In 1986, at the Premier Colloque International d'Alger sur l'Histoire des Mathématiques Arabes, Jacques Sesiano revealed the existence of a major twelfth-century Latin mathematical treatise written in Castile and inspired by Arabic *muᶜāmalāt* mathematics (roughly, the mathematics of commercial and other social transactions), the *Liber mahameleth*. Apart from the much shorter *Liber augmenti et diminutionis* and some hints in the *Regule* attached to the *Liber alchorismi*, this Latin interest in Arabic commercial arithmetic was unique in its century. However, it was to find a parallel in Leonardo Fibonacci's *Liber abbaci* (in its 1228 version approximately twice as long as the *Liber mahameleth*).

Sesiano's contribution appeared in the proceedings of the conference, printed in Algiers in 1988 and poorly circulated—neither the Library of Congress nor the British Library nor the Bibliothèque nationale de France know about it. Moreover, while presenting a thorough analysis of the treatise, Sesiano offered only brief quotations from the text itself in the notes. Anybody with interest in Latin medieval mathematics, in particular in the adoption of Arabic knowledge or in the new beginning of commercial arithmetic in the Christian Mediterranean, must therefore be grateful to Anne-Marie Vlasschaert for her publication of a fine critical edition, a reworking of her PhD thesis (Louvain, 2002/2003).

The edition is based on three manuscripts and a fragment (all already known to Sesiano). Vlasschaert chooses as her basis the manuscript Paris, BNF lat. 7377A ("ms A"), the youngest of the three but clearly the best; her critical apparatus is meticulous and easy to use. To judge from occasional controls on a bad photocopy of ms A the edition appears to be quite careful (in two places on p. 69, *qui* should be *quem*; on pp. 58 and 319, where differences between manuscripts necessitate presentation in columns, ms A appears in both columns, presumably meant to indicate repetition, where in the former case the text to the right is an obvious continuation of that to the left, and in the latter two different problems should occur in sequence).

Part of the initial commentary deals with technical matters: a detailed description of the manuscripts, an account of editorial principles, glossaries (of arithmetical terms, metro-logical and monetary units, etc.), a bibliography, and indexes of names and of Latin and French terms. Beyond that, the commentary contains short chapters presenting the context of the treatise—commerce, intercultural contacts, the Toledo environment—and a long chapter presenting its mathematics. The latter chapter considers all sections of the treatise in order but does not analyze all its problems, not even all the different problem types. Since some of the rare mathematical blunders in the treatise are overlooked, one may suppose that Vlasschaert has not followed all the calculations; obviously, her main objective (since she is a philologist, not a historian of mathematics) has appropriately been to produce the edition—once the text is there, everybody who wants to can follow and check its proce-dures (at many points, those who want to may also find a more profound mathematical commentary in Sesiano's description).

As also pointed out by Sesiano, some of the coins that are mentioned date the *Liber mahameleth* to the mid-twelfth century (or slightly later). After having asked whether it could be the translation of some unidentified Arabic *Kitāb al-muᶜāmalāt*, Vlasschaert decides that it is a creative adaptation making use of several sources—so creative that she speaks in full right of its originator as an author, not a compiler. She shows that passages or characteristic phrases from the *Liber mahameleth* reappear in the above-mentioned *Regule* and two of Gundisalvi's works. On these grounds, Burnett has suggested that Gundisalvi

was the author—a claim that Vlasschaert finds plausible but nothing more (the reviewer agrees).

Vlasschaert concludes from the subject matter dealt with—purchase and sale, profit, partnership, and so forth, but also stones falling into water-filled cisterns and traditional recreational problems—that the treatise was written for merchants. If that is the case, the author must have had a bad understanding of (or no respect for) what merchants needed to know about calculation. Firstly, many topics that should in that case have been dealt with are absent (e.g., loans, discount, and interest), as are such methods as the double and single false position (the latter is replaced by formulations in terms of proportions). Secondly, apparently practical questions are varied in ways that betray a purely mathematical interest: firstly by inverting the relation between the data and what is asked for, as is often done in books meant to teach merchant youth but written by professional teachers; secondly, by taking as data, for instance, the sum, difference, or product of investment and profit, of goods sold and their price, or even of their square roots (this is virtually unknown elsewhere in Latin, Italian, and Iberian practical arithmetic). The treatise is a very scholarly production, furnished with thorough proofs for most of what it teaches. It is perhaps not to be totally excluded that some wealthy merchant might pay for such mathematical sophistication as a piece of ostentation, even though conspicuous consumption was more characteristic of the feudal nobility than of the rising merchant class; but it seems much more plausible that the endeavor reflects the omnivorous appetite of the translators' environment. For comparison, we may remember that Fibonacci dedicated the 1228 version of the *Liber abbaci* to Michael Scot, not to a fellow merchant.

Vlasschaert presents some of the possible sources for the treatise, but only in very general terms. In particular, the copious references to the *Elements* leads her to give a bibliographic survey of known translations into Latin and Hebrew (notwithstanding the possibility that the author used an Arabic version). However, this survey is only meant as an invitation to further work; Vlasschaert does not look for clues regarding possible connections. When it comes to sources not identified in the treatise text, she abstains from looking for them, exhorting readers only to look attentively at all new text editions that may appear, in particular editions of Arabic works.

Finding the possible connections between the *Liber mahameleth* and works that may be related to it will probably be an arduous undertaking. Comparison with such published works as a priori suggest themselves—the *Liber abbaci*, the *Liber augmenti et diminutionis*, the *Regule*, the earliest extant Castilian practical arithmetic (*El arte del alguarismo*), Qalaṣādī's *Kašf*—does reveal affinities, but in all cases even greater differences. Vlasschaert must be complimented for having forced us to discover that the process of transmission and digestion was even more complex than we imagined.

Reviewer's note: this review was written in July 2012 and takes into account neither the edition of the *Liber mahameleth* made by Jacques Sesiano (Cham, Switzerland, 2014) nor the further work of the reviewer (forthcoming in the proceedings of the 11ième Colloque Maghrébin sur l'Histoire des Mathématiques Arabes, École normale supérieure, Kouba— Alger, 26, 27, 28 octobre 2013).

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