

Medieval Music through the Technology Looking-Glass

Carmen Julia Gutiérrez (Universidad Complutense de Madrid)

The research group *El Canto llano en la época de la polifonía* (CLEP), based at the Universidad Complutense de Madrid, presently coordinates most of the research into medieval music carried out in Spain. One of its most important contributions is to the broadening of the perspectives for studying and recovering medieval polyphonic music using digital reproductions of sources and virtual restoration techniques carried out in collaboration with the DIAMM (Digital Image Archive of Medieval Music).

The digitalisation process is a genuine tool for academic observation and research, as images in ultra high resolution allow scholars to carry out studies difficult to be performed on the original document, such as the micro-measuring of items (letters, staves, quills), the detailed comparison of sources (ink colours and parchments) held in far-apart archives, the reconstruction of sources and the reading of palimpsests through their virtual restoration. The reference to Lewis Carroll's tale *Through the Looking-Glass, and What Alice Found There* in the title is a clear allusion to the fact that technology is a key which opens the door to another world.

The project employs very sophisticated technical equipment allowing photographs of up to 350 MB to be taken.ⁱ The image capturing criteria employed by DIAMM is used, with the addition of other, more specific criteria in order to obtain as much information as possible from the images. These criteria include always taking the photographs in the same light conditions, indicating measurements and colours with scales and capturing photos in ultra high resolution (500 dpi) without any kind of file compressing or postproduction. Details from the context of the source are also captured, photographing the whole codex, including the binding and flyleaves, codicological forms, folds and glued areas. Moreover, where necessary, some virtual restoration is carried out, which is providing spectacular results.

This text discusses one of the results of this project: the study of a small fragmentary source from which a large amount of information was obtained through the use of this technology. Some of this information is summarised, briefly, below:

- an unknown fragment in historiography has been located
- the original source of the aforementioned fragment has been reconstructed
- a very unique poetic piece from the Hispanic Rite has been identified in it
- as a result of the comparative study of this piece, some melodies from Mozarabic chant restored during the sixteenth century have been demonstrated to come from Hispanic melodies of the tenth century.

ⁱ Technical information about this project can be found in (Gutiérrez, Catalunya 2010).

The Mundó 17 fragment

The first phase of digitalising Spanish medieval sources included work in the private collection of the Catalan medievalist Manuel Mundó, the author of over 200 publications including historical-literary studies, textual criticism, palaeography and codicology. There, Dr. Mundó showed us a fragment that is completely unknown and unpublished in music historiography, which he considered of interest to our study, (Archivo Mundó, frag. 17, today at The Montserrat Library). It consists of two small pieces of parchment purchased from an antique dealer at the Rastro de Madrid (Madrid Flea Market) in 1967, and pertaining to a fourteenth-century musical codex. The larger of the two, fragment *a*, measures approximately 151 x 55 mm, while fragment *b* measures approximately 98 x 27 mm.



Figure 1. Mundó 17

Despite its limited visible surface, Mundó 17 is interesting for the information it provides regarding the use of mensural music in the Iberian Peninsula and because it adds to the short list of fourteenth-century music sources from the former Kingdom of Castile. Moreover, it contains an unknown concordance for a type of piece that has been very rarely studied: the Hispanic *preces*. This fragment was recently presented at the 2011 Med & Ren Conference (Gutiérrez, Catalunya 2011).

Using the extremely high quality photographs carried out with the DIAMM team and computer manipulation, a series of codicological observations have been made (as a result of David Catalunya's work) that would have been impossible only working with the original:

- The analysis of the colour of the inks, using the colour spectrum, has established that it is copied in two different inks, although they are very similar in their composition.
- The micro-measuring of letters, staves, quills and brushes demonstrates

that two copyists used two different types of writing instruments and that the folio was not prepared homogeneously or carefully.

- The calculation of the folio's measurements has allowed it to be hypothetically reconstructed. This, in turn, has allowed one of the pieces it contains to be reconstructed.
- The restoration of the palimpsest has demonstrated that the fragment comes from a book containing liturgical chant, possibly from one of the folios left blank at the end.
- The analysis of the transfer of inks on the fragment has allowed part of the manuscript's history to be reconstructed, revealing that there were at least three levels of transfer: one, probably while the fragment was still in the original book, the other two, at two different points in time after its separation from the book.

An analysis of all of these details led to the hypothesis that this fragment possibly formed part of the end of a liturgical codex (or less likely, a booklet) containing monodic repertory. It might have been a folio that was left blank (perhaps with a few others) and a later copyist used to copy pieces of mensural music. Subsequently, when a third copyist set out to copy other pieces, he didn't have enough free space, and therefore decided to erase original material. The fur side would be the last *recto* the copyist of the original codex used; the flesh side the first *verso* of a few remaining folios that were left blank.

After the codicological study and the partial reconstruction of one of the pieces, the fragment's content was then studied. The piece transmitted on the flesh side is very similar to one of the examples from E-Bc Misc23/4, f. 2v, a treatise dating from the mid-fourteenth century explaining the Petronian system and which was the only known example of this kind of notation in Spain until now. The part on the fur side turned out to be much more productive and interesting. Despite the few legible syllables of the text, I have identified a Hispanic *preces*: *Miserere Iesu bone*. "Preces" ("supplications", from *precor-precare*) are poetic chants of a penitential nature that seek divine forgiveness and mercy. There are *preces* in the Mass, the Office for the Dead and the Divine Office. They consist of an introduction sung by a deacon, whose final (which often begins with, or contains, the word *Miserere*) serves as a refrain the whole congregation sings; the deacon sings new verses and the congregation repeats the refrain. *Preces* were always sung, but not always written with music in Hispanic manuscripts, where they are often conserved in a partial and inconsistent manner. Moreover, Hispanic manuscripts contain adiaستمatic notation, making frag.17 from Mundó's archive even more important, and this is the reason why I embarked on the following study of Hispanic *preces*.

Hispanic chant evolved in the Iberian Peninsula since the third century and was established, during the sixth and seventh centuries, by liturgists including Eugenius II of Toledo and Saint Isidore of Seville. After numerous attempts at abolition, throughout the eleventh century (between 1034 in Palencia [Rubio 2011] and the 1080 Council of Burgos) the Franco-Roman rite replaced the Hispanic rite throughout the Peninsula and the latter was only maintained in the city of Toledo, where the Christian "Mozarabs" had conserved it during the Muslim domination by means of the oral tradition and the "reading" of the early adiaستمatic manuscripts. When these manuscripts deteriorated, parish churches copied them again (especially during the thirteenth century) imitating the textual writing and early models of notation

(Mundó 1965, Pinell 1996, 35).

Interest in preserving the early Rite and attempts at restoring it had been constant since its abolition during the eleventh century. This restoration culminated with the printed edition of the Mozarabic Missal and Breviary (Toledo 1500 and 1502, both without music) ordered by Cardinal Cisneros. In 1508, Cisneros had the music from the Mozarabic Mass and the Office for the Dead copied in the so-called *Cantoriales de Cisneros*: four manuscripts whose exact models are unknown, but which have been shown to be based on both medieval sources accessible at the time in the city of Toledo and the oral tradition of chant conserved by the Mozarabs.

The relation between the melodies of the *Cantoriales* and their presumed medieval models is still unclear (and unstudied), although many musicologists have attempted to discover the melodies hidden in the adiastematic sources of the early Hispanic repertory, and various hypotheses have been suggested. For the moment, however, the only ones known with any certainty are the few Hispanic melodies copied in Aquitanian notation in sources of the Franco-Roman Rite (Prado 1928), Carmen Rodríguez Suso's reconstructions (1998) of the antiphons for the consecration of the altar and, perhaps, those which can be located by comparing the *Cantoriales de Cisneros* with their medieval models. These total around 50 manuscripts and fragments (almost half of which have music) whose notation doesn't indicate the pitch of the sounds. And my research has focused on the latter.

Preces texts

According to Meyer (1914) and Randel (1973), the *preces Miserere lesu bone* appears in:

- E-SI 7, f. 108, tenth century, without music.
- E-Tc 33.3, f. 45v, twelfth century (Mundó 1965), probably a copy of another incomplete manuscript from the tenth or eleventh century, with a melody in neumatic notation.
- Cisneros's Breviary, printed in Toledo in 1502, without music.

My study of the Mundó 17 fragment commenced with a linguistic comparison of the four extant textual versions. The piece consists of various verses and a three-line refrain, which is repeated after each verse. The version given in the 1502 Breviary is the most elaborate and complete of the four. The Breviary, which was prepared by the canon Ortiz, was modelled on certain medieval manuscripts, but he also made some of his own arrangements of the texts. Of course, he is also likely to have used manuscripts that are lost today. The 1502 Breviary seems to have been based on a model similar to E-Tc 33.3 because the order of its verses is very similar and both have important concordances, although the Breviary has two verses that are not found in E-Tc 33.3 and could originate from another lost model. The manuscript from Santo Domingo de Silos (E-SI 7) has more variants with respect to the Breviary than E-Tc 33.3 and a very different verse order. The Mundó 17 version, for its part, is very fragmented and its verses do not correspond with those of the other three sources.

The analysis of the text also reveals how the verses of *preces*, especially the ends of the verses, are interchangeable. This would explain why the verses of Mundó 17 do not correspond with the other versions: *preces* are composed as

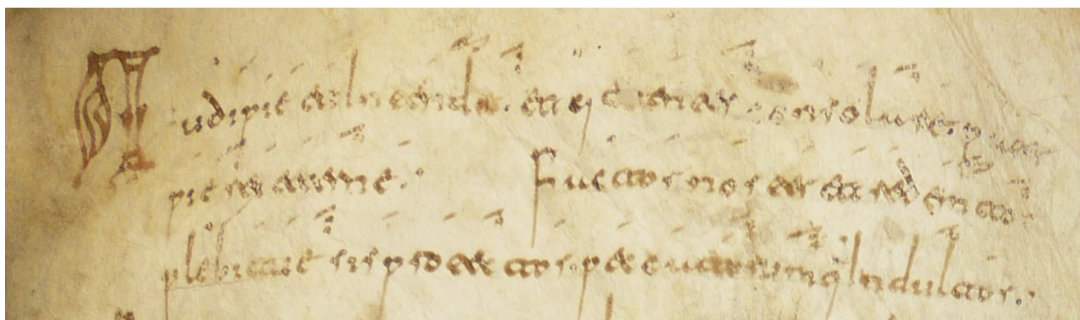
combinations of verses (and even words) and the fragments from Mundó 17 are too short to identify any coincidences with a line from the other sources.

Silos 7 (10th-c)	To 33.3 (12th-c)	Mundó 17 (14th-c)	Breviario de Cisneros (1502)
Miserere miserere Miserere Iesu bone P. Peccatis nostris finem pone. Miserere.	[Miserere]*	Miserere Ihesu [...] [... ..] pone. Miserere [...] doctor <i>Christe</i> [...] isti pecca[...]	Miserere miserere Miserere Iesu bone. P. [P]eccatis nostris finem pone. Miserere.
2. Audi Christe et intende Et gementes consolare Pater pie rex aeternae. Miserere	1. Audi pie et intende Et gementes consolare Pater pie rex aeternae.	1. <i>Ihesu clementis</i> in[...] [... ..] [... ..]	1. Audi pie et intende Et gementes consolare, Pater pie rex aeternae.
3. Factor noster et redemptor Plebi tuae sis protector Peccatorumque indultor. Miserere	2. Factor noster et redemptor, Plebis tuae sis protector Peccatorumque indultor.	2. [... ..] [... ad <i>go sis an</i> [...] [... ..]	2. Auctor noster et redemptor, Plebis tuae sis protector Peccatorumque indultor.
1. Prostrati omnes rogamus; Ut ignoscas supplicamus; ut dimittas exoratus. Miserere	3. Prostrati omnes roguemus; ut ignoscas supplicamus; ut dimittas exoratus. Miserere	3. [... ..] [... gloria [...]. [... ..]	3. Prostrati omnes rogamus; ut ignoscas supplicamus; ut dimittas exoramus.
4. Tu pro nobis formam serbi Adsumere voluisti Iam memento serbis tuis. Miserere	4. Qui pro nobis formam servi Induere voluisti Obes tuas tu custodi. Miserere		4. Qui pro nobis formam servi Induere voluisti Poenitentes iam exaudi.
6. Qui latronem confitentem Paradiso collocasti Et alium condemnasti. Miserere			5. Qui latronem confitentem Paradiso collocasti Et alium condemnasti.
7. Crucis tue nos protege Quos per eam redemisti, Dextera tua nos custodi. Miserere	6. [...] tua iam p[...] [... ..] redemisti, [...] Miserere		6. Qui pro nobis sustulisti Passionem quoque crucis, iam memento servis tuis.
5. Qui Lazarum quadriduannum De sepulcro suscitasti, gloriam tuam manifestasti. Miserere	5. Qui Lazarum iam potentem De sepulcro suscitasti, poenitentes iam exaudi. Miserere		7. Cruce tua iam protege Quos per eam redemisti, Dextera tua iam custodi.
8. Peregrinis seu genis Viduit atque pupilis Protector pius esto illis. Miserere			8. Qui Lazarum iam putentem De sepulcro suscitasti, Oves tuas tu custodi.
9. Defunctis requiem dona Paradisique concede In aeterna amenitate. Miserere			9. Rex aeternae Iesu bone, a macula nos absolve Et in bonis nos confirma.
			10. Peregrinis seu egenis Viduis atque pupilis Protector pius esto illis.
			11. Defunctis requiem dona Et paradiso colloca Iunctos sanctorum catervae.

Figure 2. Comparison of the extant textual versions of *Miserere Iesu bone*

Preces melodies

I also carried out a reconstruction of the melody from Mundó 17 and compared it to the only version containing music, E-Tc 33.3. Although there don't seem to be any clear similarities between the versions, there is a coincidence in the ornaments on the final positions of the verses. That is to say, two pieces in sources two centuries apart don't completely coincide in either their texts or melodies. It should be remembered that the transmission of the Mozarabic repertory was basically oral, and that little is known about the written models of transmission until the *Cantoriales*, in which, as Prado pointed out (1928, 108-113), there are few melodies coinciding with medieval sources.



Sílabas: 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10

Figure 3. *Miserere lesu bone* in E-Tc 33.3 and reconstruction of his melody from Mundó 17

Thus we have a series of *preces* from Hispanic sources whose melody is illegible, the *preces Miserere lesu bone* in Mundó 17 from the fourteenth century and the *preces* from the *Cantorales* of the sixteenth century. The next step was to attempt to discover whether there was a relation between Mundó 17, and sources preceding and succeeding it: the comparison of *Miserere lesu bone* (which is not in the *Cantorales*) with the 16 *preces* present in the *Cantorales* revealed a surprising similarity in their style, form, melody and notation.

Figure 4. *Preces* in Mundó 17 and *preces* in *Cantoral I de Cisneros*

The *preces* in the *Cantoriales* of the sixteenth century and their medieval models

For this reason, I went a step further, comparing the *preces* from the *Cantoriales* with the medieval *preces*, in order to establish whether their melodies corresponded and if Mundó 17 could be an example of an intermediate stage of transmission between the Hispanic sources and those Cisneros restored. These are the results of this comparison:

The four medieval *preces* with music from the Office for the Dead are conserved in three manuscripts from La Rioja dating from sometime between the end of the tenth century and 1059; two of them (*Deus miserere* and *Miserere, miserere*) are also present in F-Pn 776, in Aquitanian notation, and the melody of one of them is also conserved in *Cantoral IV de Cisneros*, allowing two versions from the eleventh century to be compared with one from the sixteenth.

	La Rioja 10th-c	La Rioja 11th-c	South of France 11th-c	Toledo 16th-c
Indulgentia dicamus omnes domine	E-Mah Aemil 56, 27 ^{v*}	E-SI 3, 17 ^{v*} E-SI 4, 89 ^r		
Deus miserere miserere illi deus et parce	E-Mah Aemil 56, 28 ^r	E-SI 4, 90 ^v		
Deus miserere, deus miserere miserere o Ihesu bone	E-Mah Aemil 56, 27 ^r	E-SI 3, 19 ^{r*} E-SI 4, 88 ^v	F-Pn 776, 138 ^r	
Miserere, miserere, miserere illi deus christe redemptor		E-SI 3, 18 ^{r*} E-SI 4, 90 ^r	F-Pn 776, 139 ^r	E-Tc Cantoral IV, 7 ^r y 26 ^v
Miserere mei deus				E-Tc Cantoral IV, 4 ^r
Miserere, miserere, deus miserere veniam				E-Tc Cantoral IV, 10 ^v y 27 ^r
Miserere, miserere, miserere. Illi deus malis				E-Tc Cantoral IV, 13 ^r y 27 ^v
Deus miserere, deus miserere heu me				E-Tc Cantoral IV, 24 ^r
Deus miserere, deus miserere in peccatis eius				E-Tc Cantoral IV, 24 ^v
Miserere, miserere illi deus				E-Tc Cantoral IV, 26 ^r

Figure 5. *Preces* from the Office for the Deadⁱⁱ

Prado (1928, 74-75) transcribed the melody from Pn 776 with a final on *mi*, and went as far as to say that "it would be unacceptable read in another clef" and that, therefore, the melody from the *Cantoral* is different from both the Hispanic and Aquitanian sources (which are identical). However, if the Aquitanian version is transcribed with a final on *re* (and B flat), the differences with the *Cantoral* are reduced to a minimum: it is the same melody that has been subjected to a process of ornamentation.

ⁱⁱ Pieces marked with an asterisk (*) have no music, while those with a cross (+) only have an incipit.



Figure 6. The three versions of *Miserere*, *miserere* and the beginning of Prado's transcription

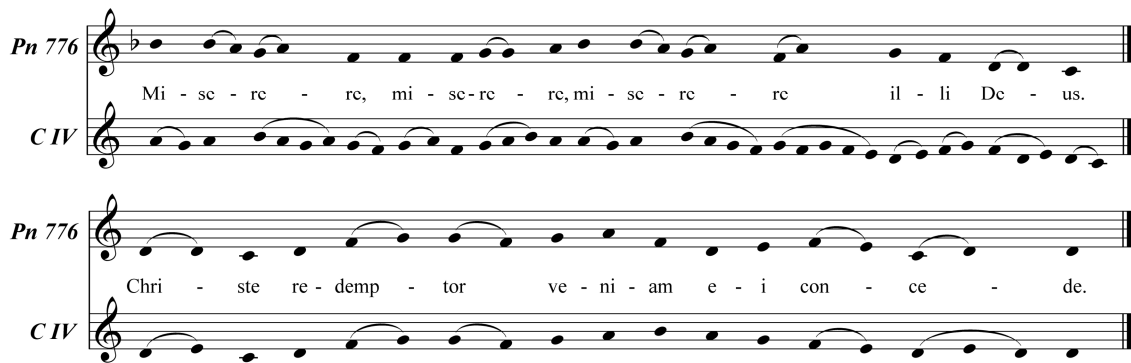


Figure 7. *Preces Miserere, Miserere*: versions from F-Pn 776 and *Cantoral IV de Cisneros*

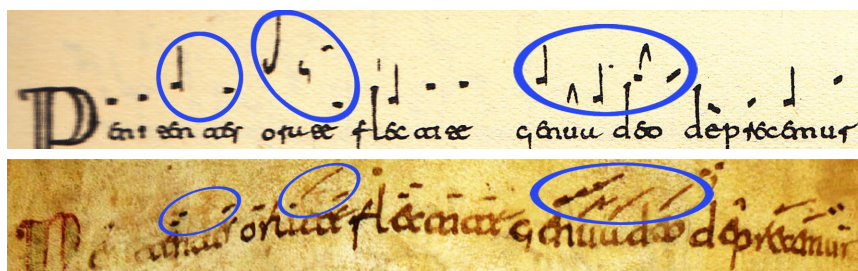
Lent *preces*, the largest group, are basically conserved in Toledo 35.5, a manuscript on which the *Cantorales de Cisneros* were based (or on another very similar manuscript). Various *preces* are also found in books of the Roman Rite and Aquitanian notation, as well as the *Cantorales*.

	León s. X	Sur Francia	La Rioja /Silos s. X-XII	Toledo s. XII-XIII	Toledo s. XVI/ otros
Averte domine iram tuam a nobis				E-Tc 35.5 5 ^v ; 75 ^v ; 99 ^{r+}	
Deus miserere, deus miserere miserere, deus deus miserere, Christi			E-SI 7 108 ^{r*}	E-Tc 33.3, 48 ^r	
Dicamus omnes domine exaudi	E-La 8, 165 ^r , 165 ^v , 166 ^{r*}		GB-Lbm 30845, 154 ^{r+} , 158 ^{r+} GB-Lbl 30846, 138 ^{r*} E-Mah Aemil 45, 54 ^r	E-Tc 35.5, 140 ^r , 141 ^r , 142 ^r , 142 ^v	
Domine miserere mei et libera me			E-SI 7, 109 ^{r*} , 112 ^{r*}	E-Tc 35.5, 149 ^r	
Domine misericordiarum obliviscere	E-La 8, 116 ^{v*}		GB-Lbl 30846, 146 ^{v*}	E-Tc 35.5, 16 ^r , 87 ^v , 38, 61 ^v	
Indulgentiam postulamos					E-Tc Cantoral I, 30 ^r
Insidiati sunt mihi				E-Tc 35.5, 94 ^r	E-Tc Cantoral I, 56 ^r
Miserere et parce clementissime			GB-Lbm 30845, 154 ^{r+}	E-Tc 35.5, 22 ^r	E-Tc Cantoral I, 38 ^r
Miserere miserator et esto placatus			E-SI 7, 110 ^{r*}	E-Tc 33.3, 46 ^r	
Miserere miserere domine.				E-Tc 33.3, 46 ^r	E-Hp S-48, 82 ^r
Miserere miserere miserere Iesu bone			E-SI 7, 108 ^{r*}	E-Tc 33.3, 45 ^r	E-BMundó 17
Miserere miserere miserere nobis deus ne nos iudices.			E-SI 7, 109 ^v		
Non est alius nisi tu deus			E-Mah Aemil 30, 161 ^r , 159 ^v		
Poenitentes orate, flectite genua... ut indulgentiam					E-Tc Cantoral I, 87 ^r
Poenitentes orate, flectite genua... ut remissionem	E-La 8, 170 ^r			E-Tc 35.5, 5 ^r	E-Tc Cantoral I, 35 ^r
Pro solemnitate paschali flectamus				E-Tc 35.5, 164 ^r	
Pro solemnitate paschali precemur	E-La 8, 174 ^v		E-SI 4, 161 ^v		
Rogamus te rex saeculorum		F-Pn 776, 87 ^r	GB-Lbm 30845, 156 ^{r+} E-Mah Aemil 45, 60 ^r E-Mah Aemil 51, 149 ^r	E-Tc 35.5, 45 ^r	E-Tc Cantoral I, 45 ^v E-Z 41-117, 64 ^v E-Hp S-48, 85 ^r E-Dah, frag. n° 154
Te precamur Domine indulgentia	E-La 8, 169 ^r			E-Tc 35.5, 158 ^r	E-Tc Cantoral I, 89 ^v , 91 ^r
Tu pastor bone	E-La 8, 162 ^{v+} *			E-Tc 35.5, 157 ^r	E-Tc Cantoral I, 89 ^r , 90 ^v , 92 ^r
Vide Domine humilitatem meam		F-Pn 13426 ^{r*} F-Pn 903, F-Pn 776, 84 ^r GB-Lbl Harley 4951	E-Mah Aemil 45, 54 ^r	E-Tc 35.5, 69 ^v	E-Tc Cantoral I, 50 ^v E-Hp S-48, 78 ^r

Figure 8. Lent *preces*

The comparison of their melodies has allowed various questions to be answered:

- Do Hispanic sources transmit the same melodies for *preces* or are there other versions in the different Hispanic traditions?ⁱⁱⁱ In the four cases of concordance the similarity between León (tradition A) and Toledo 35.5 (tradition B) can be seen. Hence, in principle and with respect to *preces*, Hispanic sources transmit the same melodies.

Figure 9. Preces *Penitentes*: similarity between Hispanic versions from E-La 8 and E-Tc 35.5

- Do Hispanic and Aquitanian sources also transmit the same melody? In this case the answer is more complex. In the three cases in which there is a concordance, very clear similarities can be seen, especially in *Vide*

ⁱⁱⁱ For close to half a century (Pinell 1965) the sources of Hispanic chant have been considered to pertain to two traditions (A and B) with different text orders and possibly different melodies.

Domine. In other cases, there are some differences in the Aquitanian version with respect to the Hispanic version.

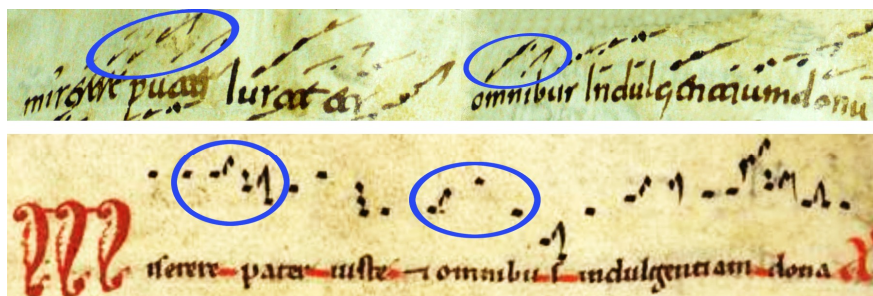


Figure 10. Preces *Vide Domine*: similarity between versions from E-Tc 35.5 and E-Mah Aemil 45

- c. Is there a melodic relation between Hispanic sources and the *Cantoriales*? Occasionally, the melodies from the sixteenth century are syllabic, while the Hispanic melodies are neumatic or melismatic. In other cases there is a very clear formal relation between the Hispanic melodies and those from the *Cantoriales*, which suggests the same melodic contour, modified over the centuries.

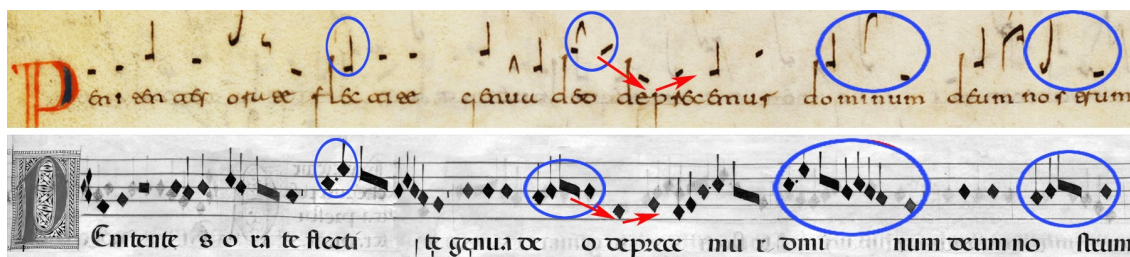


Figure 11. Preces *Penitentes*: melodic similarity between E-La 8 and E-Tc Cantoral I

Despite its small size and the circumstances that have led it to have gone unnoticed until now, Mundó 17 is a good example of a fragment from a manuscript that, at some point in time, began to be used to add pieces on blank pages or the space obtained by eliminating parts that were no longer necessary. The pieces copied were those without a clearly defined place in the liturgical books and they were usually written on fascicles or loose sheets (such as *preces*). Consequently, they have not come down to us today and, for the most part, are largely unknown. Thus, apart from being the only known example of the practical use of Petronian notation in the Iberian Peninsula, Mundó 17 is the only known case of *preces* in an intermediate stage between the Hispanic sources and the restored Rite of the sixteenth century, capable of providing us with an idea of the nature of the missing models that were used to put together Cisneros's recompilation during the sixteenth century.

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