Authoring : *Katsiampoura Yanna , Nikolaidis Efthimios*
Translation : *Βελέντζας Γεώργιος*
For citation : *Katsiampoura Yanna , Nikolaidis Efthimios , "Theodore Meliteniotes, Three Books on Astronomy (Tribiblos)", Encyclopaedia of the Hellenic World, Asia Minor*
URL: <http://www.ehw.gr/l.aspx?id=8495>

Summary :

Three books on astronomy under the title *Astronomical Tribiblos*, written in the 14th century by Theodore Meliteniotes. The publication of the work has not been completed yet. It is a textbook based on the works on astronomy of Ptolemy and Theon of Alexandria, which incorporated elements of Arabian and Persian astronomy, thus aiming to compare the two traditions.

Date

Third quarter of the 14th century

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1. History of the Text – Publication

The *Astronomical Tribiblos* by Theodore Meliteniotes is considered one of the most comprehensive and important texts on astronomy in the Byzantine period. The work was called Tribiblos as it included three books. So far, only the first two have been published, in an annotated edition by Régine Leurquin in the series Corpus des Astronomes Byzantins.[1]

The work was written in the second half of the 14th century, while the title must have been given after 1368. So implies the title of the first book's introduction, which reads: «by the megas sakellarios and didaskalos ton didaskalon of the great holy Church of God and archdeacon, Theodore Meliteniotes, the first introduction to *Astronomical Tribiblos*». Theodore Meliteniotes took the office of archdeacon in 1368 and retained it for 25 years, until he died.[2] Therefore, there is a *terminus ante quem* concerning the completion of the Tribiblos. The work was probably written between 1360 and 1368.

The *Astronomical Tribiblos* must not have been particularly popular, judging from the number of manuscripts (about ten) of the first two books preserved so far in the collections of the greatest European libraries (Rome, Paris, London, Madrid, etc.). The original (Vaticanus gr. 792, ff. 24v-353v et 361) is in the Vatican Apostolic Library, where three more copies of the 14th and the 15th century may be found, while only two out of the ten manuscripts have preserved the work in total.

The third book is special. It seems that at some point this book, which included elements of Persian astronomy, was detached from the other two books and started to circulate separately under the title *Paradosis eis tous persikous proxeirous kanonas* («Tradition to the Persian Rough Tables»). The book, preserved in more than thirty manuscripts, came out at times as a work of either Isaac Argyros, to whom was attributed until recently, or of George Chrysokokkes.[3]

2. Content

The *Astronomical Tribiblos* is one of the most massive works on astronomy. It included all the important issues defining the discussion about astronomy in the Paleologean era, when sciences became one of the fields that attracted the scholars' particular interest. Such discussions led to the formation of respective trends in astronomy. One of them was followed by the scholars who introduced and adopted elements of the Persian and Arabic astronomy, along with the Ptolemaic tradition introduced by Gregory Chioniades and followed by George Chrysokokkes. This trend influenced the astronomical works of Theodore Meliteniotes, who, though following Ptolemy, knew and introduced elements of the Persian astronomy for the sake of comparison.[4]

The work of Meliteniotes is written in topical units. In the introduction the writer says that he is absolutely against astrology, in accordance with the tradition formed mainly because of the unfriendly attitude of the Church towards it. Meliteniotes makes his point against astrology in the first place in order to defend his involvement in the science of astronomy.[5] Then, in the first book, the writer presents those elements of arithmetic considered necessary for astronomy students, while in the second book he presents the basic elements of the Ptolemaic system. The third book is focused on Persian astronomy.

The work aimed to introduce the science of astronomy to the readers and offer them all they needed to continue studying this science.

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Thus, it starts from basic principles, which the writer considers necessary for further reading. For example, the first chapter of the first book is a kind of introduction to astronomy, as it answers to questions such as what astronomy is, what its origins are and how it was handed down to the 'Greeks', what the *Syntaxis Mathematica* by Claudius Ptolemy is and what the content of its thirteen books is. It proceeds with calculation issues, such as 'On Multiplications' and 'On Partitions', thus offering to the readers all they needed to keep up with the following chapters and proceed to calculations on their own. A great part of the first book includes the issue of the manufacture and use of the astrolabe.

The third book, the *Paradosis eis tous persikous proxeirous kanonas* ["Tradition to the Persian Rough Tables"], follows the book on astronomy written by George Chrysokokkes, the Introduction to the Syntaxis of the Persians. Meliteniotes in this part of the work follows Chrysokokkes and makes the same mistakes, although he attempts to improve the Ptolemaic tables in order to make them seem more accurate.[6] But already since Nikephoros Gregoras had written his own work, before 1330, it was widely accepted that the Ptolemaic tables needed corrections.

In terms of methodology, the work follows the tradition of the Byzantine texts on astronomy, starting from elementary and rudimentary knowledge and proceeding to special topics. The particular work is characterised by detailed description.

Meliteniotes aims to compare the very long Ptolemaic tradition with the more recent Persian one. He used the same examples in both books so that the differences could be more easily understood.

3. Evaluation

The *Astronomical Tribiblos*, along with the work of George Chrysokokkes, contributed to the formation of a scientific tradition that lasted until the end of the Byzantine Empire. From then on, one of the main interests of the students of astronomy was the comparison between the Ptolemaic method and the more recent Persian, or even the Arabic and the Hebrew ones.

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1. Leurquin, R. (ed.), *Théodore Méliténiote, Tribiblos Astronomique, Livre 1* (Corpus des Astronomes Byzantins IV, Amsterdam 1990)· Leurquin, R. (ed.), *Théodore Méliténiote, Tribiblos Astronomique, Livre II* (Corpus des Astronomes Byzantins V, Amsterdam 1993).

2. *Oxford Dictionary of Byzantium* 2 (Oxford 1991), p. 1336, see entry «Meliteniotes, Theodore» (A.-M. Talbot).

3. The first who correctly attributed the authorship of the book to Theodore Meliteniotes was G. Mercati, in his work *Notizie di Procoro e Demetrio Cidone, Manuele Caleca e Theodoro Meliteniota, ed altri appundi per la storia della teologia e della letteratura bizantina del secolo XVI* (Studi e Testi 56, Citta del Vaticano 1931), p. 175. See also Pingree, D., «Gregory Chioniades and Palaeologian astronomy», *Dumbarton Oaks Papers* 18 (1964), p. 145.

4. See Νικολαΐδης, Θ., «Η έκδοση της "Συντάξεως περσικής Αστρονομίας" του Γεωργίου Χρυσοκόκκη», in ΚΝΕ/ΕΙΕ, *Οι επιστήμες στον ελληνικό χώρο* (Athens 1997), p. 137.

5. About the relation between astronomy-astrology, see Κατσιαμπούρα, Γ., *Πρόσληψη, μετάδοση και λειτουργία των επιστημών στους μεσοβυζαντινούς χρόνους και το Quadrivium του 1008* (Athens 2004), pp. 76-89.

6. See Νικολαΐδης, Θ., «Οι επιστήμες στο Βυζάντιο. Η ιστορική παράδοση του νεώτερου ελληνισμού», in Καράς, Γ. (ed.), *Ιστορία και φιλοσοφία των επιστημών στον ελληνικό χώρο* (Athens 2003), p. 41.

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Glossary :

didaskalos ton didaskalon

A layman or a priest who was teacher of religious matters. The title also designated a teacher on matters of faith and the Holy Scriptures in the Patriarchal School of Constantinople.

megas sakellarios

Ecclesiastic official. The sakellarios was responsible for supervising the monasteries of his bishopric. In late 11th c. the sakellarios of the Patriarchate of Constantinople was given the epithet «megas» (great). By that time the office had lost any economic responsibilities and was responsible for supervising the monasteries of Constantinople, as well as for composing and seeing to the application of patriarchal acts concerning the *charistikai* donations.

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Quotations

Table of Contents in the first book of the Astronomical Tribiblos

Ἀστρονομικὴς Τριβίβλου ἡ α^{η} ψηφοφοριῶν εἰσαγωγὴ περιέχει ταυτὶ
1ον. Τί ἐστιν ἀστρονομία. Καὶ παρὰ τίνων εὑρεθεῖσα τὸ ἐξ ἀρχῆς ἦλθεν εἰς Ἕλληνας ὕστερον. τίς τε ὁ σκοπὸς τῆς Μαθηματικῆς καὶ Μεγάλης Συντάξεως. Καὶ τί τῶν ἐν αὐτῇ τρισκαίδεκα βίβλων ἑκάστη διέξεισι.
2ον. Περὶ πολλαπλασιασμῶν μοιρῶν τε καὶ ἑξηκοστῶν εἴ' οὖν ὅλων καὶ μορίων.
3ον. Περὶ μερισμῶν τῶν αὐτῶν καὶ ὅπως οἱ μερισμοὶ γίνονται.

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4ον. Πῶς ἐστιν ἑκάστου δεδομένου ἀριθμοῦ ἢ ῥητοῦ ἢ ἀρρήτου τὴν τετραγωνικὴν ἀνευρίσκειν πλευράν.
5ον. Πῶς ἐστιν εὑρεῖν ἑκάστου δεδομένου ἀριθμοῦ τὸ ἐπιζητούμενον μόριον.
6ον. Πῶς αἱ τῶν μορίων συνθέσεις γίνονται.
7ον. Περὶ ἀφαιρέσεως τῶν αὐτῶν.
8ον. Πῶς οἱ τῶν αὐτῶν πολλαπλασιασμοὶ μορίοις τε καὶ ἀριθμοῖς εἶτ' οὖν ὅλοις γίνονται.
9ον. Ὅτι τῶν αὐτῶν ταυτὸν ἐστι πολλαπλασιασμὸς καὶ μερισμός.
10ον. Ὅπως χρῇ τὸν τοῖς μαθηματικοῖς ἐξαναλόγου ἀποδεικτικὸν τρόπον καλούμενον ἐφοδεύειν.
11ον. Περὶ τῆς τοῦ ἀστρολάβου ὡροσκοπείου κατασκευῆς.
12ον. Περὶ χρήσεως αὐτοῦ. Καὶ πρῶτον περὶ τῆς ἡμερινῆς τοῦ Ἡλίου διοπτείας. Ἐν ᾧ καὶ περὶ τῶν τεσσάρων κέντρων. Τοῦ τε ὡροσκοποῦντος καὶ μεσουρανοῦντος καὶ τῶν τούτοις διαμετρούντων.
13ον. Πῶς ἐστιν ἐκ τοῦ ὀργάνου τὰς εἰλημμένας καιρικὰς ὥρας ἡμερινὰς εἰς ἰσημερινὰς μεταποιῆσαι, ἔτι τε εὑρεῖν πόσοις ἰσημερινοῖς χρόνοις ἕκαστον ζῴδιον ἀναφέρεται καὶ πόσοις δύνει.
14ον. Περὶ τῆς νυκτερινῆς τῶν ἀπλανῶν ἀστέρων ἐντέχνου διοπτείας. Καὶ ὅπως ἂν τὰς ἐντεῦθεν ἀναδοθείσας ὥρας εἰς ἰσημερινὰς μεταποιήσωμεν διὰ τοῦ ὀργάνου.
15ον. Ὅτι λαβεῖν ἐστιν ἐκ τοῦ ὀργάνου τὰς ὥρας εὐθὺς ἰσημερινὰς καὶ διακεκριμένας.
16ον. Ἔτι περὶ τῆς τῶν νυκτερινῶν ὡρῶν ἐποχῆς.
17ον. Περὶ χρήσεως παλαιγενοῦς ἀστρολάβου. Καὶ πρῶτον περὶ τῆς διορθώσεως τῆς ἡλιακῆς ἐποχῆς ἐν τῷ τὸν ζῳδιακὸν ἔχοντι διμοιριαῖον ἢ τριμοιριαῖον καὶ ἐφεξῆς.
18ον. Περὶ τῆς εὑρέσεως τῆς ὡροσκοπούσης μοίρας ἐν τῷ τοιούτῳ ὡροσκοπείῳ.
19ον. Περὶ τῆς εὑρέσεως τῆς μεσουρανούσης ἐν τῷ αὐτῷ ὀργάνῳ.
20ον. Τίνι δεῖ τρόπῳ τὰς νυκτερινὰς ἀνευρίσκειν ὥρας ἐν ἀστρολάβῳ τοὺς κατὰ τὴν ἀράχνην ἀστέρας ἔχοντι εἰς τὰ προηγούμενα τῆς κατὰ παρὸν ἐποχῆς τούτων ἑκάστου.
21ον. Περὶ τῆς λήψεως τῶν ἀπὸ τῆς ἔγγιστα παρελθούσης μεσημβρίας ὡρῶν.
22ον. Πῶς διὰ τῆς τῶν κανόνων ψηφοφορίας ἀπὸ τοῦ τοῦ Ἡλίου ὑψώματος αἱ ἠνυσμέναι τοῦ Ἡλίου λαμβάνονται ὧραι ἡμεριναί.
23ον. Πῶς ἐστιν εὑρεῖν ἑκάστην μοῖραν τοῦ ζῳδιακοῦ πόσον τοῦ ἰσημερινοῦ παραλλάσσει ἐπὶ βορρᾶν ἢ ἐπὶ νότον ἐκ τοῦ ὀργάνου.
24ον. Ὅπως ἑκάστης τοῦ ζῳδιακοῦ μοίρας τὸ μέγιστον εὑρήσομεν ὕψωμα διὰ τοῦ ὀργάνου.
25ον. Πῶς ἐστι λαβεῖν ἐκ τοῦ ὀργάνου διὰ τῆς ἀκριβοῦς πρὸς τὸν ἥλιον διοπτείας τὸ τοῦ ἐν ὧ ὄντες διοπτεύομεν κλίματος πλάτος.

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