

# Revue d'Histoire des Mathématiques



TEXTES & DOCUMENTS

*A new source for medieval mathematics  
in the Iberian Peninsula:  
The commercial arithmetic in Ms 10106  
(Biblioteca Nacional, Madrid)*

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# REVUE D'HISTOIRE DES MATHÉMATIQUES

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## TEXTES & DOCUMENTS

### A NEW SOURCE FOR MEDIEVAL MATHEMATICS IN THE IBERIAN PENINSULA: THE COMMERCIAL ARITHMETIC IN MS 10106 (BIBLIOTECA NACIONAL, MADRID)

JAVIER DOCAMPO REY

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**ABSTRACT.** — This paper contains a critical edition of a short commercial arithmetic written in Castilian (ca. 1400). The manuscript has certain characteristic features, like the presence of composite fractions, that distinguishes it from other known treatises of the Iberian peninsula. The document appears to improve considerably our knowledge of the origins and the transmission of vernacular commercial arithmetic in Europe.

**RÉSUMÉ.** — Dans cet article, nous étudions et éditons une petite arithmétique commerciale écrite en castillan (vers 1400). Parmi les caractéristiques du manuscrit, on observe la présence de fractions composées, ce qui permet de le différencier des autres manuels péninsulaires connus. Tout porte à croire que l'on est devant un document très important qui améliore notre connaissance des origines de l'arithmétique commerciale en vernaculaire, ainsi que de sa transmission en Europe.

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## INTRODUCTION

In 1998, Antoni Malet published a critical edition of Francesc Santcliment's *Summa de l'art d'Aritmètica* (Barcelona, 1482). This Catalan commercial arithmetic was the first mathematics book printed in the Iberian Peninsula,<sup>1</sup> and the second commercial arithmetic printed in Europe. Malet's monograph also included a short section on the *Compilatio de Arismética sobre la arte mercantívol* (Zaragoza, ca. 1487), which was Sancliment's Castilian adaptation of the *Summa*. This *Compilatio* is shorter than the Catalan treatise and does not deal with fractions. It does, however, include a short chapter on the calculation of square and cubic roots which is not in the *Summa*.<sup>2</sup>

The *Summa* and the *Compilatio* were the first Iberian printed commercial arithmetic texts in Catalan and Castilian, respectively. Even though these works were put to print at a relatively early date, the number of manuscripts of this genre in the period 1300–1500 that have been identified in the Iberian Peninsula is still very small:

To date, only five Catalan *abbacus*<sup>3</sup> manuscripts have been found and studied.<sup>4</sup> The earliest one (ca. 1390) basically uses the Roman system, while the latest, which can be dated to around 1520, contains the first known account of algebra in a vernacular Iberian language.<sup>5</sup> The others are 15th-century commercial arithmetics.

For the Castilian *abbacus* tradition, two treatises have been presented so far. The most important one can be dated to around 1393–1400 and is

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<sup>1</sup> See [Malet 1998]. For a detailed analysis of the contents of Santcliment's book and also on the early sixteenth-century arithmetics of Juan de Ortega and Joan Ventallol, see [Labarthe 2004].

<sup>2</sup> In fact, the *Compilatio* is not a translation but quite a free adaptation of the *Summa*. The numerical values in the exercises are also not the same, and the nomenclature and units are changed to fit the Castilian context. See [Malet 1998, pp. 40–43]. In this paper, we use the terms *Castilian* and *Catalan* in a linguistic sense. Thus, if we mention a *Castilian* source, we refer to a text that is written in Castilian, but not necessarily a text composed in Castile (as well as a *Catalan* source is not necessarily a source written in Catalonia).

<sup>3</sup> The term *abbacus* is generally used to make reference to the vernacular Italian tradition of mathematics, which was mainly connected with commercial arithmetic with the Hindu-Arabic system, but also included algebra and practical geometry (see [Van Egmond 1980]). Expressions like *abbacus teacher*, *abbacus school* or *abbacus treatise* are usually understood in this context roughly for the period 1280–1600. We will use the same terminology also in similar European traditions, even when they are not Italian, because it is less restrictive than the expression “commercial arithmetic”.

<sup>4</sup> These manuscripts are analysed in detail in [Docampo Rey 2004].

<sup>5</sup> See [Docampo Rey 2006; 2009].

entitled *Libro de Arismética que es dicho algarismo*. It is bound together with a treatise on alloying coinage: the *Libro que enseña ensayar qualquier moneda*. In total, they contain almost 200 solved exercises and problems.<sup>6</sup> The other document is a short arithmetic titled *De Aresmética* (14th c.) that is mostly devoted to operations with fractions.<sup>7</sup>

We expect further research on arithmetic in Iberian vernacular languages to provide relevant insights in the transmission of medieval mathematics, in particular for the following reasons: a) many Arabic scientific works (those on mathematics among them) were translated into Latin and Hebrew in the Iberian Peninsula;<sup>8</sup> b) many important Muslim and Jewish cultivators of mathematics were active there; c) the geographical situation of Catalonia and its commercial relations with the rest of the Mediterranean made it a privileged area for the transmission of mathematical knowledge.<sup>9</sup>

### DESCRIPTION OF THE MANUSCRIPT

The anonymous and untitled manuscript we are presenting here is preserved in the Biblioteca Nacional (Madrid). It consists of 16 numbered sheets of paper of 280 by 200 mm and occupies the first part of the codex with signature Ms 10106.<sup>10</sup>

Even though, as we will see, some pages may be lacking at the beginning of the text, the preserved contents are well ordered and organized. Blank spaces are left at the beginning of some paragraphs where the first letter is lacking, surely to be filled in with decorated letters. Therefore, it is reasonable to suspect that the manuscript was part of a text to be prepared for circulation as a treatise.

<sup>6</sup> Ms. 46 of the Real Colegiata de San Isidoro de León. This treatise has been edited in [Caunedo del Potro & Córdoba de la Llave 2000].

<sup>7</sup> Real Academia Española, Ms. 155, ff. 144<sup>r</sup>-164<sup>r</sup>. See [Caunedo del Potro 2003].

<sup>8</sup> See [Allard 1997; D'Alverny 1978; Lindberg 1978].

<sup>9</sup> It has been recently stated that the Catalan area could be related to the beginnings of Italian vernacular algebra. See [Høyrup 2006, pp. 25, 34].

<sup>10</sup> The remainder of the codex consists of two medieval texts on agriculture. The manuscript was formerly preserved in the library of the Cathedral of Toledo (Tol. 96-40). The arithmetic part is mentioned in [Faulhaber et al. 1984, p. 122 (num. 1653)] and has been described very briefly in [Millás Vallicrosa 1942, p. 91].