

O LIVRO DE COMO SE FAZEM AS CORES
OR A MEDIEVAL PORTUGUESE TEXT
ON THE COLOURS FOR ILLUMINATION: A REVIEW

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Introduction

O livro de como se fazem as cores (LCFC), that is, *The book on how to make colours*, is a Portuguese technical text with relevance for the knowledge of the materials used in medieval painting, especially in manuscript illumination. It is known through a miscellaneous Hebrew manuscript kept at the *Biblioteca Palatina de Parma* (Ms. Parma 1959) and was first published in 1928 (Blondheim).

Several editions and translations of LCFC were produced and several opinions on the authorship and date were advanced (see Cruz & Afonso, 2008), but the first detailed study about the work was only published in 1999 (Strolovitch). This study, which focused on language issues, was developed and incorporated into a doctoral thesis (Strolovitch, 2005), but until 2005, when two of us presented a communication to the Córdoba Symposium, neither the technological aspects raised by LCFC had been studied nor its historical and artistic framework had been significantly developed. In that communication, in addition to the necessary review of the literature, the date of the text was discussed based on the Portuguese historical context and the vocabulary used in connection with materials and techniques. We thus concluded that it was more pertinent to consider the text as a fifteenth century work, as some claimed, rather than a thirteenth century text, as was argued by others based on other texts contained in the same manuscript volume. Finally, we also discussed the characteristics and influences of the text, namely its Hebraic, Spanish and alchemic influences. Shortly after the symposium, we made significant progress on the main aspects discussed in our presentation, and due to the publication delay of the proceedings a more detailed study with new data was published in a journal (Cruz & Afonso, 2008). Therefore, it is no longer relevant to publish again the text that we had prepared for the proceedings of the symposium.

LCFC has been the subject of several studies since then, ours and by others, and significant progress has been made on some of the issues we had initially raised. Hence, it now seems appropriate to review the current state of research on LCFC. Among the new studies is a Master dissertation (Matos, 2011) supervised by one of us, somehow as a major development of the communication presented at the symposium, which partly carried out the literature review that we intend to do here. Therefore, this text incorporates parts of that dissertation and it comes signed by its author. Considering the theme of the symposium, this present review focuses on the fundamental issues related to the date and authorship of LCFC, its sources and technological aspects. Only studies published after 2005 have been considered, as earlier publications have already been identified in our first paper (Cruz & Afonso, 2008). Likewise, the historic and artistic contexts are not treated here either, since they were revised and developed in the cited dissertation (Matos, 2011).

The manuscript and its date

LCFC occupies folia 1 to 20 of the Ms. Parma 1959, a manuscript volume mostly written in Hebrew with a total of 221 folia. According to Débora Matos (2011), who directly examined the manuscript, this volume contains 20 philological units, although a smaller number of texts is mentioned in other studies. Traditionally, it was considered that LCFC was composed at Loulé, south of Portugal, around 1262, by Abraham Ibn Hayyim due to an ornamented signature with that name at the end of LCFC (fol. 20r). The same name, together with the place and the date (in an abbreviated form without the century), also appears in the colophon of another work (f. 195v), the *List of the oddly shaped letters found in an accurate Torah scroll*.

It has been stressed the homogeneity of the volume in terms of format, justification, number of lines, composition of books and decoration, which accounts for the association between the two texts, although in some cases the variety of calligraphy has been mentioned. Luís Afonso identified nine hands and concluded that the two texts were written or copied by two different writers (Afonso, 2010). Consequently, although it can not be ruled out the initial possibility of Ibn Hayyim being the author of the two mentioned texts, he could not have written them by his own hand and no relationship can be established between the monogram in the first book and the colophon in the other – and therefore ceases to exist any justification for the traditional dating and authorship attribution. However, Matos (2011), who analysed the palaeography of the entire volume, suggests that the handwriting differences between the two texts are not significant and their apparent difference must be understood otherwise. Both texts are written in a careful semi-cursive script, and even though LCFC seems to be more formal, she considers that there is no sufficient evidence to assume that they were copied by two different hands. She argues that

the apparent differences should be understood in terms of modes of writing in Hebrew: semi-cursive script is used in texts dealing with para-textual elements relating to the copy and decoration of Hebrew sacred texts (with some justified exceptions) and for liturgical texts, whereas *halakhic* texts are written in a more current semi-cursive script. Consequently, she concludes that there is a direct relation between the nature of the texts included in the Ms. Parma 1959 and their modes of writing, and they seem to have been copied by the same person (Matos, 2011).

Moreover, Matos established that the ink used in both the ornamented signature at the end of LCFC and the main text is the same, currently a brownish ink, and not inks with different colour as it had been stated previously, which clearly indicates the simultaneous writing of both the signature and the text. In view of the entire manuscript volume Matos considers that Abraham Ibn Hayyim must not be the author of LCFC but rather its copyist, similarly to the majority of the texts included in the volume (Matos, 2011).

It was already known that the paper of the manuscript had unspecified watermarks in use between 1423 and 1488, but in the meanwhile new data about the paper arose. Inês Villela-Petit (2011)¹ reported that according to the information given to her four watermarks were found: a crown, a horn, a pair of scissors and a cross. The former corresponds to a model that was common in Europe precisely between 1423 and 1488, with strong similarities to watermarks in papers of Italian origin, more specifically from Piedmont, dated from between 1459 and 1473. The author also pointed the pair of scissors to be an exclusively Italian watermark, most likely from Genoa. None of these watermarks was detected in LCFC, only in some of the other texts that comprise the volume (Villela-Petit, 2011). Matos (2011), through the direct analysis of the manuscript, was able to confirm the crown (Fig. 1) and the pair of scissors (Fig. 2), yet the watermark that had been described as a horn was an ox head instead (Fig. 3). Also, in the place of cross appeared to be a column (Fig. 4). These differences partly result from the fact that some watermarks are cut and incomplete. Moreover, Matos, who noticed a greater number of folia with watermarks, detected one additional watermark – a ring with three stones (Fig. 5). She was equally able to establish that two folia of LCFC have watermarks (a crown in folia 1 and 2). Considering the distribution of the watermarks across the volume, Matos believes that the first 37 folia, corresponding to the first eight texts, were written in the same paper with a crown watermark, whereas from fol. 84 onwards the paper used is the one with the scissors watermark. All the other watermarks are found in one specific text in the middle of the volume, and their variety corresponds to the textual divisions (Matos, 2011).

1. Although published in 2011, this paper corresponds to a communication presented in a symposium held in 1999.



Fig. 1: Crown watermark on fol. 37 (Matos, 2011).

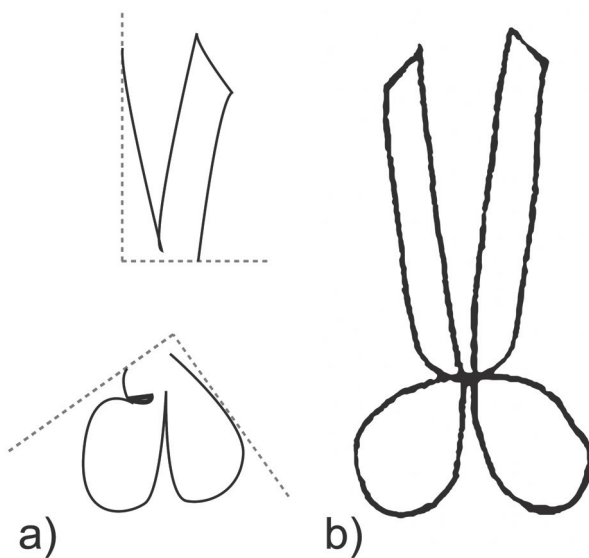


Fig. 2: a) Fragments of the scissors watermark on foll. 51 and 52;
b) a similar watermark from Genoa. Redrawn from Matos (2011).

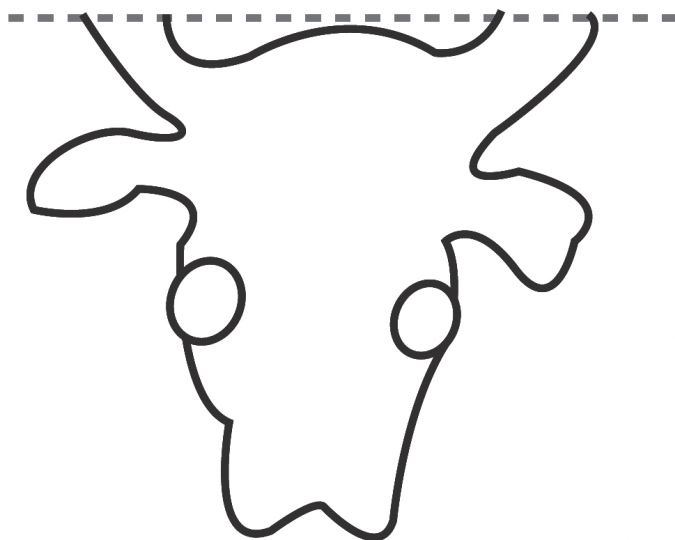


Fig. 3: Ox head watermark on fol. 44 (Matos, 2011).

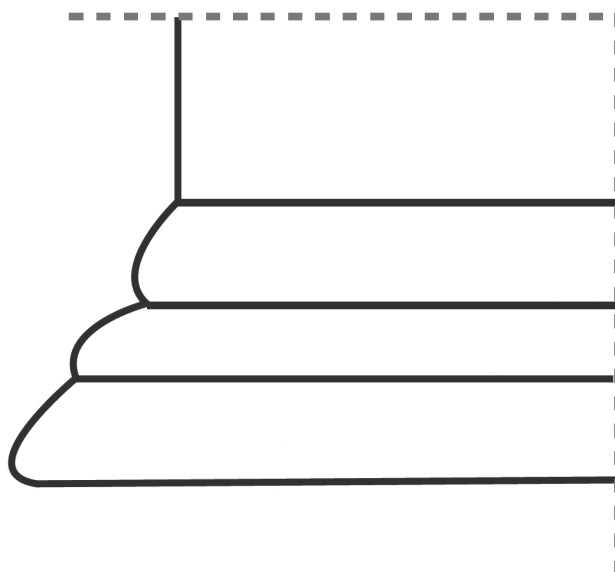


Fig. 4: Column watermark on foll. 73 and 74 (Matos, 2011).

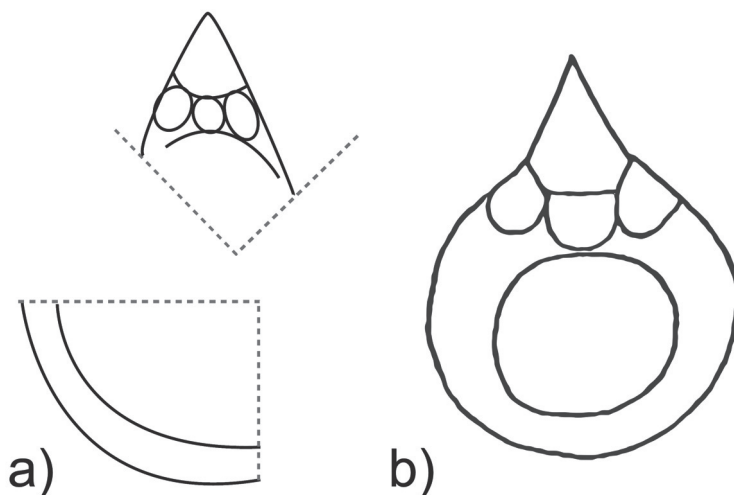


Fig. 5: a) Fragments of the ring watermark on foll. 45 and 41;
b) a similar watermark from Cologne. Redrawn from Matos (2011).

Regarding the date and origin of the watermarks, Matos (2011) agrees with Villela-Petit regarding the crown watermark, and found parallels of the several watermarks in papers from Italy, as is the case of the scissors (Genoa, 1448-1463) and the ox head (Genoa, 1462), and from Germany (Cologne, 1457) and the Low Countries (Utrecht, 1462) in the case of the ring. Based in these findings, Matos suggests that the manuscript was copied somewhere between 1423 and 1463 and that the year of 62 (without the century) on the colophon on the *List of the oddly shaped letters* most likely corresponds to the year 1462 – which, ultimately, may be the date of the manuscript (Matos, 2011).

In addition to the previously mentioned researches, the text of LCFC was printed two other times: based on his PhD dissertation, Devon Strolovitch published the transliteration (Strolovitch, 2010a) and an English translation (Strolovitch, 2010b). Moreover, there is a forthcoming French translation by Anne-Marie Quint and Michel Larroche (2009).

The text: philological issues and date

Aiming to clarify the doubts about the date of LCFC, António João Cruz and Luís Afonso (2008) explored the history of the vocabulary used to name materials, equipment and procedures related with the colours preparation or its use, as well as the history of the materials themselves. With this approach, they intended to avoid the formal changes (namely those related to the spelling) that

could have occurred during any possible copy in order to discuss the date of the original text.

With respect to the vocabulary, they used a set of 122 words, many corresponding to materials or objects of common use, of which, according to the documentary corpus used by the best Portuguese dictionary with historical data, only 50 percent were known in a written form in the thirteenth century or before, while 20 percent had their first appearance in fifteenth century or later. Of the ten words documented only after the fifteenth century, nine correspond to terms of restricted use, and considering the probable reduced number of technical texts in the corpus, it is not unexpected that those words might already have been in use before. Therefore, they concluded that the words employed by LCFC suggest for the text a date not earlier than the fifteenth century (Cruz & Afonso, 2008).

Regarding the materials used in the recipes comprised in the LCFC, Cruz and Afonso pointed out that the use of paper for pigment storage, as mentioned in the text, in a situation where the paper did not have any advantage compared to other storage materials, could only be justified at a time when paper was a common material in Portugal, i.e. only in the fifteenth century or later. They equally noted that mosaic gold, a pigment for which two recipes are presented in LCFC, is not mentioned in any of the known technical treatises dated from the thirteenth century, being the oldest references from the fourteenth century. Similarly, they considered the references to gum Arabic and to turnsole (*cata-sol*) as more probable in the fourteenth and fifteenth centuries than in the thirteenth century. Consequently, they concluded that the materials mentioned in LCFC suggest a date not earlier than the fourteenth century for the original text (Cruz & Afonso, 2008).

In relation to the vocabulary, Ivo Castro (2010) drew attention to the fact that the date recorded in a dictionary for the first usage of a word is not the date on which that word appeared in that language, since before recorded in written form the word circulated orally, and it does not necessarily correspond to the oldest document but only to the oldest document known to the dictionary's author. Consequently, the dating done by Cruz and Afonso based on the set of 122 words should be regarded with reservations, and in any case should be considered as provisional. Castro also showed that the represented orthography through Hebrew script of many words of LCFC is characteristic of Old Portuguese (thirteenth and fourteenth centuries) and that these words did not circulate with those forms in the fifteenth century, except in the case of the copy of previously existing texts. In conclusion, Castro, considers that the fifteenth century paper, and the language of LCFC shows that its known text is a copy of older sources (Castro, 2010).

Regardless of the language issues, Afonso (2010) investigated the possibility of dating the text offered by the reference to the gold coins (*dobras*, *escudos* and *florins*) used for gilding. According to his research about the

circulation of coins in medieval Portugal, the text cannot be earlier than 1266, when *escudos* were minted for the first time in Europe, but it is much more likely to have been written somewhere between early fourteenth century and mid-fifteenth century, the period when the three coins had significant circulation. However, Afonso considered that the LCFC comprises three parts which correspond to different sources (see below) and, hence, this dating does not apply to the whole book but only to the first part (where the three coins are mentioned) (Afonso, 2010).

The structure of the text and its sources

As a result of the analysis carried out on LCFC, Cruz and Afonso (2008) concluded that the text is a collection of recipes, organised in one introduction plus 45 chapters (including the missing chapters 22 and 23) compiled from several sources, and not an original coherent book, and for that reason they avoided the use of the term 'treatise' for it. The authors mentioned the lack of organisation, the employment of different systems of nomenclature for similar materials, the duplication of procedures and the use of different materials in identical situations. Furthermore, the diversity of significant influences found by them, namely alchemic, Castilian and Arabic, was also interpreted as an indication of the variety of sources.

Afonso (2010) took this analysis further and identified two incipits in the text, one in the beginning and another on chapter 25, which are an indication of the juxtaposition of at least two sources. Taking into account the recipes in terms of contents (materials, procedures, aims, etc.), as well as in terms of language (syntax, words, etc.), he concluded that the first 24 chapters can be split into two parts. Therefore, he considered the whole LCFC composed of three parts, each originated from different sources: part I (introduction and chapters 1 to 15), dealing with the preparation of pigments and with how to temper them, is characterised by a language with strong elements of an alchemic tradition; part II (chapters 16 to 24), dealing with recipes for dying objects made of wood and bone, has a stronger presence of Portuguese words of Arabic origin; and part III (chapters 25 to 45), consisting mainly of recipes for the mixture of pigments and dyes, is where the Castilianisms are more frequent (Afonso, 2010).

A similar division was proposed by Villela-Petit (2011): a first part (introduction and chapters 1 to 15) only about pigments; a second part (chapters 24 to 45) less ordered and with recipes about binders, glue, varnish, pigment mixtures and indications for use; and a very heterogeneous set of six recipes (chapters 16 to 21) related several activities. Nevertheless place the beginning of the second part in Chapter 24, she noted, as Afonso, that the first words of chapter 25 resemble a prologue.

Matos (2011) also addressed this issue related to the constituent parts of LCFC, as she found a mark (Fig. 6) that is repeated in various parts of the book. This led her to conclude that this may be a signal of textual division. Hence Matos proposes an alternative division of the text into four parts: part one (introduction and chapters 1 to 16), with some alchemic language; part two (chapters 17 to 23), the most coherent one, dealing exclusively with the dyeing of wood and bone, with a strong Arabic influence; part three (chapters 24 to 40), which deals mostly with colour tempering, shades and variations, and mixtures and mordants; part four (chapters 41 to 45), with no specific subject (Matos, 2011).

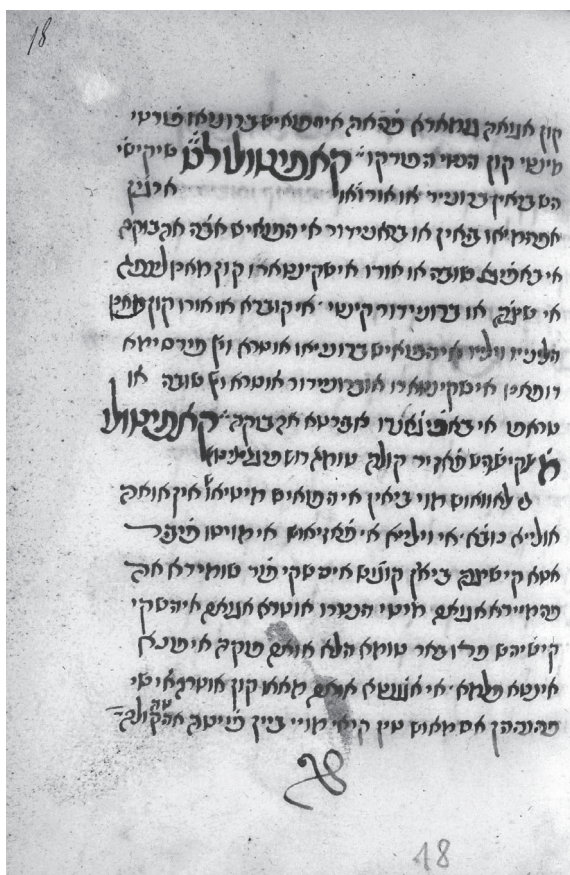


Fig. 6: Sign at the end of chapter 40 (Matos, 2011).

Regarding the specific sources compiled in LCFC, little progress has been made, although some affinities have been pointed out. Cruz (2010) searched

for similarities for it in the *Mappae Clavicula*, a work referred in Portuguese medieval libraries, which is a source of many other manuscripts, but he found no connection. Yet he detected some similarities between LCFC and Jehan Le Begue treatise's *Experimenta de Coloribus* (1431), the *H490 Montpellier Manuscript* (1460-1480) and, to a lesser degree, the *Bolognese Manuscript* (first half of the fifteenth century). These similarities are manifested through the procedures' details on how to make some pigments, namely mosaic gold and silver blue, and through the names attributed to certain pigments or pigments' raw materials. The recipes in question from the manuscript of Le Begue are part of a set of recipes collected by him in Italy, especially from a manuscript which, in turn, reproduced recipes of another manuscript of Fra. Dionysius of Milan. The second source is a miscellany, which particularly collects documents of medical and botanical nature, probably compiled by Juan de Celaya, master or bachelor of arts, of Salamanca. The last work, also known as *Segreti per Colori*, is a well-organised compilation of recipes, in Italian and Latin, which gives an account of common practices in Bologna. The contact points detected do not reflect the direct use of these works by LCFC, but only the existence of common sources, not identified, which eventually may be relatively remote (Cruz, 2010).

With a similar methodology, Villela-Petit (2011) found some lexical similarities between the pictorial conventions for the representation of clothing and fabric expressed in LCFC and the same conventions expressed in *De Coloribus et Mixtionibus*, a text dated from the twelfth century, but often copied up to the fourteenth century. However, there are also significant differences between the two texts.

With another methodology, that of comparing the general characteristics of LCFC with the general characteristics of the works forming the corpus of the medieval technical texts, Mark Clarke (2010) concluded that LCFC is a characteristic work of the fourteenth or fifteenth century because it is a systematic vernacular composition and not merely a compilation or translation of old material, but rather a new, locally composed, coherent, usable treatise, comprising in part some re-worked pre-existing material and in part newly composed material. Moreover, he considered that the manuscript may reflect fifteenth century practices, although it might also reflect somewhat earlier practices, and that it may have belonged to a Jewish illuminator (Clarke, 2010). Also for Villela-Petit (2011), the vernacular language is an important argument to put LCFC in the context of the European literature of the fourteenth and fifteenth centuries.

This conclusion agrees with the contextualisation of LCFC in the Portuguese history which led Cruz and Afonso (2008) to consider that a technical text on colours for illumination would have been useful in Portugal during the second half of the fifteenth century, coinciding with a large production of Hebrew manuscripts but not before, particularly in the thirteenth century.

Historical accurate reconstructions

Recently, there has been a strong interest in testing recipes from ancient texts through historical accurate reconstructions. In some cases, the obtained materials, besides being chemical and physical characterised, have been compared with those found in some contemporary works of recipes.

The recipe for vermillion recorded in LCFC is one of the tested recipes, which was done by Catarina Miguel and collaborators. From a theoretical point of view, the instructions stated in LCFC for the synthesis of that pigment from cinnabar and sulphur appeared to be one of the best found in a medieval text, although some important details are missing from the recipe. In practice, as a result of the complex mechanism involved in the synthesis, some of the experiments were carried out without success, but other experiments allowed to obtain vermillion that matched the reds employed in medieval manuscripts of Lorrvão – an important Romanesque monastery centre of manuscript production and illumination in Portugal (Melo & Miguel, 2011, in press; Miguel *et al.* 2011, 2012).

In another successful experiment, a dark saturated green colour with a glassy appearance observed in the same manuscripts of Lorrvão, a colour identified as bottle-green, was obtained from copper and vinegar, following instructions contained in LCFC (Miguel *et al.*, 2009). The preparation of red lead from lead white, as is described in LCFC, also provided a paint that likewise matched some colours of the Lorrvão manuscripts (Miranda *et al.*, 2010). Some of the materials obtained in these successful experiments were precisely used as reference materials in a detailed analytical study of Lorrvão manuscripts (Claro, 2009).

However, in other cases, the desired materials were not obtained or the materials have failed to reproduce the features observed in Portuguese medieval manuscripts, namely its colours. This happened, for example, with the “fine carmine” mentioned in chapters 13 and 14 of LCFC (Miranda *et al.*, 2010). The recipe for another lac, the brazilwood, presented in chapter 9 was also reproduced (Miguel *et al.*, 2009), but there seems to be no details available about the success of these experiments.

Regarding the other colours mentioned in LCFC, the work seems to be in progress and some preliminary remarks about the recipes or the processes that will likely be involved in the recipes were already presented (Miguel *et al.*, 2009).

Conclusion

If before the Córdoba symposium LCFC was generally considered a thirteenth century work or, at least, such date was plausible, the studies published meanwhile clearly suggest that this is a fifteenth century text, compiled from

a variety of sources, some considerably older. As Clarke (2010) points out, if this manuscript is not the original compilation, it is a fifteenth century copy of a slightly earlier original. Be that as it may, LCFC is a valuable source for the knowledge of the medieval painting in the Iberian Peninsula, and it should be particularly considered in the light of Hebrew manuscript illumination in Portugal.

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