

A Revaluation of Interior Acoustics in the Iberian Peninsula during the First Half of the Sixteenth Century¹

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RESUM / RESUMEN / ABSTRACT

La impressió a Roma del tractat *De Architectura* de Vitruvi en 1486 i la revaloració de la cultura clàssica potencien a Itàlia una creixent preocupació pels espais en relació amb el so. L'objectiu de la present investigació és comprovar si aquestes inclinacions per l'acústica també es mostren a la península ibèrica en una època propera a aquesta edició i de quina manera s'expressa. Per dur endavant aquest propòsit es realitza un estudi de fonts hispanes de la primera meitat del segle XVI relacionades amb diversos centres catedralicis. Els documents revelen una cura minuciosa en els punts d'emissió musical, buscant l'equilibri i l'aprofitament de la topografia del temple per aconseguir uns resultats basats en el coneixement empíric.

La impresión en Roma del tratado *De Arhitectura* de Vitruvio en 1486 y la revalorización de la cultura clásica potencian en Italia una creciente preocupación por los espacios en relación con el sonido. El objetivo de la presente investigación es comprobar si estas inclinaciones por la acústica también se muestran en la península ibérica en una época cercana a esta edición y de qué forma se expresa. Para ello se realiza un estudio de fuentes hispanas de la primera mitad del siglo XVI relacionadas con diversos centros catedralicios. Los documentos revelan un cuidado minucioso en los puntos de emisión musical, buscando el equilibrio y el aprovechamiento de la topografía del templo para conseguir unos resultados basados en el conocimiento empírico.

The 1486 Roman edition of Vitruvio's treatise *De Architectura* and the development of Classical culture generated an increasing interest in space and its relation to sound in Italy. The aim of this article is to investigate whether this acoustics awareness is evident on the Iberian Peninsula around the time of the printing of this treatise and how such awareness is expressed. As part of this inquiry, a study of various early sixteenth-century Spanish sources related to several cathedrals is made. The documents reveal meticulous attention to the points of musical production, indicating a concern for balance and use of the topography within sacred spaces, in order to achieve results based upon empirical knowledge.

PARAULES CLAU / PALABRAS CLAVE / KEY WORDS

Musicología urbana; arquitectura; acústica; música; espacio; ornamentos textiles
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Urban musicology; architecture; acoustics; music; space; textile ornaments

RECEPCIÓ / RECEPCIÓN / RECEIVED: agost 2016 / agosto 2016 / August 2016

ACCEPTACIÓ / ACEPTACIÓN / ACCEPTANCE: octubre 2016 / octubre 2016 / October 2016

¹ This article is a review of the introduction to the fourth chapter of Esteve, 2016: 155-236. With thanks to Javier Goldáraz for reading and advising on the draft of this text.

Interest in the study of sound in interior spaces was reinstigated in the Renaissance of Classical Greco-Roman culture during the *Quattrocento* and *Cinquecento*. The widely disseminated treatise, *De Architectura* by Marcus Vitruvius Pollio, reflects the importance of a building's internal structure in the distribution of sound during the sixteenth century.² The treatise was first printed in Rome in 1486, and was translated into Italian by Cesare Cesarino in 1521.³ In the sixteenth century, several experts wrote essays on the architectural structures suited to the best sonic results, taking into account both musical and spoken sound. Francesco Zorzi, in his celebrated article of 1535 concerning the design of San Francesco della Vigna (Venice), concluded that a vaulted ceiling was best suited to musical performance. However, from the beginning of the seventeenth century, and with more elaborate polyphony being heard more frequently in church, the Venetian architect Vincenzo Scamozzi (1548-1616) condemned the resonance of voices and instruments produced in the majority of buildings of the time (Howard, 2009: 6-7).

The aim of this article is to ascertain when—and how—the Italian interest in sonic (particularly musical) quality and its spatial dissemination was considered on an equally high level on the Iberian Peninsula during the sixteenth century. For this purpose, I have consulted significant Spanish sources from various geographical locations but have focussed on proceedings in Toledo Cathedral given the influence it held over Castile and other areas throughout the Peninsula because of its primacy over the other dioceses.⁴

The first Castilian edition based on Vitruvius's text was entitled *Medidas del romano*, and was written by Diego de Sagredo in 1526 (Sagredo, 1526). The work was printed in Toledo, where the author was based and where, from 1523, he had worked on several occasions for the Cathedral and Archiepiscopal Palace. The dedication was addressed to Sagredo's patron, Archbishop Alonso de Fonseca, whose humanist leanings and interest in art were reflected in the edition of the text (González, 1999: 110-111; Llamazares, 2004: 297).⁵ The treatise became established as the first original architectural study in Europe written in the vernacular (Figure 1). It was so successful that it was printed in Castilian at least four times before 1550,⁶ translated into French eleven years after its first appearance and reprinted several times in Paris.⁷

² Written around the year 20 AD, this work considers the use of cornices in reflecting sound back down into a room, and also discusses the type of ceiling most conducive to clearly articulated speech according to the distance of the speaker (Howard, 2009: 6-7).

³ *Lucii Vitruvii Pollionis de Architectura libri decem*, Roma, Heroldt, 1486; *Di Lucio Vitruvio Pollione de Architectura libri decem traducti dal latino in vulgare affigurati. Comentatti et commirando ordini Insignati*, Como, Gotardus de Ponte, 1521 (Riello, 2008: 30).

⁴ Its influence was also felt in the Kingdom of Aragon at this time for example, in the adaptation of liturgical books in cathedrals and other ecclesiastic centres, such as the monastery at Uclés in the fifteenth century (E-Mn, ms. 8902, Janini, 1969: 100, n° 78), with references to singing 'in the Toledan way' ('a la toledana') in Valencia under the rule of bishop Feliciano de Figueroa (1599-1609), and also in the adoption of melodies from Castilian liturgical books printed in Zaragoza in 1596 (Calahorra, 1996a: 89; 1996b: 104; Carrero, 2014: 242).

⁵ «por la mucha inclinación que vuestra señoría [Alonso de Fonseca] tiene a los edificios, y lo que en ellos ha hecho en Santiago y hace en Salamanca y se espera que hará en esta su diócesis de Toledo» (Sagredo, 1526, s.f.; López, 1905: 42). The humanist leanings of Alonso de Fonseca have been documented in several publications (Bataillon, 1998:239; González, 1980: 63, 94; Llamazares, 2004: 297).

⁶ Toledo, 1526, 1549 y 1564; Lisboa, 1541, 1542 (Wilkinson, 2010: 665).

⁷ Paris, 1537, 1539, 1542, 1550, 1555 and 1608 (Losada, 2007: 67).

Yet the undeniable success of Sagredo's translation did not diminish interest in the Roman original. Lázaro de Velasco translated the whole of Vitruvius's treatise into Castilian between 1544 and 1546, but it was not printed until Miguel de Urrea's 1585 version, which was dedicated to Philip II (Valencia, 2010: xvii). Through the number of surviving copies and the dissemination of its commentaries and translations, there is no doubt that this work helped spread an interest in Classical architecture and its attention to the propagation of sound in Spain.⁸

The first practical example of this revaluation of acoustic interest in Iberian architecture can be found in one of the most characteristic features of Spanish churches: the position of the choir within the nave, separated from the main chapel in the chancel by the crossing. The earliest pioneering examples of this construction were begun in the thirteenth century in Santiago de Compostela and Toledo Cathedrals (Franco, 2010: 226) and these served as models for similarly large Gothic structures in Tarragona, Lugo, Barcelona, Tortosa and Valencia (Carrero, 2009: 160-168). The same arrangement was used for the reorganisation of Granada Cathedral after the city's capitulation in 1492⁹. Before construction started in September 1509, Íñigo López de Mendoza, Marquis of Mondéjar and Count of Tendilla, sent a letter to King Ferdinand concerning Enrique Egas's project, mentioning his concern for the building's acoustics:

What is certain is that with the altar being 120 feet behind the grille of the choir, and even further from where the lectern is, it is a great distance to hear someone with a good voice, and even more so for someone without; and this can be corrected without much cost, that is by squareing off the heads of the naves, where they now say the main altar must be in the nave, at that point, and in this way the chapels (which are now octagonal) are behind the choir, and the main altar is as they have at Seville, which is in the middle of [the building], and of the choir, only the crossing remains¹⁰

This passage shows a particularly high level of interest in aural perception. López de Mendoza was considering the complete remodelling of the cathedral's ambulatory and side chapels with the aim of improving the acoustic inside the building. This aspect that was not taken into account in Segorbe Cathedral in the thirteenth century, when the choir was moved from both sides of the chancel to the foot of the nave in order to prevent the altar from being accessed by laypeople, and at the same time to make it more visible. Visibility and organisation were given as the reasoning behind this structure, and yet the result was the isolation of both spaces, such that they had to put seats in front of the main altar during the sermon in order for the clergy to hear, since it was inaudible from the choir (Carrero, 2014: 250-251). This alteration would not have been allowed according to the precepts of Vitruvius and López de Mendoza.

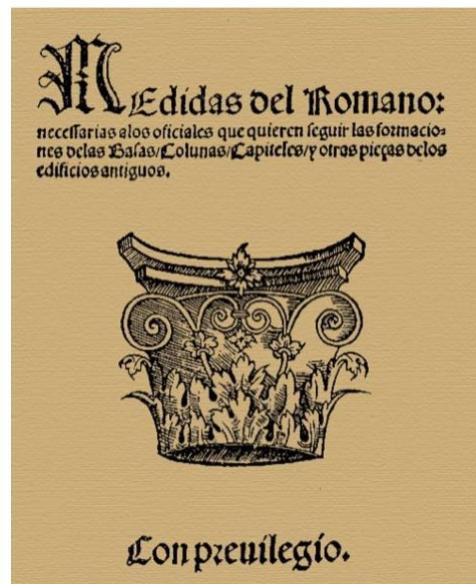


Figure 1. Sagredo. *Medidas del Romano*, 1526. Toledo.

⁸ There are 19 surviving volumes from the fifteenth and sixteenth century, kept in the Biblioteca Nacional (E-Mn): in print: 1490 (INC/2073(1)), 1513 (R/2370), 1522 (ER/2684), 1523 (ER/2681), 1524 (ER/2533), 1536 (ER/2556), 1550 (ER/2676), 1552 (ER/2589), 1556 (ER/2494), 1567 (ER/2567 y R/14792), 1572 (R/1267), 1582 (ER/2548 and R/25087), 1584 (BA/4110 and ER/2581); manuscripts: c.15 (MSS.MICRO/6853) and c.16 (Castilian translation, MSS.MICRO/18500, MSS.MICRO/13485).

⁹ Building works began in 1523; six years later, Diego Silóe took over with a more ambitious plan.

¹⁰ 'Ciertos es, que estando el altar mayor de la rexa del coro cxx pies, y más desde donde a destar el facistor, que es mucha distancia para oír [a] qyen tuviere buena boz, quanto más a quien no la tuviere tal; y en esto puede aver buena enmyenda no con mucha costa, que es haser quadradas todas las cabeças de las naves, donde agora disen que ha de ser el altar mayor en la nave que está cabe ellas y desta manera quedan las capillas que agora son ochavadas por trascoro, y viene el altar mayor de la manera que está el de Sevilla, que en medio del y del coro no queda sino el crucero' (Navascués, 1998: 65).

Increased awareness of sonic perception is also made manifest by a greater concern for the placement of sources and receivers of sound. This was not only seen in new architectural projects, but also resulted in changes to the age-old tradition of seating benefice-holders within the choir. Such seating arrangements were gradually modified in order to obtain a more satisfactory musical result. Significant changes were carried out at 1524 Toledo Cathedral, the main u-like structure of which was closed off under the orders of archbishop Pedro Tenorio, who ruled the archdiocese from 1377 to 1399 (Franco, 2010-2011: 117). The Toledan constitutions of 1356 already recognised the rigorous ordering of seats within the choir (Fernández, 2005: 26-27; Lop, 2003: 191). As in other places of worship, the archiepiscopal throne, located in the centre of the choir, divided its structure into two halves, as in the current ashlar.¹¹ The archbishop's choir was located on his right-hand side, and that of the dean was on his left, and both sides consisted of stalls on two levels. About 1500 the strict hierarchy of cathedral personnel reflected the celestial orders, following doctrine that was developed in the fifth and sixth centuries and became well established throughout the Christian West during the Middle Ages.¹² In the seats nearest the archbishop were the ecclesiastical dignitaries—seven on each side—followed by the canons and, at the far end, the prebendaries; lastly, the eight seats of the singer prebendaries were located in the final section of the upper choir (Reynaud, 1996: 204). In the lower stalls were canons who were not members of the chapter, chaplains, choirboys and «seises» (González, 1999: 180-181; Lop, 2003: 191-192; 2008: 50). All those present in the choir took an active role in the musical parts of the service.

However, this ordering was gradually altered for acoustic reasons. In 1508, at least five singers were recorded in the dean's choir (although there were probably six) in comparison with two in the archbishop's choir, including the chapel master.¹³ The sonic imbalance that resulted from this hierarchical ordering of singers according to ecclesiastic grounds—with more privileges for the archbishop's choir—did not satisfy nearby listeners, who informed the head of the archdiocese. The following year, on 25 February 1509, Cardinal Francisco Jiménez de Cisneros sent a letter to the chapter on this very matter, requesting that the singers be more evenly distributed:

We have been informed that the choir prebendaries of Our Lady's Church of Toledo are all on the dean's side of the choir and that because of this, during the music there is much dissonance in the choir because everybody is on the one side.¹⁴

Following a tense debate between defence of ecclesiastical privileges on the one hand, and the search for a satisfactory musical solution on the other, the singers were gradually divided so as to give a more balanced sound, with four singers placed on each side of the choir. Thirty years later, with the increased search for good voices, Cardinal Juan Pardo Tavera raised the number of singers at Toledo to twelve and requested that they be seated in a balanced way across the choir, illustrating an awareness of empirical variants in sound production and care in their placement.

And for the first chaplaincies that fall vacant care should be taken to appoint up to twelve people with good voices, so that there be six in one choir and six in the other, helping to sing and intone the psalms from the lectern, and in this way Our

¹¹ Dividing the choir into sections according to rank is normal in large institutions with a bishop or archbishop, such as in the cathedrals of León, Lugo and Salamanca (Navascués, 1990: 38; *Encyclopediæ metódica*, 1792: 635, entry 'Lugo'; Martín, 1977: 597, document 469). In Barcelona the choir was divided between the dean's and archdeacon's sides (Carrero, 2014: 21).

¹² Illustrated in *Sobre la jerarquía celestial* and *Sobre la jerarquía eclesiástica*, written by Pseudo Dionisio Aerogapita (Franco, 2010: 226).

¹³ The number of singers increased from six to eight in 1491, the number being reconfirmed in 1508. The two tenors sat in the archbishop's choir (one of them generally acting as chapel master) and the other voices (basses, altos and trebles) in the dean's choir (Reynaud, 1996: 5-7).

¹⁴ E-Tc Actas capitulares, vol. III, f. 132 (cit in Reynaud, 1996: 6, footnote 36), 'Somos ynformados que los racioneros cantores de la nuestra santa Yglesia de Toledo estan todos a la parte del coro del dean e que [en] esta casa ay en la musica en el dicho coro mucha disonancia por estar todos a una parte'.

Lord God will be served, and divine worship augmented.¹⁵

The reason to justify the care in this allocation of singers is to improve worship and increase the musical contribution to the divine office, arguments that strengthen its continuity: according to the Toledan canon Blas Ortiz, this distribution and number lasted until at least 1549.¹⁶

The imitation of Classical models of balance and symmetry—characteristic of the Renaissance era—was not only found in visual art, but was also a requisite part of aural perception, to the extent that sonic satisfaction took precedence over established ecclesiastical privileges. This is the first time on the Iberian Peninsula that documents show the importance of sensory—chiefly aural—experience outweighing and modifying the structural plans of a church, or the traditional seating arrangements within the choir. Sound consequently was a crucial factor to be taken into account in the religious offices, with greater value than in previous centuries.

This fact is not only exemplified through architectural elements, or in the location of singers: decorative fabrics and tapestries, traditionally linked with the visual, were also taken into consideration for their impact on the sonic, and thus reveal clues as to their acoustic function in the sixteenth century. On occasions when rooms were not particularly large, listeners often complained about a ‘dry’ acoustic because of an excess of tapestries and ornaments. Such complaints are found in the second half of the century at the ducal chapel of Braganza (Portugal) and in the Madrid *alcázar* later, where in 1611 it is documented that the excessive use of rugs, fabrics, curtains, cushions, tapestries and velvet coverings deadened the sound of the music too much (Robledo, 2000: 102-103).

However, the acoustics of large spaces in cathedrals were significantly improved with the adornment of cloths and fabrics, which reduced the resonance that would have been characteristic such spaces.¹⁷ In Barcelona Cathedral there is evidence of the use of tapestries for large feast days at the end of the fifteenth century ‘as was the custom’ (*según era costumbre*), and in 1493 there is record of a donation made by Queen Isabel of Castile, for woven, golden fabric to be hung in the chancel (Sinués, 1956: 351). Moreover, Toledo Cathedral was decorated with rugs and an altar cloth from at least the fifteenth century, and the canons put cushions and bench-covers on their seats on major feast days. Fabric donations were also made to this institution by archbishops Alfonso Carrillo de Acuña, Francisco Jiménez de Cisneros and Juan Pardo Tavera, who ruled the archbishopric of Toledo from 1446 to 1545. The Cathedral still houses one of the most extensive collections of ornamental fabrics in Spain, which bear witness to this longstanding tradition (Herrero, 2010: 382-387); another example is found at Zaragoza Cathedral.¹⁸

¹⁵ Constituciones del Sr. D. Juan Tavera, 1539 (E-Tc, Secretaría capitular I, book 9, f. xiiiij), ‘Y en las primeras capellanías que se proueyerense tenga respecto de nonbrar para ellas personas de buenas bozes hasta número de doze, para que seys de vn coro y seys en otro ayuden a cantar y salmear al facistor, pues sera dello Dios N[uest]ro Sen[n]or seruido y el culto diuino aumentado’.

¹⁶ *Subsequuntur deinde octo cantores, qui praeter singulas portiones, quas in ecclesia obtinent [...]. Sunt et alii cantores numero in praesentia duodecim, qui et si non portiones stipendia tamen unusquisque pro meritis percipit.* ‘Following then are eight singers who have an annual salary of a prebend that each holds in the church [...]. Likewise there are other singers who at present number twelve, although they do not hold a prebend; however, each is paid the wage they deserve’ (Ortiz, 1549: cxxxvi; E-Tp 210: 554 *apud* González, 1999: 282). An eighteenth-century translation of this source can be found in E-Tp ms. 210.

¹⁷ Experiments conducted in St Mark’s Basilica in Venice show that tapestries around the chancel acted as absorbers of resonance that, along with the throng of people who attended services on major feast days, improved the acoustic and allowed for much clearer diction (Howard, 2009: 39, 41).

¹⁸ These fabrics can be seen at the Museo de Tapices y Textiles at Toledo Cathedral, and at the Museo de Tapices y Capitular de la Seo in Zaragoza.

At Santiago de Compostela in 1511, archbishop Alonso de Fonseca ordered ‘a good rug’ (*una alfombra buena*) to be placed in the middle of the choir on major feast days, and he also gave the cathedral four tapestries of the Creation, which were placed in the main chapel on solemn feasts.¹⁹ Seven years later, the porter’s duties to put out benches and the ‘required rugs’ (*alfombras necesarias*) in the place where the chapter was to celebrate the Office are documented, as are the costs for the purchase and maintenance of the ‘wall-hangings’ (*paños de pared*) used in the cathedral for important occasions²⁰. Similarly, at Palencia in 1528 bishop Juan Rodríguez de Fonseca commissioned four large tapestries to create a more intimate space behind the cathedral choir suitable for the celebration of the Salve service and devotion of the Virgin, which included specific musical elements (Knighton, 2009: 143). In the middle of the century, in the same location, the cathedral floor is described as covered in fabrics. This was usual in other large religious institutions (Sánchez-Herrero, 1978: 274) to the extent that in the sixteenth century some cathedrals even had salaried tapestry-makers or master embroiderers whose tasks comprised—among other things—maintaining, hanging and taking down of the tapestries, rugs, and other decorations for solemn feast days.²¹

In addition to the presence of these fabrics, the large number of laypeople who attended the most important services in the liturgical year must be taken into account. Their attendance *en masse* required the authorities to take extra measures to prevent crime, as well as to provide water on hot days to alleviate the combined effects of crowds and high temperatures (Martínez, 2014: 88, 342; Moll, 1975: 220-232). On more important feast days, the number of laypeople was often so vast that it became very difficult to move forward, and on occasion it was necessary to erect iron railings to bar the way so that the crowds would not block the processions between choir and altar (Carrero, 2014: 351; Fernández, 1999: 113). All these elements absorbed resonance, sharpened clarity of diction, and directed the passage of sound.

The results of the acoustic experiments carried out at St Mark’s, Venice, demonstrate that the space within the chancel—which included the choir of canons and ecclesiastical dignitaries—behaved much like a church within a church (Howard, 2009: 41). This same phrase has been used from a liturgical point of view by various historians with regard to the spaces formed by the choir and chancel in Toledo Cathedral.²² This set-up of the interior layout was customarily found at the centre of most Spanish cathedrals, with two opposing enclosures (the choir and altar), open visually to each other, joined by the crossing and adorned by decorative fabrics. It thus formed a structure at the heart of the sacred space. At the centre of this main nucleus were the faithful, receivers of the music produced from both sides of an impressive work of architecture. According to Blas Ortiz, Primal Cathedral canon from 1524 to 1552, the men heard the office within the chancel, which was named the ‘great choir’ (*coro mayor*) —whose name is significant as the other centre of musical production—, while the women were located in the crossing, separated by the large grilles that closed off the chancel.²³ The

¹⁹ López, 1905: 202 and in appendixes, p. 25.

²⁰ Antonio López cites repairs from 1518 (López, 1905: 201-202). References to such repairs are common throughout the length of the sixteenth century (Iglesias, 2010: 134, 154, 224, 240).

²¹ For example, in Toledo (Lop, 2003: 335, 432; Fernández, 1999: 111-112) and in Santiago de Compostela (López, 1905: 398).

²² The grouping consists of ‘a church within the church, aimed to isolate the officiants during the celebration of the Mysteries, or the songs of the Hours (*una iglesia dentro de la iglesia destinada a aislar a los oficiantes durante la celebración de los Misterios o cantos de las Horas*)’ (Franco, 1991: 438 *apud* Lop, 2008: 236).

²³ *Ideoque deauratis clauditur brevibus cancellis apprime eferro factis, sexto gradu a sacro altari et quarto a pavimento iaspideo distantibus, quo viri ad divina solent convenire, eosque afoeminis separant ingentes mirumque in modum aeditiores datri. Super quos Christi Redemptoris nostri in crucis li[g]no pendentis imposita est imago.* ‘And thus [the altar] is closed off by small railings of iron, six steps away from the main altar, and four from the jasper floor where men usually assemble to hear the divine office, and are separated from the women by large and very high grilles, upon which is placed an image of Christ Our Redeemer crucified’ (‘Y por eso [el altar] está cerrado con pequeños cancelles de hierro, distantes seis escalones del sagrado altar; y cuatro del pavimento de jaspe donde los hombres suelen juntarse a oír los oficios divinos, y los separan de las mujeres, grandes y muy altas rejas, sobre las cuales está colocada una imagen de Cristo Nuestro Redentor crucificado’) (Ortiz, 1549: XLIIIP; E-Tp 210: 196 *apud* González, 1999: 175).

location of women in the crossing during the Office is seen increasingly—due to their exclusion from the two main enclosures—and was ratified in the Provincial Council of Toledo in 1582, although surely exceptions occurred.²⁴

The placing of the laypeople in the crossing and transept was an established custom in big churches and cathedrals on the Peninsula given the greater visibility of the main altar and choir, and the proximity it afforded to the pulpits, from where sermons were preached (Carrero, 2014: 360).²⁵ As this area was located between the openings of the two main walls of the central building where the main emitters of sound were sited, it was often referred to as the *entrecoro*.²⁶ A visualisation—possibly idealised—of the view from the *entrecoro* at large events can be seen in the engraving made around 1519, which depicts Enrique de Hamusco preaching a sermon from the pulpit of the Primal Cathedral (Figure 2). The lower margin of the engraving provides information about the speaker, the location and the laypeople listening.²⁷ It shows a church full of people, with the women sitting at the front and the men standing around them, so the scene confirms the female priority in the crossing (Hamusco, 1519: s.f.). However, to judge from the chapter's prohibitions of 12 June 1531, the atmosphere was probably more festive than the engraving would suggest, at least on major feast days.

That neither on the day of Corpus Christi, nor of the Assumption, nor on other days should they hang fabrics in the church, nor should they walk around or bring tables or food. And that although it be a day with a sermon, they should bring neither chairs, nor benches, nor rugs, nor cushions, nor mats, nor any other fabrics, and that in the winter the church puts mats between the two choirs and also put them down on All Saint's Day²⁸

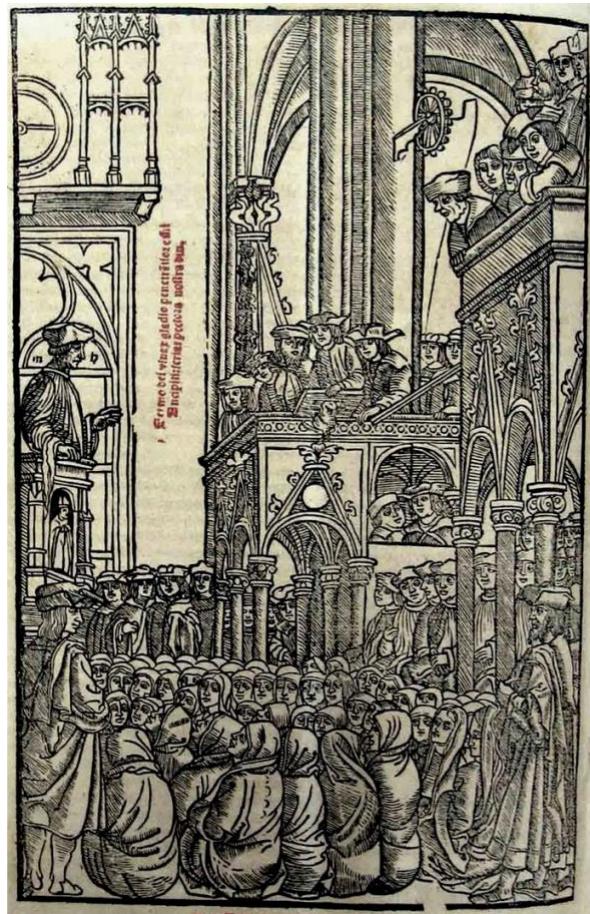


Figure 2. Pulpit and *entrecoros* in 1519 (Toledo Cathedral).

²⁴ The wording implies that previously there were exceptions to this rule: ‘which in cathedrals and colleges, while the divine offices were being celebrated, all the women were closed off not only from the choir, but also from the chancel’ (*que en las catedrales y colegiatas, mientras se celebren los oficios divinos se excluya a todas las mujeres no solo del coro, sino también de la capilla mayor*) (Martínez, 2014: 36).

²⁵ In this period there exists substantial documentation concerning the reading of homilies from pulpits; see for example Alonso, 2014: 66; Carrero, 2014: 251, 307; Pío, 1536: lxxx, lxxxvij and Torres, 2006: 246.

²⁶ *Altero quidem ab ortu, quod sacellum maius dicitur, altero vero ab occasu quod cleri stationem possumus appellare, vulgus autem utrumque nominat chorom.* ‘the one on the east is called the chancel, the other on the west which we can call the clergy’s room: but most people call both the choir’ (*uno al oriente que se dice capilla mayor, y otro al oceso, que podemos llamar la estancia del clero: pero el vulgo a uno y otro llama coro*) (Ortiz, 1549: XXI; E-Tp 210: 88 *apud* González, 1999: 150). The *consueta* of Toledo in the first half of the fifteenth century also refers to the chancel as the *coro mayor* or *coro superior* (Carrero, 2014: 323, 332).

²⁷ *Urbe Toletana veneratur virginis [a]udem concio: quam signat picta figura tibi. Hic ex suggesto clamans est muneric autor Henricus populus qui sacra verba mone. Hic series veneranda patru[m] dicentis ab ore percipit et qui sunt inter utru[s] quem chorom.* ‘In the city of Toledo a sermon praising the church of the Virgin, as this image shows you. Here, proclaiming from the pulpit, is the author of the work, Enrique, who speaks sacred words to the laypeople. Here the venerable gathering of nobles who are between both choirs listens to what he has to say’ (Hamusco, 1519: s.f.). With thanks to Pepe Rey for the translation of this passage.

²⁸ ‘Que los días del Corpus, ni Asumpcion, ni otros días no se hagan en la iglesia tablados, ni andamios y que no traigan mesas ni comidas. Y que aunque sea dia de sermon, no traigan sillas ni banco, ni almohada, ni alfombra, ni estera, ni otro tapiz y que se pongan de aqui adelante en los ibiernos esteras entre los dos choros y se pongan por el dia de Todos los Santos’ (E-Tc, 42-31, f. 88v).

The mats had the function of shielding the women from the cold floor where they sat, as seen in the picture and confirmed by the chapter acts.²⁹ The passage also mentions restrictions on objects brought into the church, with the aim of organising and controlling elements that would disrupt both the visual and sonic perspectives in the church interior. It demonstrates the desire of the institution itself to organise all ritual elements through increased dominance of the interior space.

Here the laity were the connection between two interior spaces and became the direct receptors of the music emitted from both points.³⁰ One of the occasions that demonstrated the use of different points of emission surrounding the public was during the Office of Tenebrae, which took place between Holy Wednesday and Good Friday. Several sources describe how, once all the candles in the church had been extinguished, with the exception of one that was shielded but continued to glow, several groups of singers alternated with the choir from distinct locations within the church while they performed the *Kyrie tenebrarum*. The *Breviarium Toletano* of 1551 describes in precise detail how before the Kyrie they performed the antiphon *Benedictus, Traditor autem dedit eis signum dicens:*

to repeat, immediately before [this] all the candles in the church are to be extinguished with the exception of one in the middle [of the tenebrario] which stays burning and is covered in such a way that it does not look like it is completely dark. And they then sing the lines that follow.³¹

During the course of this ritual, both the liturgy of the Dominican Order and the rubrics of Valencia Cathedral call for two singers on the steps of the altar and another two in the centre of the choir, alternating with the rest of the clergy remaining in the choir stalls (*Hores*, 1533: CLXV'; Hardie, 1988: 164-165).³² The placing of pairs, this time at three distant points, as well is recorded as being carried out by six boys at Toledo in 1515.³³ At this particular liturgical moment, it was usual to include boys' voices, with variations in grouping and ordering. This practice is documented in the thirteenth-century ordinal of the Benedictine Abbey of Saint Arnulf in Metz and in monastic regulations that date from the tenth century (Boynton, 2008: 41). This alternation is also seen at other Spanish institutions: for example, at the Seu of Urgell in 1418 the singers were located in the pulpit, choir, and behind the altar and they moved forward to other places in groups of four (Carrero, 2014: 269).³⁴ All these vestiges show probably a general practice that took place in different religious spaces with some variants.

The attention to detail in interpretation and ritual in ceremonials and liturgical books during this service is significant: the collaboration between adult singers and boys, the contrast between two or three small groups and the choir, the distance between them, the lack of light and the significance of liturgical protocol made this a unique moment during the liturgical year.³⁵ The laypeople of higher social standing who were fortunate enough

²⁹ 'mats that are between the two choirs, allowing the women to hear the sermons and the divine offices' ('esteras que estén entre los dos coros para que las mujeres oyen los sermones y los oficios divinos') (E-Tc, Actas capitulares vol. 5, 12 June 1531, ff. 42-42' cit. Lop, 2004: 243).

³⁰ Theatrical performances are documented at this space in Toledo, Salamanca and Valencia (Carrero, 2015: 240, 251-253).

³¹ 'repetir inmediatamente antes de que se extingan todas las velas de la iglesia con la excepción de la de en medio [del tenebrario] que permanece viva y esta cubierta de modo que no aparece en absoluto hasta que termina la oscuridad. Y cantan las líneas que siguen', *Repetita ante statim extinguantur o[mnia] luminaria ecl[esi]e excepta illa candela de medio quae remanet viua. Et ista sic cooperiat q[uae] non appareat: donec finiant tenebrae. Et cantent isti versus qui sequuntur.* The next sung text is the *Kyrie tenebrarum* (Martínez, 1551: 117).

³² Dominican sources used by Hardie survive from 1260 until the end of the fifteenth century, which shows the stability of monastic instruction manuals through the centuries (Hardie, 1988: 164-165).

³³ *Versiculi qui sequuntur dicuntur a sex pueris bini et bini finitis tenebris.* 'The versicles that follow are said by six boys, ending the Tinieblas in pairs' (Jiménez, 1515: 74). This is also mentioned in the *Passionarium toletanum* of 1516 and 1525 (Jiménez, 1516, s.f. y Fonseca, 1525, s. f.).

³⁴ Arxiu Capitular at the Seu d'Urgell, ms. 2048: 61 *apud* Carrero, 2014: 269.

³⁵ The candles that were put out indicated the successive abandonment of the disciples of Christ and the hidden candle that continued to be lit symbolized Christ behind the tomb (Carrero, 2014: 309).

to occupy the space between the two choirs must have had an unforgettable experience, surrounded by darkness, with sounds only ever heard in a space of daunting proportions yet muffled by decorative ornaments and emitted from opposing points.

This example, extraordinary for the heightened awareness of sound due to the lack of light, is not the only instance of preoccupation with aural perception in ceremonies. The clergy's interest in preserving silence and musical organisation in the choir is documented from much earlier times. The Lisbon Synod of 1240 states 'that they sing in the church with complete devotion [...] the psalms being sung and recited clearly' ('que canten en la iglesia con toda devoción [...] salmos cantados y recitados claramente') (Matías, 1992: 96). Likewise, Gonzalo Pérez, archbishop of Toledo in the same century (1291) recommended that the clergyman did not begin a verse until they had finished the preceding one, and that they all sang at the same time (Lop, 2003: 87-88).

However, in the fifteenth and sixteenth centuries there was a greater analysis of aural perception in relation to space, just as greater study of optics was applied to the art of painting. The influence of Classical art developed a greater awareness of the acoustics of architecture, of musical balance, of the absorbent quality of ornamental fabrics, and of the importance of placing sources of sound in relation to receptors. The consideration for sonic effects in relation to scientific thinking is linked to symbolic connotations and rhetoric, used to win over the growing public attending church before the currents of religious reform and ecclesiastical schism that were about to take place in Europe.

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Cita recomanada

Esteve Roldán, Eva. 2016. "A Revaluation of Interior Acoustics in the Iberian Peninsula during the First Half of the Sixteenth Century". *Quadrívium,-Revista Digital de Musicología* 7 [enllaç] [Consulta: dd/mm/aa]