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Review

Reviewed Work(s): George Gemistus Plethon: Manuel d'astronomie by Anne Tihon and Raymond Mercier

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transcription is faithful to the original, although Malet has introduced modern punctuation, capitalization, accents, and orthography. The most significant changes arise from Malet's use of modern Catalan spellings. Thus, among other minor changes, the ubiquitous conjunction *e* becomes *i*, *axi* becomes *aixi*, and *noy* becomes *no hi*. As the transcription is directly parallel to the original, however, readers interested in the original orthography should have no difficulty establishing it.

Malet's introduction offers a brief survey of the elementary mathematics of the Renaissance, a description of the contents of the work, some stylistic analysis, and, most important, a comparison with similar works of the period, particularly the French Pamiers manuscript of circa 1435 and Chuquet's *Triparty* of 1484. A section-by-section comparison with these two works in Appendix 2 reveals the definitions, phrases, and methods that demonstrate that the *Summa* was part of the common European mathematical tradition of the Renaissance. Here again we have further evidence that the forms of mathematics that emerged in Italy in the fourteenth century had penetrated all of the languages and cultures of Europe by the end of the fifteenth century.

One piece of information that was completely new to me was Malet's report of a translation of Santcliment's text into Castilian Spanish that was printed in Saragossa circa 1487. This translation has apparently been known to Spanish scholars since 1951, but it is not to be found in any of the standard catalogues of incunabula. It is to be hoped that Spanish scholars will now delve more deeply into the libraries and archives of their country in order to identify those other works that might reveal how closely the development of mathematics in Spain paralleled its contemporaneous development in the other nations of Europe.

WARREN VAN EGMOND

**Anne Tihon; Raymond Mercier** (Editors). *George Gemistus Pléthon: Manuel d'astronomie*. (Corpus des Astronomes Byzantins, 9.) 324 pp., figs., tables, bibl., index. Louvain-la-Neuve, Belgium: Academia Bruylant, 1997. Fr 242.

The chief desideratum of historians of medieval astronomy has always been an adequate corpus of editions of texts and translations into modern languages. In a field where the transmission and adaptation of concepts, methods, and data are among the principal objects of study, it is a se-

rious impediment when each scholar can study at first hand few texts other than those that are in accessible manuscripts and written in those languages and scripts that the scholar is competent to read. In contrast to the rather disappointing pace of recent publications of, for example, the astronomical literature in Arabic, the situation for medieval Greek astronomy has improved radically since Otto Neugebauer complained in 1957 about the "shocking neglect of a great wealth of source material which is of primary importance for our knowledge of Byzantine astronomy." That we now have access to a representative and growing selection of Byzantine treatises ranging from late antiquity to the end of the Byzantine Empire is due entirely to Anne Tihon's dedicated promotion and general editorship of the *Corpus des Astronomes Byzantins*.

George Gemistus Plethon was active in the first half of the fifteenth century (he died shortly before the fall of Constantinople to the Turks in 1453) and is best known for his philosophical school at Mistra in the Peloponnese, his participation in the Council of Ferrara and Florence, which sought a reunion of the eastern and western Christian churches, and his exposure of the Italian humanists to Platonic philosophy. Plethon's astronomical work is related to a part of his *Treatise of Laws*, in which he proposed a lunisolar calendar in place of the Roman civil calendar. Like other matters in the *Treatise of Laws*, the calendar is a reflection of Plethon's model, Plato's *Laws*, which prescribes a lunisolar calendar resembling the Athenian calendar and advocates beginning the year with the first new moon crescent after the summer solstice. Plethon, however, preferred a more ostensibly rational scheme, taking midnight following the first conjunction after the winter solstice as the starting point of the year.

If this Neohellenic calendar has a humanistic aspect, Plethon's astronomical composition nevertheless occupies a technical level to which the contemporary humanists of western Europe had no ambition to attain, although it was by no means unusual among the scholars of Palaeologan Byzantium. The calendar itself consists of a set of astronomical tables and instructions for calculating positions of the heavenly bodies and dates of conjunctions and full moons, without theoretical discussion—the typical contents, in other words, of a medieval *zīj* on Ptolemaic lines. What is less typical is that the tables operate with Plethon's lunisolar calendar but provide no resources for converting dates from any of the calendars actually in use in Plethon's time into the

calendar of the tables. A further complication is that the text and tables exist in two versions: one using 1433 as the epoch year and ascribed to Plethon, the other slightly earlier and anonymous, although there are strong arguments for taking it to be an earlier draft by Plethon rather than a work that he plagiarized. Finally, in 1447 Plethon communicated to his former pupil Besarion some revised numerical parameters, effectively producing a third edition.

The editors have divided the text between them, Tihon editing and commenting (in French) on the prose instructions and Mercier editing and analyzing (in English) the tables. Of especial interest is Mercier's painstaking treatment of the origins of Plethon's tables, which turn out to draw on material from Arabic, Persian, Hebrew, and Latin sources as well as the Ptolemaic tradition. The volume is more attractive in layout and typography than some of its predecessors, and I detected few misprints. All in all, the editors have done an admirable job of making accessible a document that will be of interest to historians of not only Byzantine but also medieval science and culture.

ALEXANDER JONES

**Ahmad ibn Yusuf al-Tifashi.** *Arab Roots of Gemology: Ahmad ibn Yusuf al Tifashi's Best Thoughts on the Best of Stones.* Foreword by **Eric Bruton.** Translated by **Samar Najm Abul Huda.** xx + 274 pp., frontis., illus., table, bibl., index. Lanham, Md.: Scarecrow Press, 1998. \$45.

There were numerous mineralogical texts written in Arabic during the Middle Ages, including both translations of Greek mineralogical works, most of which are apocryphal, and original writings. (For a good inventory and a historical survey of this material see Manfred Ullmann's *Die Natur- und Geheimwissenschaften im Islam* [Leiden: Brill, 1972].) Ahmad al-Tifashi's *Azhār al-afkār fi ġawāhir al-aḥġār* [Best thoughts on the best of stones], written around 1240, is by far the most informative of these texts. It consists of a list of precious stones that provides not only gemological characteristics but also some practical data, such as the stones' medical properties (as is usual in Arabic mineralogical texts) and their market prices. Ullmann records more than fifty extant manuscripts of this work, observing that the original text was corrupted by the emendations of many other Arabic mineralogists. The original text has been printed before, in part and as a whole—the last edition appeared in Cairo

in 1977—but no complete translation of it in a modern Western language has been published until now.

Samar Najm Abul Huda's work opens with a short introduction discussing the author and his times, his methods of describing and classifying the different stones (hardness, weight, etc.), and the text itself. The introduction is followed by a facsimile edition of what Abul Huda seems to consider the best and most ancient manuscript of Tifashi's work (Paris, Bibliothèque Nationale, ar. 2773). It is this manuscript that she uses as the basis for her English translation, although she also occasionally compares variant readings from other witnesses. Some brief notes and a commentary on the characteristics of each of the stones that Tifashi describes, in which Abul Huda includes some references to other medieval Arabic mineralogical sources, supplement the text. Two brief chapters—on methods of preparing and imitating stones according to these sources—and a short bibliography complete this edition.

Tifashi's book and Abul Huda's translation are surely important keys to any knowledge of Arabic mineralogy. Unfortunately, in a large number of cases Abul Huda has failed to notice the importance of Tifashi's use of sources, for his work is more a literary patchwork of materials and quotations drawn from Greek and Arabic mineralogical texts than a really "original" contribution. Moreover, Abul Huda identifies many of the sources incorrectly: Theophrast is in reality, according to Ullmann, an Arabic pseudo-Theophrastean work; what Abul Huda cites as Pliny's *Natural History* is the *Book on the Secret of the Creation* by pseudo-Apollonius of Thiana; and Tifashi's work is full of references to other Greek works (by Alexander of Tralles, for example) that Abul Huda has simply failed to notice. Obviously, Tifashi knew neither Greek nor Latin (p. 11) and so relied on Arabic translations. Finally, the rationale for Abul Huda's choice of the edited text is not clear: the antiquity of the Paris manuscript is not necessarily a guarantee of its faithfulness to the original text, and Abul Huda's terminology does not always appear to be precise (what does she mean by different "versions" of Tifashi's text, on p. 81?). Probably a commentary that focused more closely on the relationship between Tifashi, his sources, and his followers than on his gemological skill (as Abul Huda's does) would have explained more clearly Tifashi's importance for the history of Arabic science.

MAURO ZONTA