-Zarqāllu see the article by J. Vernet in *DSB* and the references there cited. It was not previously known that al-Zarqāllu wrote on the regular planispheric astrolabe. The author of the treatise on the astrolabe presents a star catalog for the year 459H, which is precisely the date mentioned by al-Zarqāllu in one of his three treatises on the universal plate, extant in a unique copy in fols. 1r-75r of the same Aya Sofia manuscript (cf. fols. 10r and 148v). This particular treatise is arranged in 80 *bābs*, as compared with his other two treatises of sixty and one hundred *bābs*: thus each of al-Zarqāllu's three treatises is now known to exist in the original Arabic.

3. Cf. Krause, p. 443, and Sezgin, V, p. 170.

10. al-Ḥarīrī and Commentators

The *Maqāmāt* of the eleventh-century Baṣra litterateur al-Ḥarīrī are a

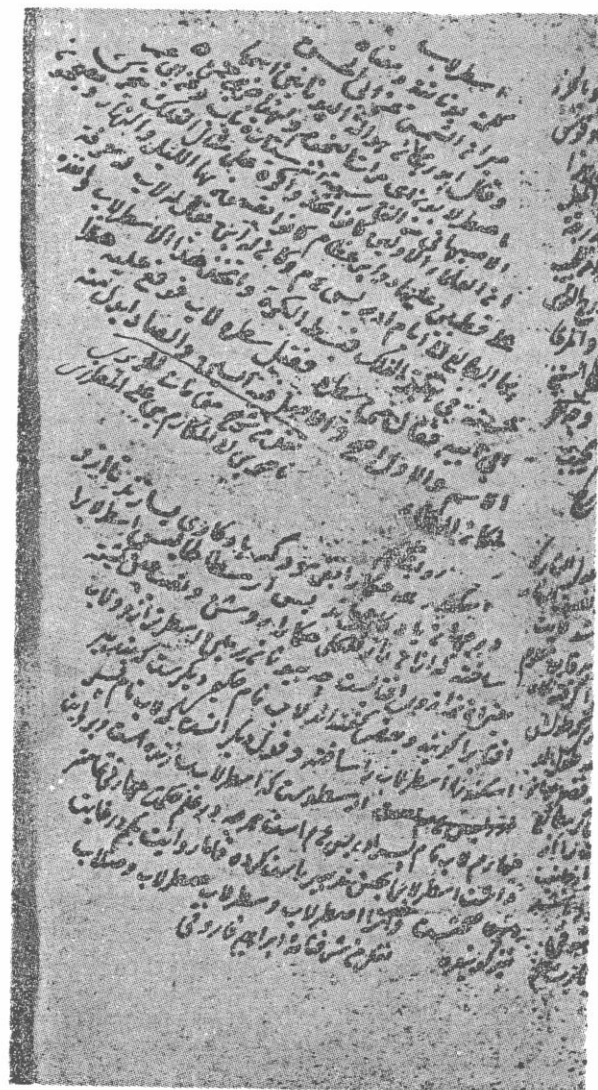


Plate 1: Two sets of stories about the early history of the astrolabe, one in Arabic and the other in Persian, found in MS Cairo ʿAlʿat miqāt 255, fol. 2v (see nos. 10 and 30). Reproduced with kind permission of the Egyptian National Library.

classic of Arabic belles-lettres.¹ In this work there is no mention of any aspect of astronomy. However, a note on the etymology of *asṭurlāb* and the invention of the instrument, stated to be taken from a commentary on al-Ḥarīrī's *Maqāmāt*, is found in MS Cairo Dār al-Kutub Taymūr *ḥikma* 15, p. 137, immediately preceding a copy of the treatise *Unmūdḥaj al-ʿulūm* by Jalāl al-Dīn al-Dawānī.² The author describes the instrument as "one for measuring the stars and the sun", stating that the first person to make it was Lāb, and then adding an alternative derivation from Persian (due to Ḥamza al-Iṣfahānī), in which, however, the Arabic paraphrase is based on the meaning "mirror of the stars", not on the correct meaning of the Persian. The same note is found in MS Cairo Dār al-Kutub Mustafā Fāḍil *hay'a* 1, fol. 1r, preceding 'Alī Birjandī's marginalia to Qāḍī Zāde's commentary on al-Jaghminī's *al-Mulakḥkhas fi'l-hay'a*, copied about the year 1610 in Amud, Iran. The note on *asṭurlāb* from an unspecified commentary on the *Maqāmāt* occurs together with another stated to be taken from the *Qāmūs* (of al-Fīrāzabādī (see no. 23)).

Another note stated to be taken from the commentary on the *Maqāmāt* by al-Muṭarrizī (*fl.* Khwarizm and Baghdad, d. 1213)³ occurs in Cairo Dār al-Kutub Ṭal'at *miqāt* 255, fol. 2v, amidst various notes preceding a collection of treatises on instruments and timekeeping—see Plate 1. Al-Muṭarrizī quotes successively Abū'l-Ḥasan (Kūshyār), Abū Rayḥān (al-Bīrūnī), Ḥamza al-Iṣfahānī, and Abū Naṣr (al-Qummī).

1. On al-Ḥarīrī see the article in *EI*₂ by S. S. Margoliouth and Ch. Pellat.

2. On al-Dawānī see the article in *EI*₂ by A. K. S. Lambton, and on his treatise see Brockelmann, II, p. 282.

3. On al-Muṭarrizī see Brockelmann, I, pp. 350-352, and also p. 327. I have been unable to locate this passage in the Cairo manuscripts of al-Muṭarrizī's commentary listed by Brockelmann.

11. Abū Naṣr Aḥmad b. Zarīr (?)

MS Leiden Or. 591 (pp. 32-46, copied 630 H) contains a treatise on the astrolabe with a crab-shaped rete (*musarṭan*) by an individual named Abū Naṣr Aḥmad b. Zarīr (?)¹ Since the author mentions the celebrated astrolabist Hibat Allāh al-Aṣṭurlābī (*fl.* Baghdad, ca. 1100) we may presume that he lived in the twelfth century. Abū Naṣr states at the beginning of his treatise that *asṭurlāb* is a Greek word, and that the astrolabe is a fine instrument and the "balance of the sun" (*mizān al-shams*).

1. Abū Naṣr and his treatise are mentioned in *Suter*, no. 484.

12. Ibn Khallikān

The celebrated thirteenth-century Syrian historian and literary scholar Ibn Khallikān¹ discussed the origin of *asṭurlāb* in his biographical dictionary *Wafayāt al-a'yan*. In his entry on Abū'l-Qāsim Hibat Allāh al-Aṣṭurlābī,

a famous instrument-maker of late-eleventh- / early-twelfth-century Baghdad, Ibn Khallikān cites first the etymology of Kūshyār (no. 5), and then presents an anecdote about the invention of the astrolabe by Ptolemy, introduced with the word *qila*, "it is said that ...". The story is that Ptolemy was taking a ride with an armillary sphere in his hand; inevitably, he dropped it and the animal on which he was riding trod on it and squashed it: the result was an astrolabe. Ibn Khallikān goes on to relate that neither Ptolemy nor any of the ancients realized that the sphere could also be represented on a line and that Sharaf al-Dīn al-Ṭūsī was the first to develop a linear astrolabe, later to be improved by his student Kamāl al-Dīn ibn Yūnus. Ibn Khallikān concludes this section with a discussion about the futility of trying to represent the sphere at a point!

Indeed Sharaf al-Dīn al-Ṭūsī² did devise a linear astrolabe, called *ʿaṣal-Ṭūsī*, "al-Ṭūsī's stick", which was modified by his student Ibn Yūnus,³ also a scholar of distinction. It is of interest that Ibn Khallikān early in his career met Kamāl al-Dīn ibn Yūnus in Mosul, but it seems unlikely that he would have picked up the anecdote about Ptolemy from such a serious scholar. The only reference to the anecdote known to me in later Arabic literature is in the writings of the eighteenth-century Moroccan author Muḥammad Bannānī (no. 32).

1. On Ibn Khallikān see the article in *EI*₂ by J. W. Fück. The passage is found in *Ibn Khallikān*, II, pp. 184-185, translated in *de Slane*, III, pp. 581-582.

2. On Sharaf al-Dīn al-Ṭūsī see the article in *DJB* by R. Rashed. For a brief discussion of his linear astrolabe see *Michel* 2, pp. 115-123.

3. On Kamāl al-Dīn ibn Yūnus see *Suter*, no. 354, and Brockelmann, SI, p. 859.

13. Anonymous (Maghribi or Andalusian)

Another etymology occurs in an anonymous Maghribi or Andalusian treatise on the astrolabe preserved in MS Cairo Dār al-Kutub *miqāt* 1169,6 (fols. 45r-57r, 1158H). This treatise begins with the statement that *asṭurlāb* is a Greek word which was originally *asṭurlābūl* [read *asṭurlābūn*!],¹ meaning *dhāt al-nujūm*, "possessing stars" and that the letters after the *b* were removed "to make (the word) lighter", that is, "to make it easier to pronounce".

1. There is a possibility that a Spanish influence is operating here to provide an ending *-al*.

14. Mūsā ibn Ibrāhīm

Yet another etymology is contained in a treatise on the astrolabe attributed to Mūsā ibn Ibrāhīm, on whom I have no further information. The treatise is contained in MS New York Columbia 285,1 (fols 1v-8r, of ca. 1000H?), and begins: "*ʿstṛl'b* [*sic*!] in Greek means taking the altitude of a star because *ʿstṛ* is star in that language and taking is *lāb*.¹ Some people say that it means balance of the stars. It is attributed to Ptolemy".

1. The manuscript has *lāt* rather than *lāb*, which is probably an error of the copyist rather than the author.

15. *Ibn Jamā'a*

Ibn Jamā'a was a scholar of Hama in the late thirteenth century¹ and in the first chapter of his work on the use of the astrolabe he states that *asṭurlāb* is a foreign word meaning "measurer of the stars" or "balance of the sun", or according to another opinion, *asṭurlāqūn* "mirror of the stars", taking *asṭur* as "star" and *lāqūn* as "mirror". Here perhaps *lāfūn* is intended: see the remarks on Hājji Khalifa (no. 27). Ibn Jamā'a adds that the derivation from *asṭur* and *Lāb* is not to be relied upon.

1. On Ibn Jamā'a see Brockelmann, II, pp. 89-90, and SII, pp. 80-81; and Awwad, no. 179; and on his family see the article "Ibn Djamā'a" in *EI*₂ by K. S. Salibi. I have used the unique copy MS Cairo Dār al-Kutub Muṣṭafā Fāḍil *miqāt turkī* 6,1 (fols. 1v-20r, copied ca. 1150H) of his work on the astrolabe.

16. *Abū 'Alī al-Fārisī*

Two etymologies for *asṭurlāb* are proposed by Abū 'Alī al-Fārisī (*fl.* Hama, ca. 1300) in his treatise on the astrolabe entitled *Maqāṣid dhawī'l-albāb*¹ Al-Fārisī first states that the name is a compound Greek word, *ustur* (the text is vowelised) meaning "sun" and *lāb* meaning "balance", or, according to others "mirror", and then states that "the Arabs" say that *asṭur* is the plural of *saṭr*, "line", and that *lāb* is the son of *Idris*.

1. Al-Fārisī is not listed in the modern bio-bibliographic sources on Islamic science, except for Awwad, no. 175. His treatise is extant in the unique copy MS Cairo Qawala *miqāt* 2,1 (fols. 1r-57v, copied ca. 800H).

17. *al-Nuwayrī*

Al-Nuwayrī (d. 1332 in Tripoli),¹ in his encyclopaedia entitled *Nihāyat al-arab fī funūn al-adab*, states that *asṭurlāb*, as well as the terms *ṭarjahāra* and *binkām* for water- and sand-clocks, were not Arabic.² This statement is also recorded by al-Khafājī (no. 26).

1. On al-Nuwayrī see Brockelmann, II, p. 175, and SII, pp. 173-174.

2. Quoted in Lane, I, p. 58, from the commentary on the *Nihāyat al-arab* by Muḥammad ibn al-Ṭayyib al-Fāsī, (Brockelmann, SI, pp. 541 and 685?). I have been unable to locate any reference to *asṭurlāb* in the published text of the *Nihāyat al-arab*.

18. *al-Mizzī*

Shams al-Dīn al-Mizzī, a leading astronomer in Damascus in the midfourteenth century, wrote a treatise on the use of the astrolabe.¹ In the introduction he states that the word *asṭurlāb* is Greek and that it means "balance of/for the sun".

1. On al-Mizzī see Suter no. 406; and Brockelmann, II, pp. 155-156, and SII, pp. 156 and 1018 (no. 15). I have used MS Istanbul Fatih 5397, 25 of his treatise on the astrolabe.

19. *Anonymous*

The author of a treatise on the astrolabe in 14 *bābs* entitled *Tuhfat al-ṭullāb fī'l-'amal bi'l-'asṭurlāb*, which is probably a fourteenth- or fifteenth-century Egyptian or Syrian compilation, discussed the etymology of *asṭurlāb* in the introduction to his treatise.¹ He states that the name *asṭurlāb* is Greek and means "balance of the sun", and also that *Lāb* was a wise man who drew the lines (*asṭur*), so that the instrument was called *asṭur-Lāb*. This passage is related to the parallel passage in the treatise of al-Mizzī (see no. 18 above).

1. I have examined MS Istanbul Fatih 5397, 24 (fols. 190r-195v, cop. 1113H) of this work. Awwad listed several manuscripts of what he thought to be copies of a work with this title and attributed the treatise to the Andalusian astronomer Abū'l-Qāsim Aḥmad b. 'Abd Allāh b. Muḥammad al-Ṣaffār, but the listings and attribution are confused (*cf.* Awwad, nos. 28 and 29). MS Princeton Garrett 1024 appears to be a copy of the same work as contained in the Fatih manuscript, and is likewise anonymous. The other manuscripts listed by Awwad are copies of a different treatise by Ibn al-Ṣaffār which has been published (see the article "Ibn al-Ṣaffār" by B. R. Goldstein in *EI*₂).

20. *Sharaf al-Dīn al-Khalīlī*

Sharaf al-Dīn al-Khalīlī, the nephew of the celebrated astronomer of mid-fourteenth-century Damascus Shams al-Dīn al-Khalīlī, wrote treatises on the standard instruments of his time, including one of the use of the astrolabe.¹ In the introduction to this he states that *asṭurlāb* is a foreign word meaning "(instrument for) measuring the stars" or alternatively "balance" or "mirror of the stars".

1. On Sharaf al-Dīn al-Khalīlī see Suter, no. 427, and Brockelmann, II, p. 157, and SII, p. 158. I have used MS Istanbul Fatih 5397 (fols. 65v-71r) of this treatise.

21. *Anonymous*

The anonymous author of a treatise in 25 *bābs* on the spherical astrolabe which was probably another fourteenth-century Syrian compilation,¹ states that *asṭurlāb* is a foreign word to be explained as "mirror of the stars" or as "the balance of the sun".

1. This treatise is extant in MS Istanbul Hamidiye 1453, fols. 213v-219r, cop. 869H.

22. *al-Damīrī*

The late fourteenth-century Egyptian scholar al-Damīrī is celebrated for his encyclopaedia on zoology and folklore entitled *Ḥayāt al-ḥayawān*.¹ In this work al-Damīrī states that *asṭurlāb* means "balance of the sun" because *asṭur* means "balance" and *lāb* means "sun" in Greek. Al-Damīrī was later quoted by Muḥammad Bannānī (see no. 32).

1. On al-Damīrī see the article in *EI*₂ by L. Kopf. I have been unable to locate the reference to *asṭurlāb* in the published text of his encyclopaedia.

23. *al-Firūzābādī*

The celebrated philologist al-Firūzābādī (b. 1329 in Shiraz, d. 1415 in Zabid) included an entry on his *lāb* in his lexicon entitled *al-Qāmūs al-muḥīṭ*.¹ Al-Firūzābādī states that *Lāb* was a man who drew lines and based calculations upon them and that the lines were called *aṣṭur-Lāb*ⁱⁿ, "the lines of *Lāb*". This became a compound word and the annexation construction was dropped. With the definite article the name became *al-aṣṭurlāb*, or *al-aṣṭurlāb* with a *ṣād* because of the *ṭā*. This etymology from the *Qāmūs* is also found in an astronomical manuscript copied in Amud about the year 1610 (see no. 10).

1. On al-Firūzābādī see the article by H. Fleisch in *EI*₂. I have examined MS Cairo Dār al-Kutub *lughā* 34 of this work, transcribed in 899H from the author's copy. The entry on *aṣṭurlāb* in Lane's *Arabic-English Lexicon* is based mainly partly on al-Firūzābādī.

24. *al-Birjandī*

There is no reference to the origins of *aṣṭurlāb* in the treatise on the astrolabe by the celebrated thirteenth-century Persian scholar Naṣīr al-Dīn al-Ṭūsī. However, in the Persian commentary on this treatise by 'Alī al-Birjandī (fl. ca. 1500),¹ there is a section in which the author quotes the opinions of Kūshyār, al-Bīrūnī, and through him al-Iṣfahānī (not named), as well as the anonymous commentator on the *Maqāmāt* of al-Ḥarīrī and through him Abū Naṣr al-Qummī.² In this quotation the answer to the question asked by Hermes – not Idrīs – is either due to *Lāb* or Hermes himself: the Persian is ambiguous. al-Birjandī also mentioned that some people had said that *aṣṭur* means *taṣnīf*, "a written work or compilation," and that *Lāb*, a son of Hermes, had invented the instrument. Al-Birjandī was later quoted by Munajjimak (no. 28) and Iṣḥāq al-Zakālī (no. 29).

1. On al-Birjandī see *Suter* no. 456; and *Storey*, pp. 54 and 80-82.

2. The Persian text edited in the appendix was kindly prepared by Prof. E. S. Kennedy.

25. *Jalāl al-Dīn al-Suyūṭī*

MS London B. M. Add. 9599, fol. 7r, contains a note on the Arabic words *al-Mijisṭī* and *aṣṭurlāb* stated to be taken from *al-Nafḥa al-miskīya*, a work by the late-fifteenth-century Egyptian polymath Jalāl al-Dīn al-Suyūṭī.¹ The author states that Ptolemy was the first person to make an astrolabe. He adds that Kūshyār had said that the term *aṣṭurlāb* was Greek and meant "balance of the sun", and that some had said that *Lāb* was the name of the sun in Greek.

1. On al-Suyūṭī see *Brockelmann*, II, pp. 180-204, and SII, pp. 178-194. On the treatise *al-Nafḥa al-miskīya* see II, p. 202 (no. 291) and SII, p. 197.

26. *al-Khafājī*

The celebrated Egyptian philologist Shihāb al-Dīn al-Khafājī (d. 1659) in his book on Loan-words in Arabic entitled *Shifā' al-ghalīl*..., gives no information on *aṣṭurlāb* other than that it, along with the terms *ṭarjahāra* and *binkām*, is not Arabic. He adds that the word is mentioned in the *Nihāyat al-arab*, a work by al-Nuwayrī (no. 17), and in fact al-Khafājī's remark is actually taken directly from al-Nuwayrī.

1. On al-Khafājī see *Brockelmann* II, pp. 368-369, and SII, p. 396. I have consulted MS Cairo Dār al-Kutub Muṣṭafā Fāḍil *lughā* 20, in which *aṣṭurlāb* is mentioned on fol. 75v. Brockelmann lists only the Cairo manuscript, which may have been the basis for the two printed editions that he mentions.

27. *Ḥājji Khalifa*

The seventeenth-century Turkish scholar Ḥājji Khalifa¹ in his bibliographical encyclopaedia *Kashf al-Zunūn* records various interpretations of the name *aṣṭurlāb*.² He quotes Kūshyār and al-Bīrūnī without mentioning their names, and also the *Mafātīḥ al-ʿulūm*. When quoting al-Bīrūnī Ḥājji Khalifa presents the name as *aṣṭurlāfūn*, perhaps reflecting a contemporary Greek pronunciation of β.³ He concludes the passage on the astrolabe with the statement that the first person to make an astrolabe was Ptolemy and that the first person in Islam to make one was Ibrāhīm ibn Ḥabīb al-Fazārī, and then cites titles of three books on the astrolabe, none of which is extant.

1. See the article "Kātib Chelebi" in *EI*₂ by O. S. Gökay.

2. *Ḥājji Khalifa*, I, cols. 106-107.

3. The 1892 Cairo edition of Ḥājji Khalifa's work has *aṣṭurlāqūn*.

28. *Munajjimak*

Muḥammad ibn Aḥmad Fazā'ī (?), known as Munajjimak (= the little astronomer), was chief astronomer in Istanbul about 1675 A.D., and wrote a treatise on instruments of which only fragments survive. The fifth *maqāla* of Munajjimak's treatise deals with regular planispheric astrolabes, universal astrolabes, and quadrants, and begins with a discussion of the word *aṣṭurlāb*. Munajjimak's remarks appear to be based on those of al-Birjandī (no. 24), but in the story attributed to Abū Naṣr al-Qummī it is no longer clear whether Hermes or *Lāb* is answering the question who drew the lines. Having been translated from Arabic to Persian and back to Arabic, the anecdote is now hopelessly confused. See also the next entry.

1. Munajjimak is not listed in the modern bibliographical sources. The text of the passage is found in MSS Cairo Dār al-Kutub *miqāt* 735 and 70, which are two fragments of the fifth *maqāla* of his treatise.

29. *Iṣḥāq al-Zakālī (?)*

In some marginalia to an anonymous Arabic treatise on the astrolabe in fifteen *faṣls* an individual named Iṣḥāq al-Zakālī (?),¹ on whom I have no

further information, translated the remarks of al-Birjandī (no. 24), and introduced some minor modifications. For example, he said that the meaning of the Greek *asṭurlāfūn* (which is written *asṭurlānūn* in each of the copies I have consulted) was *mir'āt al-kawākib*, "mirror of the stars" and that some had said *wāḥid al-kawākib*, implying that the term meant "mirror of the star". Here, however, *wāḥid* must result from a corruption of *akhdh*.

1. The treatise exists in numerous copies, many of which include the marginalia. I have used MSS Cairo Ṭal'at miqāt 154, Zakiya 782, and K 3844.

30. 'Abd al-Raḥmān al-Fāsi

The seventeenth-century Moroccan scholar 'Abd al-Raḥmān al-Fāsi compiled a lengthy poem called *al-Uqnūm* on the different branches of knowledge, which included a section on the astrolabe.¹ In the margin of a Cairo manuscript of this work is a note on the orthography of *asṭurlāb* and *Baṭlaymūs* (= Ptolemy),² as well as a remark that Ptolemy was the first person to make the astrolabe, and a reference to the existence of a curious story about his invention of the instrument.³ The details of this story are preserved in a commentary on al-Fāsi's section on the astrolabe: see the next section.

1. On al-Fāsi see Renaud, no. 541; Brockelmann, II, pp. 612 and 675, and SII, pp. 694-695; and the article "'Abd al-Raḥmān al-Fāsi" by E. Levi Provençal in *EI*₂.

2. Ptolemy's name in Arabic was more often written Baṭlamyūs, but in late texts both forms occur. Cf. the article "Baṭlamyūs" in *EI*₂ by M. Plessner.

3. MS Cairo Dār al-Kutub J3664 (287 fols., copied ca. 1250H), fol. 179v.

31. Muḥammad Bannānī

Muḥammad Bannānī ibn 'Abd al-Salām ibn Ḥamdūn, a scholar of Fez who died in 1163/1750, wrote an extensive commentary on al-Fāsi's poem (see no. 30) which is extant in MS Cairo Taymūr *riyāḍa* 113 (144 pp., 1327H). In a discussion of the etymology of *asṭurlāb*, the author first mentions that it is a foreign word meaning *miqyās al-nujūm*, "instrument for measuring the stars," or *mizān al-nujūm*, "balance of the stars". He adds that "it is said that" firstly *Lāb* is the name of the celestial sphere in Greek, and secondly that *Lāb* is the name of the inventor of the instrument and that it was originally *li-Ab*, "to the Father", where *Ab* was the name of "the Teacher", that is, Idrīs. Since *asṭur* is the plural of *saṭr*, *asṭurlāb* are the "lines of the sphere" (*asṭur al-falak*) and "lines of the philosopher" (*asṭur al-ḥakīm*). Muḥammad Bannānī concludes with a story about the invention of the astrolabe by Ptolemy, which was related by "a group of historians". This story is none other than the one related by Ibn Khallikān (no. 12), and Muḥammad Bannānī's treatise is the only medieval scientific work known to me which contains this delightful story.

In a shorter commentary by Muḥammad Bannānī¹ on the same poem,

extant in MS Alexandria Baladiya 3504 J (copied 1186H), the author quotes the opinion of al-Damirī (no. 22) on *asṭurlāb*, and adds that "Ptolemy was the first person to make an astrolabe and there is a strange story about his making it which we have related in the (longer) commentary".

1. On Muḥammad Bannānī see Brockelmann, II, p. 615 (where the Alexandria manuscript is mentioned), and SII, p. 686 (*etc.*). He is not mentioned in Suter, or even in Renaud, which is essentially a list of Maghribi scientists overlooked by Suter.

32. Miscellaneous

In 1941 Henri Michel published an account by a seventeenth-century French traveller named Jean Chardin describing the methods used by Persian astronomers to construct astrolabes. This little-known study is of considerable interest for the history of Islamic instrumentation, and also contains an account of the opinions of the Persian astronomers on the meaning of the word *asṭurlāb*.¹ These include the notion that "*asterleb*" is a Persian word meaning "lips of the stars", or that the word should be pronounced *astir lab* and means "knowledge of the stars". These meanings have no counterpart in the Islamic written sources. Chardin adds that the Persians call the instrument *veza kouré* (from Arabic *waḍ' al-kura*, meaning "placing the sphere") "in their books and in their lessons". Again I know of no Islamic sources in which the astrolabe is called by this name, although it was associated with Arabic sources by medieval and renaissance astronomers in Europe.²

1. Michel 1, p. 485.

2. Cf. Hartner, p. 287 and Kunitzsch 1, pp. 20-21 *sub vuazcalcora*.

33. Aḥmad Bāshā Mukhtār

In a text-book on astronomy called *Riyāḍ al-Mukhtār* and published in both Turkish and Arabic in the 1880's, the author al-Ghāzī Aḥmad Bāshā Mukhtār states that *asṭurlāb* is derived from two Latin words: *asṭur* meaning "star or celestial body" and *labiyūm* meaning "plate" (*lawḥa* or *ṣafiḥa*).¹ He also states that the astrolabe was invented by Ptolemy.

1. Mukhtār, p. 238. I owe this reference to the kindness of Prof. Paul Kunitzsch.

34. Ibrāhīm Fārūqī

After this study was completed I came across a group of explanations of the term *asṭurlāb* in Persian, some of which clearly represent quite different traditions from those which I have documented in the Arabic sources. During the course of preparing a photograph of the quote from al-Muṭarrizī in MS Cairo Dār al-Kutub Ṭal'at miqāt 255, fol. 2v, for inclusion in my forthcoming volume of photographic plates of extracts from the Cairo scientific manuscripts, I noticed another relevant quote immediately below - see Plate 1. This

Persian text¹ contains legends about Alexander and is stated to be taken from a work entitled *Sharafnāma* by Ibrāhīm Fārūqī, and I have been unable to identify the author, or the relation of the work to the medieval Islamic folklore on Alexander.²

The text translates as follows:

“A first story: Alexander commanded all the sages to construct something so that it would remain in the world as a memorial to him. So Aristotle constructed an astrolabe which elucidated the secrets of the spheres for all the sages. It is the balance of the sun, which is called in Greece *aṣṭar-tarāzū* or *lāb-i āftāb*. Some said that Lāb is the name of another sage who by the request of Alexander constructed the astrolabe. Another opinion is that Lāb is the name of the son of Aristotle who is the astrolabe-constructor. According to the fourth story Lāb is the name of a son of Idrīs – blessings and praise be upon him – who had the greatest skill in the knowledge of science, and he made the astrolabe with the greatest excellence. But the first story is the most correct. It is also called *aṣṭurlāb* and *ṣṭurlāb* and *ṣṭurlab* and *ṣulāb*. Taken from the *Sharafnāma* of Ibrāhīm Fārūqī”.

1. I am grateful to Prof. E. S. Kennedy of the Institute for the History of Arabic Science in Aleppo and to Prof. Peter Chelkowski of New York University for reading and translating this text.

2. On the Alexander legends in general see the article “*Iskandarnāma*” in *EI*₂ by A. Abel. Ibrāhīm Fārūqī is not mentioned in *Storey*, and no such references to Aristotle and the astrolabe are contained in such basic works on the medieval Alexander legends as *Southgate* and *Cary*. The astrolabe is mentioned in the *Iskandarnāma* of Niẓāmī (c. 1175): in a decisive battle against the Russians Alexander is guided by the calculations of an astrolabe (*Chelkowski*, p. 38).

Conclusion

The extent to which such popular etymologies gained acceptance in informed Muslim circles is revealed in the entry for *Lāb* in Steingass' *Persian-English Dictionary*, published in 1892.¹ Steingass lists the following meanings for *lāb*: “the sun; request; supplication; name of the son of Idrīs; also of the inventor of the astrolabe; or of the son of a Greek King of the name of Istar(?)”. In the last meaning given Istar is probably a corruption of *aṣṭur*. With the identification of *Lāb* as the son of *Aṣṭur* we should bring this survey of medieval notions about the origin of the Arabic term *aṣṭurlāb* to an end.

1. Steingass, p. 1110. The article *aṣṭurlāb* in Lane's *Arabic-English Lexicon*, published in 1863, is based on the remarks of al-Nuwayrī and al-Firūzābādī (nos. 17 and 23). Cf. Lane, I, 58, cited in Gunther, I, p. 111 and Gandz, p. 475.

Appendix

Arabic and Persian Texts

Note: The texts are numbered according to the numbers assigned to the authors in the main part of the paper.

(١)

قطعة من كتاب العمل بالاصطرلاب

المنسوب الى ما شاء الله

مترجمة من النص اللاتيني (انظر اعلاه)

... [اصطرلاب اسم يوناني معناه اخذ الكواكب] ...

(٢)

قطعة من كتاب المدخل الى علم النجوم

لابي نصر التميمي

المصادر : أ مخطوطة دار الكتب المصرية طلعت مبيعات ٢٢٢ ، ق ١١٥ و - ١١٥ ظ

ب مخطوطة استانبول فاتح ٤٣٢٧ ، ق ٤٤ و

... الفصل الثاني من المقالة الثالثة في ذكر الاصطرلاب^١ واسم كل قطعة منه^٢ وما فيه من الخطوط والمقنطرات والدوائر والاقسام كان العلماء الاولون اخذوا^٣ كرة على مثال الفلك تتحرك على قطبين وركبوا عليها عنكبوتا عليه^٤ منطقة فلك البروج وعلى الكرة الدوائر العظام مثال دوائر الارتفاع ودوائر الافق ودوائر نصف النهار ودائرة^٥ معدل النهار وغيرها من الدوائر وكانوا يقيسون^٦ بها النهار والليل ويصححون^٧ بها الطالع إلى أيام ادريس النبي^٨ عليه السلام وكان لادريس ابن يقال له لآب وله^٩ علم جليل ومعرفة

- ١ - في ب : الاصطرلاب ٢ - في أ : منها ٣ - في ب : اتخذوا
٤ - في ب : عليها ٥ - في ب : دوائر ٦ - في أ : يقيسوا ، في ب :
يقسموا ٧ - في أ : ويصححوا ، في ب : ويصحون ٨ - ناقص في أ
٩ - ٩ - في ب : معرفة حسنة

ص ٢٧٣ :

الفزاري

... وهو اول من عمل في الاسلام اسطرلابا وعمل بمسطحا ومسطحا وله من الكتب ... كتاب العمل بالاسطرلاب وهو ذات الحلق كتاب العمل بالاسطرلاب المسطح ...

ص ٢٨٤ :

الكلام على الآلات وصناعتها

كانت الاسطرلابات في القديم مسطحة واول من عملها بطلميوس وقيل عملت قبله وهذا لا يدرك بالتحقيق واول من سطح الاسطرلاب ابيون البطريق وكانت الآلات تعمل بمدينة حران ومن ثم تشتت وظهرت ولكنها زادت واتسع للصناع العمل في الدولة العباسية منذ ايام المأمون الى وقتنا هذا فان المأمون لما اراد الرصد تقدم الى ابن خلف المروودي فعمل له ذات الحلق وهي بعينها عند بعض علماء بلدنا هذا وقد عمل المروودي الاسطرلاب ...

قطعة من كتاب تاريخ الحكماء

لابن القفطي

المصدر : النص المطبوع ، (ليبزيج ، Leipzig . ١٩٠٣) ، ص ٧١

ابن

البطريق حكيم رياضي مهندس عالم بصناعة الآلات الفلكية كان في حدود مبدأ الاسلام قبله او بعده فمن تصنيفه كتاب العمل بالاسطرلاب المسطح ...

(٥)

قطعة من مقدمة كتاب الاسطرلاب لكوشيار بن لبان

المصدر : مخطوطة باريس المكتبة الاهلية عربي ٢٤٨٧

... الاسطرلاب كلمة يونانية واشهر ما قيل في معناه ميزان الشمس ...

حسنة^٩ في هيئة^{١٠} الفلك فبسط الكرة واتخذ هذا الاسطرلاب الذي في ايدي الناس وانفذه الى ابيه ادريس فاخذه^{١١} ادريس وتامله^{١١} وقال هذا من سطره^{١٢} فقيل^{١٣} له هذا اسطرلاب^{١٣} فوقع عليه هذا الاسم واستعمله^{١٤} الناس من بعده^{١٥} وللأسطرلاب قطاع^{١٥} كثيرة انا اذكرها هنا اسم^{١٦} كل قطعة منها ...

١٠- في ب : هية ١١- ١١- في ب : وتامله ادريس ١٢- في أ : اسطره

١٣- ١٣- سطره لاب ١٤- في أ و ب : واستعملوه

١٥- ١٥- في ب : وايضا يقال ان الاسطر بلسان الروم هو الميزان واللاب الشمس فسموه اسطرلاب اي ميزان الشمس والاسطرلاب [كذا] اقطاع ١٦- ناقص في أ

(٣)

قطعة من مفاتيح العلوم لابي عبد الله الخوارزمي

المصدر : النص المطبوع (القاهرة ، ١٣٤٢ هـ) ، ص ١٣٤

... الاسطرلاب معناه مقياس النجوم وهو باليونانية اصطرلابون واصطر هو النجم ولابون هو المرآة ومن ذلك قيل لعلم النجوم اصطرونوميا وقد يهذي بعض المولعين بالاشتقاقات في هذا الاسم بما لا معنى له وهو انهم يزعمون ان لاب اسم رجل واسطر جمع سطر وهو الخط وهذا اسم يوناني اشتقاقه من لسان العرب جهل وسخف ...

(٤)

قطع من كتاب الفهرست

لابن النديم

المصدر : النص المطبوع (١٨٧١ م)

ص ٢٧٠ :

ابيون البطريق

واحسبه قبل الاسلام بيسير او بعده بيسير وله من الكتب كتاب العمل بالاسطرلاب المسطح ...

قطعة من مقدمة رسالة في استعمال الاسطرلاب البيروني

المصدر : مخطوطة باريس ١٠٢٤٩٨ ، ق ١ ظ - ٢ و

... وما عثرنا لاحد من القدماء على كتاب في استعمال الاسطرلاب غير كتاب^١ ابيون البطريق^١ في العمل في الاسطرلاب المسطح افرازا له في التنقيب عن الاسطرلاب الكري واشتمل كتابه هذا على مائة وسبعة وخمسين بابا اذا حصلت بالتهذيب وتفتحت عن زوايد التقريب نقصت عدتها شيئا كثيرا على ان ابوابه في الكتاب ناقصة عما يضمه الفهرست من الاعداد واعماله في بعضها ميسرة لقصور الترجمة عنها وفساد الاصل المنقول وثابت بن قرة اما انه تولى الترجمة واما انه اصلح منه ما امكن عند المطالعة ...

١ - ١ - في الاصل : اهون الطريق [!!]

(٨)

قطعة من اول مقدمة المقياس المرجح في العمل بالاسطرلاب المنسوب الى ابي ريحان البيروني

المصدر : مخطوطة دار الكتب المصرية طلعت ميقات ١٥٥ ، ١ ، ق ١ ظ - ٢ ظ

بسم الله الرحمن الرحيم وبه نستعين المقياس المرجح في العمل بالاسطرلاب المسطح وهو مقدمة ومقالتان وكل اسم^١ السين فيه اصل وفيه طاء كالصراط والاصطرلاب او خاء كمنخرات او عين كمسنة اوقاف كصندوق فانه يجوز فيه السين والصاد والاصطرلاب اسم عجمي واستشفاق^٢ معناه من العربية بعيد وذكر ابو الحسن ثابت بن قرة في العمل بالاسطرلاب له ان ابرخس وهو قبل بطليموس وضع الاسطرلاب وسطحه على مثل ما وضعه لاب بعد ان كان كريا وان الذي دعاه الى ذلك انه رأى الكرة^٣ كثيرا عناوها قليلا نفعا^٤ فاراد ان يضع الة قريبة يسيرة جامعة لكثير من الاعمال يوضح بها ما غمض في الآلة المقببة الكرية وذكر انه كان من عادة الحكماء اذا ارادوا^٥ وضع كتاب ان يضعوه على وجهين احدهما ان يضعوه بالغامض في العلم والرمز في القول الذي لا يدركه

١ - كلمة اسم مكررة في الاصل والثانية مشتوية

٢ - في الاصل : واشتقاق

٣ - هكذا في الاصل

٤ - في الاصل : انهم ذا ، مصلح الى : اذا

٥ - في الاصل : ارادو

(٦)

قطعة من كتاب الموازنة لحمزة الاصفهاني

انظر ٧ ادناه

(٧)

قطعة من كتاب التفهيم لصناعة التنجيم لابي الريحان البيروني

المصدر : مخطوطة لندن المكتبة البريطانية ٨٣٤٩ (كما طبعت في النص المطبوع ، لندن ، ١٩٣٤ م ، ص ١٩٤)

ما اصطرلاب هو آلة للميوناينين اسمها اصطرلابون اي مراة النجوم ولهذا خرج له حمزة الاصفهاني من الفارسية انه ستاره ياب^١ ...

١ - في الاصل : بشاره باب

قطعة في معنى الاسطرلاب من افراد المقال في امر الظلال البيروني

المصدر : النص المطبوع (حيدرآباد ، ١٩٤٨ م) ، ص ٦٩ ، مع تصليحات كندي في ترجمته (حلب ، ١٩٧٦ م) ، ص ١١١

... قد ذكر حمزة الاصفهاني في كتاب الموازنة ان الاسطرلاب لفظة فارسية قد عربت فانها ستاره^١ ياب اي مدرك النجوم ويمكن ان يكون هذا اسمه عند الفرس اما مشتقا من الفعل الخاص به واما معربا من اليونانية كتعريب الفارسية فان اسمه باليونانية اسطرلابون^٢ واسطر هو النجم بدليل ان علم الهيئة يسمى عندهم اسطرونوميا وصناعة احكام النجوم اسطرولوجيا^٣ وهو آلة وجدنا لهم في صنعتها والعمل بها كتباً قديمة ولم نجد لغيرهم فيها شيئا وان كان عندهم منقولاً منهم واهل المشرق لا يعرفون الاسطرلاب ولا يهتمون لغير استعمال الظل بدله ...

١ - في النص المطبوع : اشاره ٢ - في الاصل المطبوع : اسطرلابون ٣ - في النص المطبوع : اسطرولوجيا .

الكتب في تسطيح الكرة تسطيح الكرة لبطليموس والفرغاني واحسنها استيعاب الوجوه الممكنة ١٦ في صنعة الاسطرلاب للشيخ الامام ابي الريحان محمد بن احمد البيروني ١٦ ...

١٦ - ١٦ - في الاصل : للشيخ الامام ابي الريحان محمد بن احمد في صنعة الاسطرلاب البيروني [!]

(٩)

قطعة من رسالة في العمل بالاسطرلاب [للزرقاله]

المصدر : مخطوطة استانبول ايا صوفيا ٢٦٧١ ، ق ١٣٣ ظ

... اعلم ان اسم الاسطرلاب لفظة يونانية ترجمتها اخذ الكواكب وذلك لانه يؤخذ به ان ما يطلب علمه من مواضع الكواكب ويذكر بطليموس انه كالكرة قد بسطت فصور مركزه قطبها الظاهر ...

١- ناقص في الاصل ٢- في الاصل : مركز

(١٠)

فائدة في الاسطرلاب

منقولة من شرح مقامات الحريري لشارح مجهول

المصادر : أ : مخطوطة دار الكتب المصرية مصطفى فاضل هيئة ١ ، ق ١ و ب : مخطوطة دار الكتب المصرية تيمور حكمة ١٥ ، ص ١٣٧

الاسطرلاب ١ مقياس النجوم والشمس يعني شيء ٢ ينظر فيه ويعرف به ٣ سير الكواكب والشمس واول ٤ من وضع ٤ هذا الشيء لاب وهو اسم ٥ ابن ٦ ادريس ٧ عليه السلام ٨ فلما صنع هذا الشكل وجيء به الى ادريس ٨ عليه السلام ٩ قال ٩ من سطر هذه ١٠ الاسطر قيل له لاب فاضيف الى لاب وقيل فارسي معرب اصله بالفارسية ١١ ستاره ياب ١١ يعني

١- في ب : اسطرلاب ٢- ٢- في ب : يعرف فيه ٣- في ب : اول ٤- في ب : صنع ٥- في ب : رسم ٦- في أ : لابن ٧- ٧- في ب : ع م ٨- ٨- ناقص في ب ٩- في أ و ب : فقال ١٠- ١١- في أ : ستاره ثاب ، وفي ب : ستاره

الا من احكم امر الفلسفة وعلا فيها والثاني ان يضعوه بالكشف والبيان ارادة لشرحه وبسطه واظهار علله وذكر ان الاسطرلاب محدود بثلاثة حدود لا يكون الا منها الارثماتيقي وهو معرفة حساب الاعداد وخواصها والثاني معرفة الهندسة وهي المسح بالقسي والاوتر المثلثة والمربعة الى المعشرة والمناسبات وما جرى مجراها والاسطرلاب ٦ وهو معرفة ما يشتمل عليه الزيجات من معرفة حركات الكواكب بمراكز تدويرها واركانها واختلاف صعودها وهبوطها ورجوعها واستقامتها وابطائها وسرعتها في سيرها واخذها في العرض وغير ذلك مما يشتمل عليه الزيجات قال وهذا كله معروف موجود في الاسطرلاب ويسمى ذات الصفائح لاشتماله عليها وذكر ان علة تسطيح ابرخس للمسطح هو ان الفلك المستوى المعبر عنه بدائرة معدل النهار في الكرة وفي الاسطرلاب المسطح هو المشتدل على اجزاء الحجر ٧ من الام والتملك المائل ما اشتمل من الكرة على البروج واجزاها وفي الاسطرلاب المسطح هو منطقة فلك البروج من الشبكة والفلك المائل في الطبيعة مثل المستوى ولكن اختلاف اقطارها خالف بينهما ويميل مركز احدهما عن مركز الاخر بقدر الميل الاعظم وهو في الكرة من جهة الشمال والجنوب فاراد ابرخس ان يصير ٨ الميلين في جانب واحد واختار وضعه شمالياً لانه الموضع العامر من الارض فجمع المسطح ما في البيضة من الفلكين المستوى والمائل وقد قام البرهان الهندسي انه لا يمكن ان يوجد اسطرلاب يؤدي للاعمال الحسابية التعليمية على غير الوصفين الاصيلين ٩ الشمالي ١٠ والجنوبي وان جميع الاوضاع على اختلافها لا تخرج عنها وانما تختلف صور اجناسها من اختلاف التركيب من هذين الاصيلين وسمى كل من الوصفين باسم جهة ١١ القطب الظاهر في عرض الاسطرلاب ومقنطراته من دوائر موازية للافق ونقطة سمت الراس مركزها في الكرة وانما اختلفت مراكزها في نوعي المسطح للمسطح وحدبة ١٢ قوس الافق الشمالي الى ما يلي اسفل الاسطرلاب وافق الجنوبي بالعكس ومقنطرات احدهما يخالف اشكال المقنطرات الاخر لمقنطرة عرض الصفيحة في الجنوبي تكون خطا مستقيماً ثم يعود وضع المقنطرات الى خلاف وضع الاول ١٣ فتكون حذباتها الى ما يلي الشمال عكس المقنطرات الى خلاف الوضع الاول ١٣ فتكون ١٤ حذباتها الى ما يلي الشمال عكس المقنطرات دون عرض البلد الى ١٥ ١٥ ومن جيد

٦- في الاصل : والاسطرلاب وبرميقا

٧- في الاصل : الكرة الحجرية ، وكلمة الكرة مشتوية

٨- في الاصل : يصير

٩- في الاصل : الاصيلين ١٠- في الاصل : الشمال ١١- هذه الكلمة غير واضحة في الاصل

١٢- في الاصل : وحدبة ١٣- ١٣- مكرر ومشتوب ١٤- في الاصل : فيكون

١٥- ١٥- في الاصل يياض

(١٢)

قطعة من كتاب وفيات الأعيان
لابن خلكان

المصدر : النص المطبوع (القاهرة بلا تاريخ) ، المجلد الثاني ، ص ١٨٤ - ١٨٥

ابو القاسم هبة الله بن الحسين ...

المنعوت بالبديع الاسطرلابي الشاعر المشهور

احمد الادبـاء الفضـلاء

... والاسطرلابي بفتح الهمزة وسكون السين المهملة وضم الطاء المهملة وبعدها راء ثم لام الالف ثم باء موحدة هذه هي ١ النسبة الى الاسطرلاب وهو الآلة المعروفة قال كوشيار بن لبنان بن باشهري الجيلي صاحب كتاب الزيج في رسالته التي وضعها في علم الاسطرلاب ان الاسطرلاب كلمة يونانية معناها ميزان الشمس وسمعت بعض المشايخ يقول ان لاب اسم الشمس بلسان اليونان فكانه قال اسطر الشمس اشارة الى الخطوط التي فيه وقيل ان اول من وضعه بطلميوس صاحب المجسطي وكان سبب وضعه له انه كان معه كرة فلكية وهو راكب فسقطت منه فداسستها دابته فحسفتها فبقيت على هيئة الاسطرلاب وكان ارباب علم الرياضة يعتقدون ان هذه الصورة لا ترسم الا في جسم كروي على هيئة الافلاك فلما رآه بطلميوس على تلك الصورة علم انه يرسم في السطح ويكون نصف دائرة يحصل منه ما يحصل من الكرة فوضع الاسطرلاب ولم يسبق اليه وما ابتدئ احد من المتقدمين الى ان هذا القدر يتأتى في الخط ولم يزل الامر مستمراً على استعمال الكرة والاسطرلاب الى ان استنبط الشيخ شرف الدين الطوسي المذكور في ترجمة الشيخ كمال الدين بن يونس رحمهما الله تعالى وهو شيخه في فن الرياضة ان يضع المقصود من الكرة والاسطرلاب في خط فوضعه وسماه العصا وعمل له رسالة بديعة وكان قد اخطأ في بعض هذا الوضع فاصلاحه الشيخ كمال الدين المذكور وهذبته ...

١- ناقص في الاصل

يظهر فيه ١٢ الكواكب ١٣ ويجوز قلب ١٣ السين صاداً لمجاورة الطاء لتعرب نخرجهما ١٤
١٥ انتهى من شرح مقامات الحريري ١٥

١٢- في أ : في ١٣-١٣ - في أ : وقلب ١٤- في ب : نخرجاها
١٥-١٥ - في أ : به (؟) شرح المقامات

فائدة في الاسطرلاب يقال انها

منقولة من شرح مقامات الحريري للمطرزي

المصدر : مخطوطة دار الكتب المصرية طلعت ميقات ٢٥٥ ، ق ٢ ظ

اسطرلاب كلمة يونانية ومعناها ميزان الشمس عن ابي الحسن وقال ابو ريحان هو آلة اليونانيين اسمها اصطرلابون اي مرآة ١ النجوم ولهذا خرج [له] ١ أ حمزة الاصبها في من الفارسية انه ٢ ستاره ياب ٢ وعن ابي نصر ٣ ان العلماء الاولين كانوا اتخذوا ٤ كرة على مثال الفلك يتحرك على قطبين عليها دوائر عظام كانوا يقيسون ٥ بها الليل والنهار ويصححون بها الطالع الى أيام أدريس ٦ عليه السلام ٧ وكان له ابن يقال له لاب له معرفة حسنة في هيئة ٧ الفلك فبسط الكرة واتخذ هذا الاسطرلاب وانفذه الى ابيه فقال من سطره فقبل سطره لاب فوقع عليه هذا الاسم والاول اصح والاصل فيه السين والصاد ابدل منه لمكان الطاء مقدمة شرح مقامات الحريري لناصر ٨ بن ابي المكارم بن علي المطرزي .

- ١- في الاصل : مرات ١ ناقص في الاصل فانظر ملقط رقم ٧ اعلاه
٢- ٢- في الاصل : ستارة باب ٣- في الاصل : عبر ٤- في الاصل : اتخذوا
٥- في الاصل : يتقسمون ٦- ٦- في الاصل : ع م ٧- في الاصل : هية (؟)
٨- في الاصل : ناصر

(١١)

قطعة من مقدمة الرسالة في عمل الاسطرلاب المسرطن

لابي نصر احمد بن زريور

المصدر : مخطوطة ليدن ٥٩١ ، ق ٣٢ ظ

... ان الاسطرلاب كلمة يونانية وهي آلة شريفة وميزان الشمس تحوي على اكثر الاعمال النجومية بالقوة وكانت تحويها بالفعل لو امكن ان تنقسم دوايرها الى الدقائق والثواني ...

(١٦)

قطعة من مقدمة مقاصد ذوي الألباب في العلم بالعمل بالاصطربلاب لابي علي الفارسي

المصدر : مخطوطة دار الكتب المصرية قوله ميقات ٢ ، ١ ، ق ٢ ظ

... الفصل الاول في التسمية اسطربلاب اسم مركب يوناني فأسطر اسم للشمس ولاب اسم للميزان وقيل اسم المرأة فمعناه حينئذ ميزان الشمس او مرآة الشمس اذ يجزون تقديم المضاف اليه على المضاف عند التلفظ بها وعن العرب ان اسطر يفتح الهمزة جمع سطر عملها لاب وهو ابن ادريس عليه السلام على هذه الآلة فصار مجموع الاسمين علما على هذه الآلة ...

(١٧)

قطعة من كتاب نهاية الارب للنويري

انظر ٢٦ ادناه

(١٨)

قطعة من رسالة في العمل بالاصطربلاب للمزي

المصدر : مخطوطة استانبول فاتح ٢٥، ٥٣٩٧ ، ق ١٩٥ ظ

... الاصطربلاب وهي لفظة يونانية فهم منها انه ميزان للشمس وبالجملة هو آلة يتوصل بها الى معرفة كثير من الاعمال النجومية التعليمية من غير الخمسة المتحيرة باسهل طريق واقرب ماخذ

(١٩)

قطعة من تحفة الطلاب في العمل بالاصطربلاب لمؤلف مجهول

المصدر : مخطوطة استانبول فاتح ٥٣٩٧ ، ٢٤ ، ق ١٩٠ و

... اما الاصطربلاب فهي لفظة يونانية فهم منها انه ميزان الشمس واما لاب فهو رجل حكيم قد سطر هذه الاسطر فسمى بها اسطربلاب وبالجملة هو آلة يتوصل بها الى معرفة كثير من الاعمال باسهل طريق واقرب ماخذ

(١٣)

قطعة من رسالة مغربية او اندلسية مجهولة المؤلف

المصدر : مخطوطة دار الكتب المصرية ميقات ١١٦٩ ، ٦ ، ق ٤٥ و

... الاصطربلاب وهي كلمة يونانية واصلها اسطربلابول [!] ومعنى الامر ذات النجوم حذف ما بعد الباء للتخفيف ...

(١٤)

قطعة من رسالة في الاصطربلاب لموسى بن ابراهيم

المصدر : مخطوطة نيويورك كولومبيا ٢٨٥ ، ١ ، ق ١ ظ

... الاستربلاب [!] ومعناه باليونانية اخذ ارتفاع الكوكب لان اسطر في اللغة كوكب والاختلات [!] وقال بعض ان معناه ميزان الكوكب وهو منسوب الى بطليموس ..

(١٥)

قطعة من ملخص الألباب في العمل بالاصطربلاب

لابن جماعة الكناني

المصدر : مخطوطة دار الكتب المصرية مصطفى فاضل ميقات تركي ٦ ، ١ ، ق ١ ظ

... الباب الاول معنى لفظ الاصطربلاب الاصطربلاب لفظ عجمي معناه باليونانية مقياس النجوم وقيل معناه ميزان الشمس ويجوز بالسين والصاد وقيل اصله الاصطربلابون واسطر هو النجم ولاقون هو المرأة ومعناه مرآة النجوم ثم عرب فقبل اسطربلاب واما قول بعضهم ان لاب اسم رجل واسطر جمع سطر مضاف اليه ١ فلا يعتمد (٢) ١ عليه لانه اسم اعجمي فاشتقاق معناه من العربية بعيد ...

(٢٤)

قطعة في الاسطرلاب من شرح
علي البرجندي على رسالة بيست
باب لنصير الدين الطوسي

المصادر : أ مخطوطة دار الكتب المصرية طلعت مجاميع ٣٩٨ ، ٢ ، ق ٤ ظ
ب مخطوطة دار الكتب المصرية طلعت ميقات فارسي ٢ ، ٢ ، ق ٣١ و
ج مخطوطة دار الكتب المصرية س ٤٤٣٥ ، ق ٥ و

.. لغت اصل اسطرلاب بسين است وبعضی^١ انرا بصاد بدل کرده اند^٢ کوشیار
در بعضی تصانیف خود^٣ آورده است که معنی او ترازوي^٤ آفتاب است^٥ واز
اینجاست که^٥ بعضی کمان برده اند که اسطر ترازوست^٦ ولاب افتات بود^٧ ودر
بعضی^٨ تصانیف ابی ریحان مذکور^٩ است که اصل او در لغت^{١٠} یونان اسطرلابون^{١١}
است ومعنی او آینه^{١٢} کواکب^{١٢} و نزدیکست^{١٢} باین آنچه بعضی آنرا^{١٣} بستاره^{١٤}
یاب تفسیر کرده اند وبعضی گفته اند که اسطر تصنیف است ولاب نام پسر هرمس
حکیم است^{١٥} که تسطیح^{١٦} اسطرلاب اختراع اوست وشارح مقامات حریری از ابی نصر
قمی نقل کرده^{١٧} است که جون لاب^{١٨} ولد هرمس^{١٨} دواير فلکی را در سطح
مستوی رسم ساخت هرمس ازو سؤال کرد که من سطر هذا ودر جواب گفت سطره
لاب وبدین سبب آنرا^{١٩} اسطرلاب گفتند ...

- | | | |
|----------------------|--|--|
| ١- في ج : وبعض | ٢- في أ و ب : کنند | ٣- في ج : خو |
| ٤- في ب : ترازو | ٥- في أ : واز ينحاست ، في ج : وازي است | ٥- في أ : واز ينحاست ، في ج : وازي است |
| ٦- في ب : ترازو است | ٧- ناقص في أ و ج | ٨- في ب : بعض ، في ج : بعض |
| نرد (؟) | ٩- في أ و ج : مسطور | ١٠- في أ و ب و ج : لغة |
| ١١- في ج : اسطرلابو | ١٢- ١٢- في أ و ج : نزيك است | ١٣- في ب : اورا |
| ١٤- في ج : ستاره | ١٥- ناقص في أ و ب | ١٦- ناقص في أ و ج |
| ١٧- في أ و ج : آورده | ١٨- ١٨- ناقص في ب و ج | ١٩- في ب : اورا |

(٢٠)

قطعة من اول رسالة في العمل
بالاسطرلاب لشرف الدين الخليلي

المصدر : مخطوطة استانبول فاتح ٥٣٩٧ ، ق ٦٥ ظ
... الاسطرلاب لفظ اعجمي معناه مقياس النجوم وقيل ميزانها او مرآتها ...

(٢١)

قطعة من رسالة في العمل بالاسطرلاب
الاكري لمؤلف مجهول

المصدر : مخطوطة استانبول حامدية ١٤٥٣ ، ق ٢١٣ ظ
... الاسطرلاب لفظة اعجمية تفسيرها^١ مرآة النجوم وقيل ميزان الشمس ...
١- في الاصل : تفسير

(٢٢)

قطعة من حياة الحيوان للدميري

انظر ٣٢

(٢٣)

فائدة عن لاب من القاموس المحيط
لمجد الدين الفيروز ابادي

المصادر : أ : مخطوطة دار الكتب المصرية لغة ٣٤ ، باب الباء ، فصل اللام
ب : مخطوطة دار الكتب المصرية مصطفى فاضل هيئة ١ ، ق ١ و

... واللاب^١ بالنوبة^٢ ورجل^٣ سطر اسطر^٣ وبنى عليها حسابا فقيلا اسطرلاب ثم
مزجا ونزعت الاضافة فقيلا الاسطرلاب^٤ معرفة والاصطرلاب لتقدم السين على الطاء ...
١- ١- في ب : اسم رجل ٢- اي في بلد النوبة (؟) ٣- في ب : سطر ٤- في ب : الاسطرلاب

الطالع وسمت القبلة وعرض البلاد وغير ذلك او عن كيفية وضع الآلة على ما بين في كتبه وهو من فروع علم الهيئة كما مر واصطربلاب كلمة يونانية اصلها بالسین وقد يستعمل على الاصل وقد تبدل صادا لانها في جوار الطاء وهو الاكثر يقال معناها ميزان الشمس وقيل مرآة النجم ومقياسه ويقال له باليونانية ايضاً اصطربلافون واصطر هو النجم ولافون هو المرآة ومن ذلك سمي علم النجوم اصطربنوميا وقيل ان الاوائل كانوا يتخذون كرة على مثال الفلك ويرسمون عليها الدوائر ويقسمون بها النهار والليل فيصححون بها المطالع الى زمن ادريس عليه السلام وكان لادريس ابن يسمى لاب وله معرفة في الهيئة فبسط الكرة واتخذ هذه الآلة فوصلت الى ابيه فتأمل وقال من سطره فقل سطرلاب فوقه عليه هذا الاسم وقيل اسطر جمع سطر ولاب اسم رجل وقيل فارسي معرب من استاره ياب اي مدرك احوال الكواكب قال بعضهم هذا اظهر واقرب الى الصواب لانه ليس بينهما فرق الا بتغيير الحروف وفي مفاتيح العلوم الوجه هو الاول وقيل اول من وضعه بطليموس واول من عمله في الاسلام ابراهيم بن حبيب الفزاري ومن الكتب المصنفة فيه تحفة الناظر وبهجة الافكار وضياء الاعين

(٢٨)

قطعة من رسالة في الآلات الفلكية لمنجمك

المصادر أ : مخطوطة دار الكتب المصرية ميقات ٧٣٥ ، ق ١ ظ
ب : مخطوطة دار الكتب المصرية ميقات ٧٠ ، ق ١ ظ

... المقالة الخامسة في رسم الآلات الحادثة عن تسطيح الكرة كالاسطرلاب الشمالي والجنوبي والزرقالة والشكازية والارباع المستعملة بالحيط والمري مهدفة وهي مشتملة على عدة ابواب الباب الاول في رسم الاسطرلاب وهو آلة شريفة منسوبة الى اليونانيين واورد كوشيار في بعض تصانيفه ان معناه ميزان الشمس ولهذا ظن ان اسطرلاب ولباب شمس وفي بعض تصانيف ابني الریحان اسمها اسطرلافون^٢ اي مرآة النجوم ولهذا خرج [له]^٣ حمزة الاصفهانى من الفارسية ستاره ياب وزعم بعضهم ان اسطر تصنيف ولباب اسم حكيم اخترع الاسطرلاب وهو ابن هرمس الحكيم كما حكى^٤ شارح المقامات الحريرية^٥

١- في ب : اورد
٢- في أ و ب : اسطرلافون
٣- ناقص في الاصل فانظر ملقط
٤- في أ : شارح المقامات الحريري ، وفي ب : صاحب المقامات الحريرية
٥- رقم ٧ اعلاه

(٢٥)

فائدة في الاصطربلاب يقال انها نقلت
من النسخة المسكية

المصدر : مخطوطة لندن المكتبة البريطانية اضافية ٩٥٩٩ ، ق ٧ و

فايدة اما بطليموس الفالوذي فانه صنف كتاب المجسطي^١ بكسر الميم والجيم وتخفيف اليا كلمة يونانية معناها ... [؟]^٢ وهو اول من عمل الاصطربلاب وهو بفتح الهمزة وضم الطاء قال^٣ كوشيار ابن لبنان بن باشهري الجيلي ان الاصطربلاب كلمة يونانية معناها ميزان الشمس وقال بعض الحكماء ان لاب اسم الشمس باليونانية^٤ ١ هـ من النسخة المسكية

١- ١- في الهامش
٢- في الاصل : هو (!)
٣- في الاصل : اليونان

(٢٦)

قطعة في الاصطربلاب
من شفاء الغليل فيما في كلام من الدخيل
لشهاب الدين الخفاجي

المصدر : مخطوطة دار الكتب المصرية مصطفى فاضل لغة ٢٠ ، ق ٧٥ ظ

... اصطربلاب م والآلات التي يعرف بها الوقت اصطربلاب والطرجهارة وهي
آلة مائية وبنكام وهي رملية وكلها الفاظ غير عربية ذكره في نهاية الارب ...

(٢٧)

قطعة من كشف الظنون لحاجي خليفة

المصدر : النص المطبوع في استانبول عام ١٩٤١ م ، المجلد الاول ، عمود ١٠٦ - ١٠٧

علم الاسطرلاب

هو علم يبحث فيه عن كيفية استعمال آلة معهودة يتوصل بها الى معرفة كثير من
الامور النجومية على اسهل طريق واقرب ماخذ مبين في كتبها كارتفاع الشمس ومعرفة

حاشية أخرى للرسالة

المصدر : مخطوطة دار الكتب المصرية ميقات ٢١٣ ، ق ١ ظ

اسطرلاب معناه ميزان الشمس وقال كوشيار^١ يعني مرآة الشمس والاصح اسطر
تصنيف ولاب ولد هرمس مصنفه يوناني

١- في الاصل : كشار

(٣٠)

تعليق في هامش كتاب الاقنوم

لعبد الرحمن الفاسي

المصدر : مخطوطة دار الكتب المصرية ٣٦٦٤ ج ، ق ١٧٩ ظ

الاسطرلاب بفتح الهمزة واسكان السين وضم الطاء ومعناه ميزان الشمس لان اسطر
اسم للميزان ولاب اسم للشمس بلغة اليونان واول من وضعه بطليموس بفتح الباء واللام
واسكان الياء والطاء وضم الميم وله في وضعه قصة عجيبة

(٣١)

قطعة في الاسطرلاب من شرح منظومة عبد الرحمن الفاسي

في الاسطرلاب لمحمد بناني بن عبد السلام بن حمدون

المصدر : مخطوطة دار الكتب تيمور رياضية ١١٣ ، ص ٩ - ١٠

قال ابن ابي الصلت هو الة يتوصل بها الى معرفة كثير من الامور النجومية التعليمية
على اسهل طريق واقرب ماخذ فخرج بقوله على اسهل طريق الى^١ الات^٢ الصحيفتين الزرقالية
والشكازية^٣ وربع دائرة ولفظه قيل كلمة اعجمية ومعناها عندهم قيل مقياس النجوم او
ميزانها وقيل لاب اسم للفلك باليونانية وقيل اسم لمخترع هاذة الالة من متقدمي الحكماء
وقيل اصله لاب بلام الجر ولفظه اب وهي عندهم اسم للمعلم والمراد به ادريس عليه

١- في الاصل : الخ

٢- ٢ - في الاصل : الصيحتين الزرقانية السالكازية [هكذا]

عن ابي نصر القمي^٥ انه قال ان لاب لما رسم^٦ الدوائر الفلكية في سطح مستو سيل عنه
هرمس بان يقول من سطر هذا ويقول هو في جوابه^٧ سطره لاب^٧ ولهذا سموه
بالاسطرلاب ...

٥- ناقص في أ

٦- في ب : رسم من

٧- ٧ - في أ : سطرلاب

(٢٩)

حاشية لرسالة في العمل بالاسطرلاب

ل مؤلف مجهول علق عليها اسحاق الزكالي (?)

المصادر : أ مخطوطة دار الكتب المصرية طلعت ميقات ١٥٤ ، ١ ، ق ١ ظ

ب مخطوطة دار الكتب المصرية الزكية ٧٨٢ ، ٤ ، ق ١٤ ظ

ج مخطوطة دار الكتب المصرية ٣٨٤٤٤ ، ٢ ، ق ١٥ ظ

الاسطرلاب بالسين وعند البعض بالصاد وقال كوشيار الحكيم في بعض تصانيفه معناه
ميزان الشمس ومن ثمة ظن البعض تركيبه من لفظة اسطر ولاب الاول بمعنى الميزان
والثاني بمعنى الشمس وفي بعض تصانيف ابي ريحان^١ هو في لغة يونان اسطرلا فون^٢
معناه مرآة الكواكب وبعضهم قال واحد الكواكب وقال بعضهم اسطر بمعنى التصنيف
ولاب اسم ولد هرمس^٣ الحكيم وهو اول من اخترع الاسطرلاب وقيل اول من اخترعه
بطليموس نقل شارح مقامات الحريري عن ابي النصر القمي^٤ لما رسم لاب ولد هرمس^٥
دوائر الفلك في سطح مستو قال هرمس^٤ من سطر هذا قيل في جوابه لاب ومن ثمة قيل
اسطرلاب هذا ما ذكر في شرح الفارسي^٦ للرسالة الفارسية للتصوير^٧ الطوسي اسحق
الزكالي^٨.

١- في ج : ركان

٢- في أ و ب و ج : اسطرلا فون

٣- في أ و ب و ج : هرمس

٤- في أ و ب و ج : القمي

٥- في ج : هرمس

٦- في ج : الفارسي

٧- في أ و ب و ج : للنصر

٨- في أ : الرحمان ، في ب ج : الزكالي .

(٣٢)

Extract from the travels of Chardin

Source: Michel I, p. 485

Je viens à l'Astrolabe, & je dirai d'abord que ce nom vient d'Asterleb, terme Persan, qui veut dire lèvres des Etoiles; parce que c'est par cet Instrument que les Etoiles se font entendre. D'autres disent, qu'il faut prononcer Astir lab, c'est à dire, connaissance des Etoiles, & c'est comme les Persans appellent d'ordinaire cet Instrument-là; mais dans leurs livres & dans leurs leçons ils l'appellent Veza Kouré, mot abrégé de Veza el Kouré, qui signifie position de la Sphère, parce que cet Instrument & la projection des cercles de la Sphère est un plan. C'est sans doute de ce terme Veza el Kouré qu'est venu le terme barbare de Valzagore, qui se trouve dans Regiomontanus, & dans les auteurs qui l'ont devancé, pour signifier l'Astrolabe.

(٣٣)

قطعة من كتاب رياض المختار لأحمد باشا مختار

المصدر : مختار ، ص ٢٣٨

نبذة تاريخية في الاسطرلاب وشرح لفظة الاسطرلاب لفظ مركب من كلمتين لاتينيتين اسطر بمعنى كوكب وعلى الاصح جرم سماوي ولايوم بمعنى لوحة او صفيحة وقد خفت الكلمة الثانية فصار الاسم اسطرلاب واستعملها بعضهم بدون تخفيف فقال اسطرلابيوم وهو كما لا يخفى عبارة عن تسطيح هيئة الكرة السماوية على الواح صغيرة يمكن بواسطتها اجراء الحسابات المتعلقة بالاجرام السماوية واول من ابتكر هذه الآلة واشتغل بها هو بطليموس الذي عاش بالاسكندرية في القرن الثاني من الميلاد ...

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السلام لانه مستنبطه على ما قيل ثم فتحت لام الجر لمجاورة فتحة همزة بعدها وعلى [؟] كل فالاسطر جمع سطر اسم للرسوم التي فيه اي اسطر الفلك والحكيم فهو مركب اضافي نقل اسما للالة وتعرف فيه بمقتضى لغة العجم في المنقول بالجمع بين ال والاضافة وتسكين اخر كل من الجزئين لانه يستدعي ان يكون همزة اسطر مفتوحة ولا تسمعه في الكلام الا مضمومة منقولاً ضمها للام قبلها الا ان يدعى التغيير المذكور فيه ايضاً على لغة من ذكر وحكى جماعة من المؤرخين ان اول من وضعه بطليموس صاحب المجسطي وان سببه في وضعه انه كانت معه فكرة فلكية وهو راكب فسقطت منه فداستها دابة فخسفتها فبقت عن هيئة الاسطرلاب وكانت ارباب الرياضة يعتقدون وان هاذي الصورة لا ترسم الا في جسم كروي على شكل الفلك فلما رآه على تلك الصورة علم انه ترسم في السطح وتحصل منه مقاصد الكرة فوضع وتقدم بوضعه على جميع الرياضيين ثم لم يهتد احد منهم الى انه يتأتى المقصود من الاسطرلاب في الخط حتى ظهر الشيخ شرف الدين الطوسي شيخ كمال الدين ابن يونس فوضع المضموم من الاسطرلاب والكرة خط على عصي وكان قد سهى في بعض المواضع فاصلحها الشيخ كمال الدين ابن يونس وهذبها لاجل الاستنباط للطوسي ...

٣- في الاصل : يعود [!] ٤- في الاصل : فرامتا

قطعة من الشرح المحتضر لمحمد بناني

المصدر : مخطوطة مكتبة محافظة الاسكندرية ، ٣٠٥٤ ج ، ق ٤ ظ

... والاسطرلاب قال ابن ابي الصلت الة يتوصل بها الى معرفة كثير من الامور النجومية التعليمية على اقرب طريق واقرب ماخذ واسمه عجمي معناه عندهم مقياس النجوم وقيل لاب اسم الفلك باليونانية وقيل اسم لمستنبط هاذي الآلة وفي حياة الحيوان للعلامة الدميري اسطرلاب بفتح همزة وسكون السين وضم الطاء معناه ميزان الشمس لان اسطر اسم الميزان ولاب اسم الشمس بلسان اليونان انتهى واول من وضعه بطليموس وله مع وضعه قصة غريبة حكيناها في الشرح ...

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