

EL PROYECTO GÓTICO DE LA CATEDRAL DE SEVILLA. INDICIOS DE TRAZADO, MEDIDA Y PROPORCIÓN

THE GOTHIC PROJECT OF THE SEVILLE CATHEDRAL. OUTLINE, MEASUREMENT AND PROPORTION EVIDENCES

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La planta de la Catedral de Sevilla, férreamente ortogonal y de cabecera recta, supuso una novedad en su tiempo, ejerciendo gran influencia. Un análisis gráfico de la conocida como traça de Bidaurreta, anónima y adscribible al siglo xv, permite profundizar en el proyecto gótico primero y en los comienzos de la fábrica catedralicia. También, incluso, son posibles nuevas hipótesis sobre la autoría, datación y finalidad del propio documento.

Palabras clave: Catedral; Sevilla; Traza; Bidaurreta; Gótico; Metrología

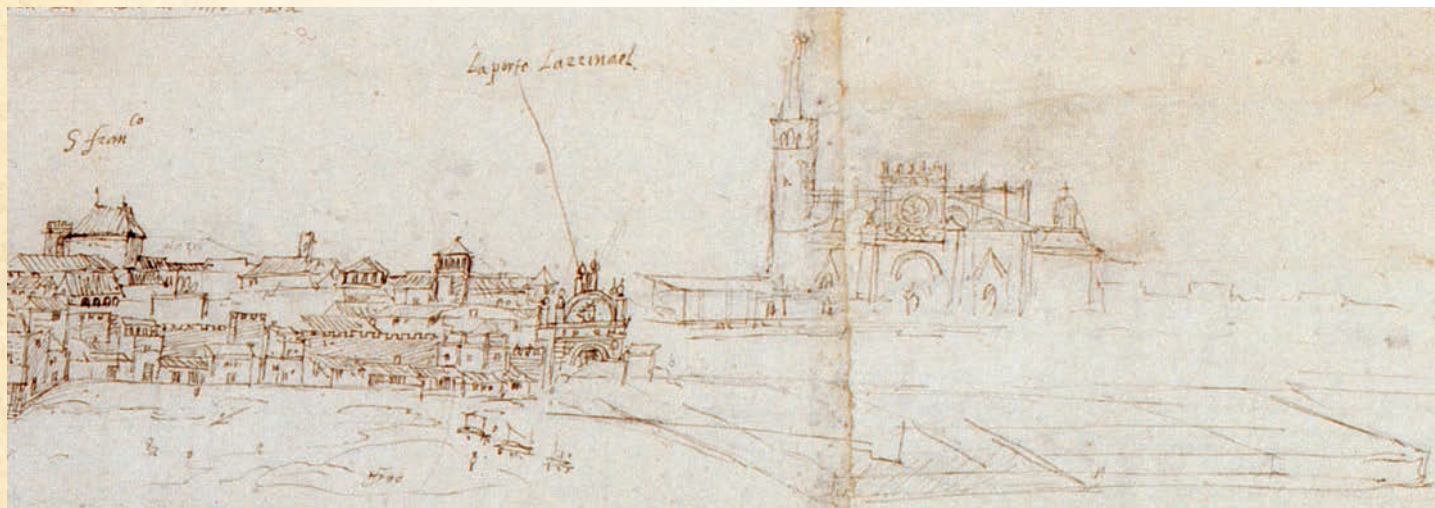
The ground plan of the Seville Cathedral is characterized by its remarkable overall orthogonality, that was very innovative and influential in its time. A graphical analysis of the 'Bidaurreta trace', an unsigned drawing datable to the fifteenth century, enables an approach to the original project and to the beginnings of the Cathedral work. Moreover, new hypotheses about the authorship, date and aim of the document itself are possible.

Keywords: Cathedral; Seville; Trace; Bidaurreta; Gothic; Metrology



1. La Catedral en una vista de Wyngaerde (1567). V&A Museum (PS, 1567), Londres.

1. The Cathedral in a Wyngaerde's view (1567). V&A Museum (PS, 1567), London.



1

Acabando el siglo xv, entre el caserío sevillano emergía la nueva catedral gótica, constituyendo por sus características formales y construcción pétreo un edificio insólito, y descomunal, en la ciudad medieval (fig. 1). Posiblemente sobre 1433 un maestro foráneo daría *traça*, hoy perdida, para sustituir a la maltrecha aljama cristianizada, proyectando un gran buque de cinco naves y capillas perimetrales 1.

En 2008 apareció la *traça* de Bidaurreta, un interesante dibujo anónimo y sin fechar, pero adscribible a la segunda mitad del siglo xv por los estudios existentes (fig. 2A). Representa la planta catedralicia, acotada, y controlada formalmente por una trama ortogonal incisa. Al estar realizado en papel, en vez de pergamino, y por su reducido tamaño (411x570 mm), pudiera ser una copia en pequeño de la traza original. Un análisis del documento desde el *modus operandi* gótico va a permitir explicar su trazado y cotas, discrepantes con lo construido, y profundizar en el proyecto primigenio. También, y contextualizándolo en los primeros momentos de

la fábrica, se atisban nuevas hipótesis sobre la fecha, autoría e incluso finalidad del propio dibujo.

Traça y replanteo

Muchas de las plantas góticas carecen de cotas o referencia a escala, aunque esto no impediría que estuvieran proporcionadas, y en definitiva a escala, aunque ésta fuera inicialmente 'indeterminada' 2. Posteriormente, al comenzar la obra, la asignación de un patrón métrico (P) a la 'unidad de dibujo' (UD) utilizada para trazar la planta permitía su 'escalado', dándole definitiva dimensión al edificio 3.

Llamativamente nuestra *traça* está acotada, evidenciando que este proceso de concreción y ajuste al solar ya se ha producido. Las anchuras de las naves laterales y central, 40 y 60 pies respectivamente, sugieren que la UD utilizada pudo corresponderse con un patrón métrico de 4 pies castellanos 4 ($P=27,86 \times 4=111,45$ cm). Esto, que supondría un valor de 10xP y 15xP para las citadas naves, permite entender metrológicamente la planta, cuya 'trans-

In the late fifteenth century, the new Gothic cathedral in Seville protruded from the houses remarkably. Furthermore, it was also an unusual building in the city, due to its formal characteristics and to the fact that it was stonework (fig. 1). Maybe about 1433 a foreign master draw a trace, now lost, to replace the damaged Christianized mosque, projecting a large building with five naves and perimeter chapels 1.

In the year 2008 the so-called 'Bidaurreta trace' was found. This is an interesting anonymous and undated drawing, but dated by existing research in the second half of the fifteenth century (fig. 2A). It represents the cathedral ground plan, with annotated dimensions, and composed by an incised orthogonal grid. The drawing could be a reduced copy of the original trace, since it is traced on a paper, instead of on a parchment, and its size is quite small (411x570 mm). An analysis of the document, considering the Gothic *modus operandi*, will allow to understand its layout and dimensions, discrepant to the built, and to further go more deeply into the original project. Moreover, contextualizing it in the early stages of the Cathedral work, new hypotheses about the date, authorship and even aim of drawing itself are possible.

Trace and stakeout

Many Gothic ground plans haven't labelled dimensions or scale. However this would not impede them to be proportionate, and ultimately made with scale, albeit initially being 'undetermined' 2. At the beginning of the work,

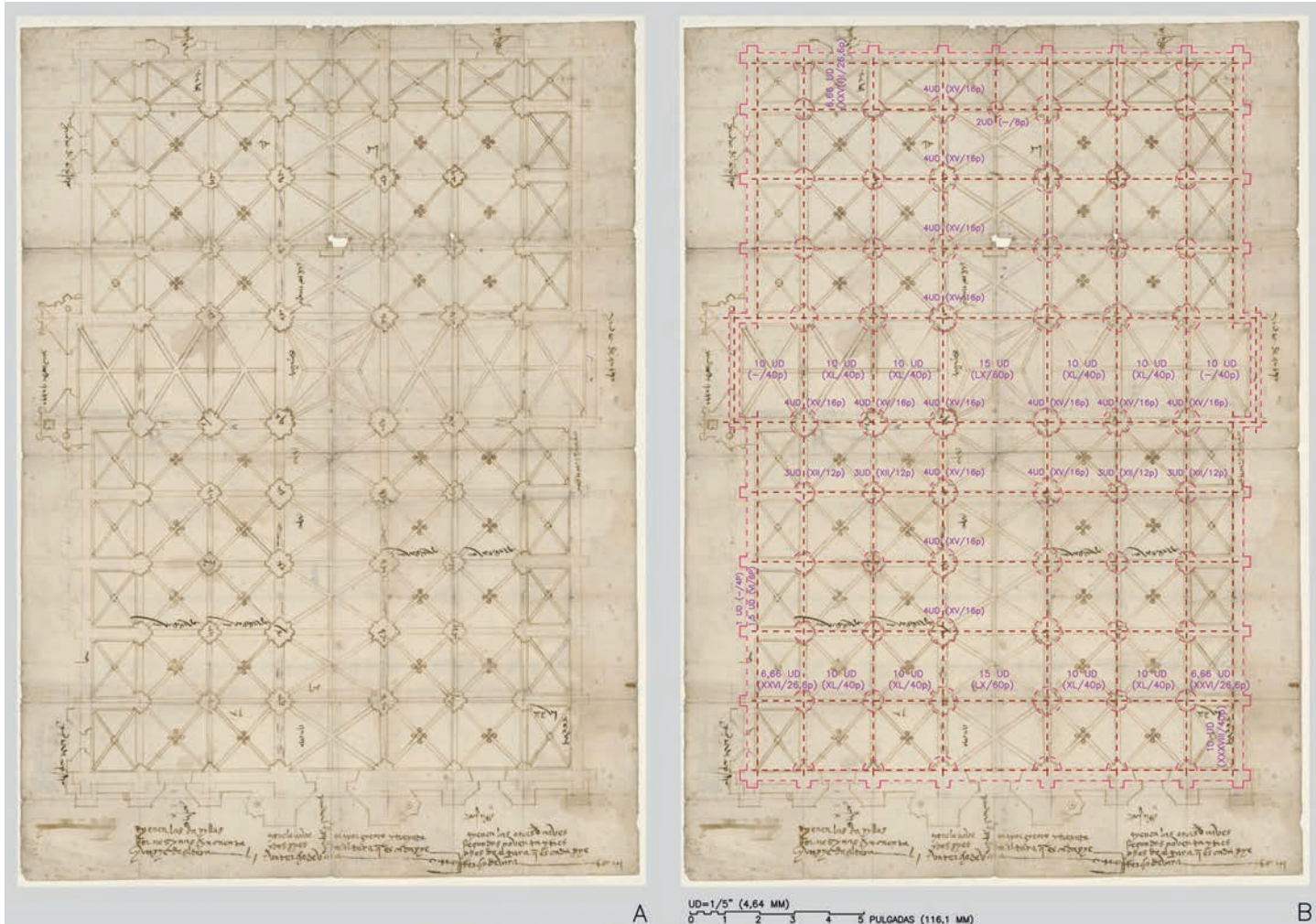


2. A. Plano de Bidaurreta. Anónimo. Archivo General de Gipuzkoa. B. Trazado regulador en UD y cotas (rotuladas –cifras romanas– / teóricas para UD=4 pies).

3. Hipótesis sobre el tamaño y dibujo de la traça original.

2. A. Bidaurreta plan. Anonymous. General Archive of Gipuzkoa. B. Regulatory outline using the UD and dimensions (labelled –Roman numbers– / theorist).

3. Hypothesis about the size and drawing of the original trace.



2

the drawing dimensional unit (UD) was made to correspond with a metrical pattern (P) to obtain the final size of the building **3**. Conspicuously this trace has labelled dimensions, showing that this process had already taken place. The widths of the aisles and nave (40 to 60 feet) suggest that UD was equivalent to a metric pattern of 4 Castilian feet **4** ($P=27,86 \times 4=111,45$ cm). This assumes a value of $10 \times P$ and $15 \times P$ for the aisles and nave, allowing also to transcribe into UD (or 'P') the trace and to coherently explain its proportions and general outline. An orthogonal grid is used for this one, which establishes pillars axes and also the walls between chapel axes, as well as the inner side of the perimeter wall. The labelled dimensions are referred to these lines (fig. 2B).

cripción' en UD (o 'P') explica coherentemente sus proporciones y trazado general. Éste se serviría de una trama ortogonal, posicionando ejes de pilares y de muros separadores de capillas, así como la cara interior del muro perimetral, líneas a las que están referidas las cotas rotuladas (fig. 2B).

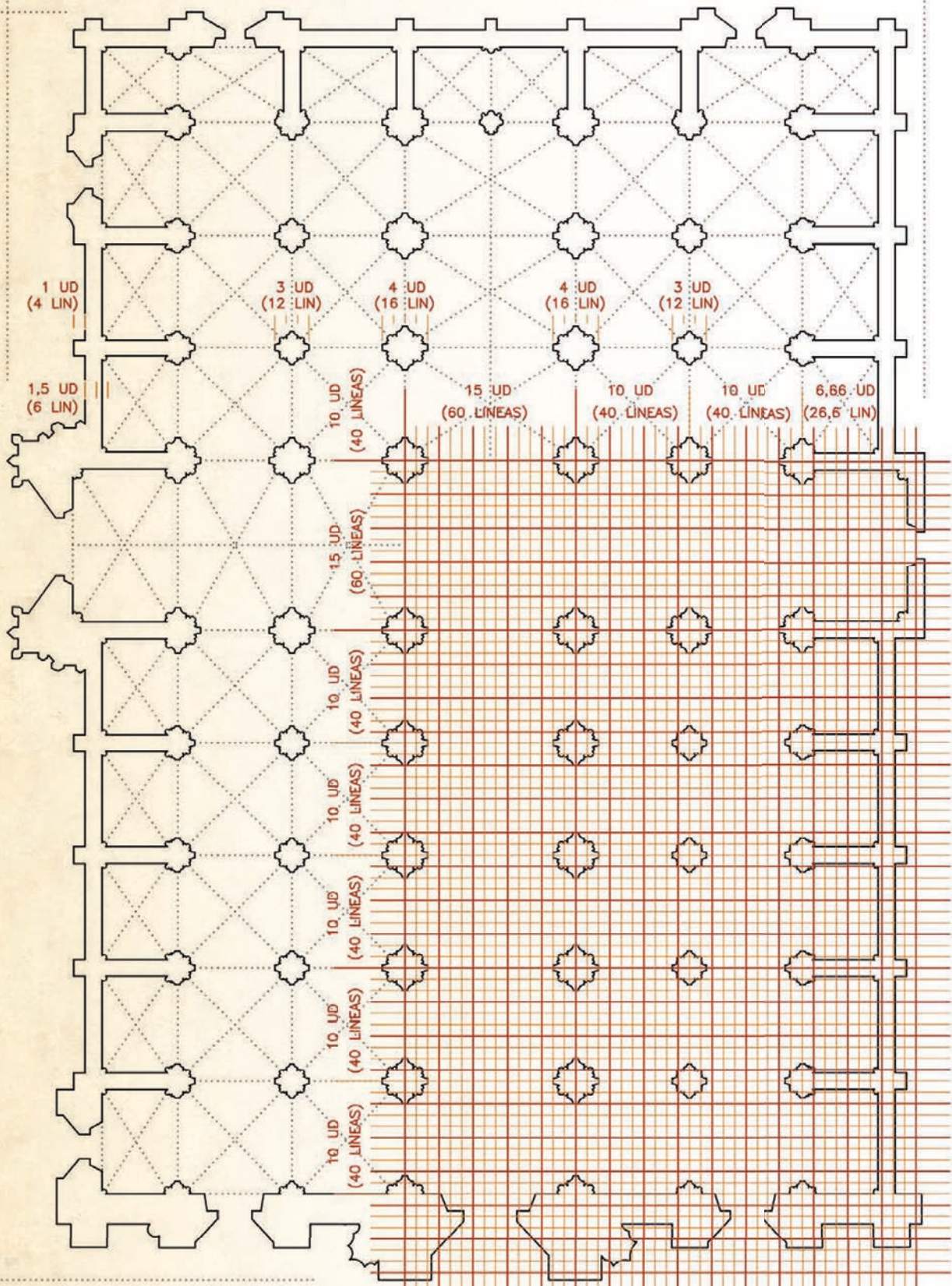
Los tramos de las naves laterales son cuadrados, y con una relación 1/1,5 con la central, también aplicada con las capillas laterales ($10 \times P / 1,5 = 6,66 \times P = 26,66$ pies). Respecto a los elementos constructivos,

el muro perimetral sería $1,5 \times P = 6$ pies (anotados expresamente) **5**, sobresaliendo el contrafuerte $1 \times P = 4$ pies, y los pilares parecen ser de $3 \times P = 12$ pies y $4 \times P = 16$ pies (aunque se rotulan 15) **6**.

Gráficamente la UD sería 0,464 cm, prácticamente 1/5 pulgada **7**, concordancia que abunda en la hipótesis metrológica formulada, y permite incluso especular sobre el tamaño y dibujo de la desconocida *traça* primigenia. Si ésta hubiera sido trazada con una UD de 1/3 pulgada (4 líneas), su correspondencia con un patrón de 4

ANCHURA MAXIMA DEL DIBUJO: 625 MM

DIMENSION LONGITUDINAL MAXIMA DEL DIBUJO: 870 MM



3 PIES

1 VARA (835 MM)

2

1

0 12 LIN

0 1 2 3 4 5 6 7 8 9 10 11 12 PULGADAS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 PULGADAS

UNIDAD DE DIBUJO (UD = 1/3 PULGADA = 4 LINEAS = 7,73 MM)



4. Capilla de San Laureano.

5. Patrones métricos P_i y P a partir de la vara castellana.

The aisle sections are squares. Their widths have a relationship 1/1,5 in relation to both the nave and the side chapels ($10 \times P / 1,5 = 6,66 \times P = 26,66$ feet). The perimeter wall thickness would be $1,5 \times P = 6$ feet (explicitly annotated in the trace) 5, the buttress would protrude $1 \times P = 4$ feet, and the diameters of the pillars would be $3 \times P = 12$ feet and $4 \times P = 16$ feet (although '15' were annotated in the trace) 6.

The UD is equivalent to 0,464 cm, approximately 1/5 inches 7. This concordance ratifies the formulated metrological hypothesis and it even allows to speculate about the size and tracing of the unknown original trace. If this had been drawn with an UD of 1/3 inches (4 lines), its correspondence with a metrical pattern of 4 feet would directly give the dimensions of the Bidaurreta trace, because a 'line' of the drawing would literally amount to a foot 8 (fig. 3).

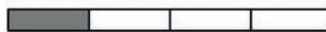
On the other hand, the comparison with the Cathedral building is also very useful. The work started around the year 1433-34 for its southwestern angle, the Saint Laureano chapel (fig. 4). The widths would be realized section by section, perhaps simultaneously to the demolition of the mosque. This would explain its random misalignments, derived from small corrections or the construction errors 9. However, the width of the aisles (≈ 1092 cm) is smaller than the length of their sections (1180 cm), losing their square proportions. It is possible that the lengths were determined by other metrical pattern, equivalent to the Castilian yardstick multiplied by $\sqrt{2}$ ($P_{\text{inicial}} = 83,5905 \times \sqrt{2} = 118,2$ cm) 10. Thus, the section length was $10 \times P_i = 1182$ cm (fig. 5).

Initially, the UD would correspond with this P_i metric pattern, being soon replaced by 4 feet, which caused the reduction of both the building dimensions and the construction thicknesses (fig. 6A). But at this moment the section length of the Saint Laureano chapel would already be materialized by the construction process, so that 38 feet were labelled in the trace (precisely in this chapel), generating the only significant inconsistency between the labelled dimensions and the drawing. These 38 feet, plus the 5 feet of the walls between the chapels, gave 43 feet between the wall axes (1198 cm), which was a good approximation to $10 \times P_i = 1182$ cm. This way, it was possible to maintain the initial section length. The remaining dimensions derived from the 4 feet metric pattern were maintained. This 'mixed' scheme was used until the work came to the transept, wherein the section length was reduced

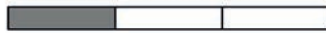


4

PALMO (1/4) 20,90 CM



PIE (1/3) 27,86 CM



MITAD 41,80 CM



PASO (5/6) 69,65 CM



PATRON DE 4 PIES P = 111,45 CM

5

4. Saint Laureano Chapel.

5. P_i and P metrical pattern based on the Castilian yardstick.

pies permitiría la obtención directa de las cotas de Bidaurreta, al equivaler literalmente una 'línea' del dibujo a un pie 8 (fig. 3).

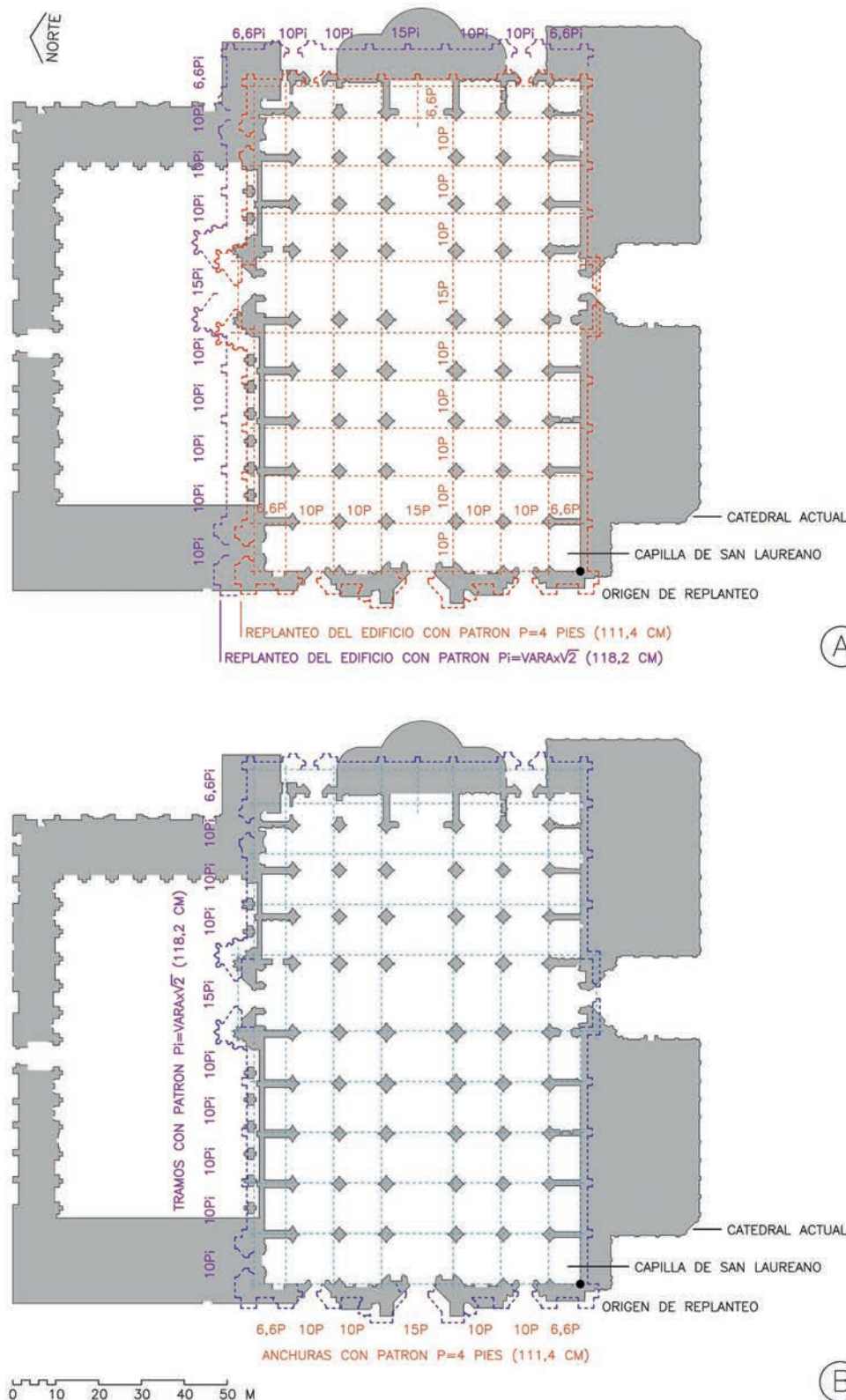
Por otro lado, resulta también de gran utilidad una comparación con la fábrica catedralicia, que sabemos comenzó hacia 1433-34 por el ángulo suroeste, la capilla de San Laureano (fig. 4). Las anchuras se formalizarían tramo a tramo, quizás conforme se derribaba la mezquita, lo que explicaría sus aleatorios desajustes, resultado de pequeñas correcciones o errores de ejecución 9. Sin embargo, la de las naves laterales (≈ 1092 cm) es sustancialmente menor que la profundidad del tramo (1180 cm), distorsionando claramente sus previstas proporciones cuadradas. Parece que longitudinalmente subyace otro patrón mayor, interpretable como la vara castellana mayorada por $\sqrt{2}$ ($P_{\text{inicial}} = 83,5905 \times \sqrt{2} = 118,2$ cm) 10; por ello la profundidad del tramo fue $10 \times P_i = 1182$ cm (fig. 5).

Este patrón P_i, probable concreción primera de la UD, pronto se cambiaría por el de 4 pies, reduciendo luces y espesores constructivos (fig. 6A). Pero en este momento la profundidad del tramo ya estaría materializada en la fábrica, por lo que en el plano estudiado (precisamente en San Laureano) se anotaron 38 pies, generándose la única incongruencia importante entre cotas y dibujo. Estos 38 pies, junto a los 5 de los muros entre capillas, daban 43 intereje (1198 cm), como aproximación a $10 \times P_i = 1182$ cm para mantener el tramo inicial, respetándose el resto de dimensiones derivadas del patrón de 4 pies. Este esquema 'mixto' sería el referente hasta llegar al crucero, aprovechado para regularizar a módulos laterales cuadrados reduciendo el tramo (fig. 6B).



6. A. 'Escalado' inicial de la traza y replanteo con $UD=P_i=VARA \times \sqrt{2}$ y ajuste a $UD=P=4$ pies. B. Esquema 'mixto' de Bidaurreta: anchuras generadas con $UD=P=4$ pies / profundidad de tramo $10 \times P_i$ (≈ 43 pies).

6. A. Initial scale of the trace and the stakeout based on $UD=P_i=YARDSTICK \times \sqrt{2}$ and the subsequent stakeout based on $UD=P=4$ feet. B. 'Mixed' scheme of the Bidaurreta trace: widths generated with $UD=P=4$ feet / $10 \times P_i$ (≈ 43 feet) section length.



to generate square modules for the aisles (fig. 6B). These changes would occur between the years 1434 and 1435. Furthermore, also the dimensions of the trace would have been also probably labelled at this moment, which is deduced from the doubts about 26 or 27 feet for the chapel widths. These doubts are evidenced by the rectification made in the dimension labelled beside the Palos door, a matter detected by Alonso and Jiménez (2009, p. 23). The studied trace does not seem to be the result of a thoughtless copy, it would rather be a plan in which the dimensions are being decided, doubting its author in the rounding to whole numbers of the theoretical 26,66 feet (6,66 UD). This would date the drawing itself to the same years 11, and it suggests us about its aim: to establish a 'new scale' for the ground plan after deciding a metrical pattern change. A small drawing on paper was sufficient for this purpose.

These important changes, in a building under construction, also suggest a change of master. This change would be, based on the referred chronology, the substitution of Ysanbarte (absent since July 1434) by Carlin (already incorporated in the work by May 1435). If the first one could be the unknown author of the original trace, the dimensional adjustments, and also possibly the Bidaurreta trace itself, should be attributed to the second one.

Elevations

Some evidences of the ground plan also suggest how the Cathedral raising was tackled. Thus, the major pillars provided for the nave and the transept anticipate a simple cruciform volume standing out from the aisles, and without a dome, because the four central piers are not thicker than the others. All its vaults would have the same height, including the outermost sections of the transept. These symptomatically increased their width, so that the semicircular diagonal arches had the same height as the adjacent ones, although this induced the small and abnormal protrusion from the perimeter. Similarly, the Royal Chapel was parceled out into two sections so that its height would not protruded out of the adjacent ones. This forced to put a small pillar obstructing the emphatic axis of the building.

This austere and 'echeloned' architectural volume (fig. 7) was explicit in the heights written at the bottom: 51 (chapels), 93 (aisles) and 132



7

feet (nave). However, these strange values are not 'round numbers' or multiples of the building's metrical pattern, and they have not any relationship with the modulation of the ground plan. For this reason, the values could be referred to the total height (including the vaults), and they would require an elementary section drawing for their determination, perhaps like the Antonio di Vicenzo's one for the Milan *duomo* 12 (fig. 8). Thus, we formulate a similar graphical hypothesis with the UD, using the element axes and the inside faces of the perimeter walls (except the transept wall), and applying the same 1/1 and 1/1,5 ratios of the ground plan. This simple scheme, once particularized with the metrical pattern of 4 feet, will explain the labelled dimensions and the constructed work (fig. 9A). Thus, the side chapels were designed with a height-width ratio of 1/1 (the cornice would be at 26,66 feet high), using 1/1,5 for the aisles and nave (the capitals would be finished at 60 and 90 feet, respectively). Afterwards the semicircular diagonal arches would be traced. The aisle ones were raised 1 unit (4 feet=111,45 cm=aisle clearance distance/10), and the nave ones 1,5 UD (6 feet=167,18 cm=nave clearance distance/10). Thus, the arches keystones would be at 50,72, 92,28 and 132,05 feet, being matching values with the labelled dimensions if they are rounded to whole numbers. In addition, this superelevation had a clear purpose at the nave and the transept: added to the vertical clearance of the diagonal arches, the resulting height is equal to the square transept height, generated with single semicircular diagonal arches, without any superelevation

Estos cambios se producirían entre 1434 y 1435, cronología que podría hacerse extensiva al propio momento de acotado de la *traça* por un revelador detalle: las dudas entre los 26 ó 27 pies del ancho de las capillas, evidenciadas por la rectificación del plano junto a la puerta de Palos detectada por Alonso y Jiménez (2009, p. 23). Más allá de una copia irreflexiva, se trasluce un proceso 'vivo', que duda en el redondeo de los 26,66 pies teóricos (6,66 UD). Esto, a la postre, daría el propio dibujo en estos mismos años 11, y nos orienta sobre su finalidad: recoger un nuevo 'escalado' para la planta tras decidirse un cambio de patrón métrico, algo para lo que bastaba un pequeño dibujo en papel.

Estas importantes transformaciones, en una fábrica en marcha, apuntan también a un cambio de maestro, que por las fechas aludidas sería el relevo entre Ysanbarte (ausente desde julio de 1434) y Carlín (incorporado ya en mayo de 1435). Si el primero pudo ser el autor de la desconocida *traça* original, al último debieran atribuirse los ajustes dimensionales que suponen las cotas, y posiblemente la propia planta de Bidaurreta.

Elevaciones

Ciertos indicios en nuestra planta sugieren también cómo se pensaba 'crecer' la Catedral. Así, los mayores pilares previstos para la nave central y transepto anticipan un limpio volumen cruciforme sobresaliendo de las naves colaterales, y sin cimborrio al no incrementarse para el crucero. Todas sus bóvedas estarían a una misma altura, incluyendo los tramos extremos del transepto, que sintomáticamente incrementaron su anchura para que los ojivos semicirculares igualaran en flecha a los contiguos, y aunque ello implicara el pequeño y anómalo resalte respecto al perímetro. Análogamente, la Capilla Real se compartimentaría en dos ámbitos para que no sobresaliera de las contiguas, con el coste de colocar un pequeño pilar entorpeciendo el potente eje del edificio.

Esta volumetría, austera y 'escalonada' (fig. 7), quedó explicitada en las alturas rotuladas al pie: 51 (capillas), 93 (naves laterales) y 132 pies (nave central). No obstante, estos extraños valores no son 'números redondos', ni múltiplos del patrón dimensional, y parecen ajenos a la modulación de



7. Vista suroeste de la Catedral.

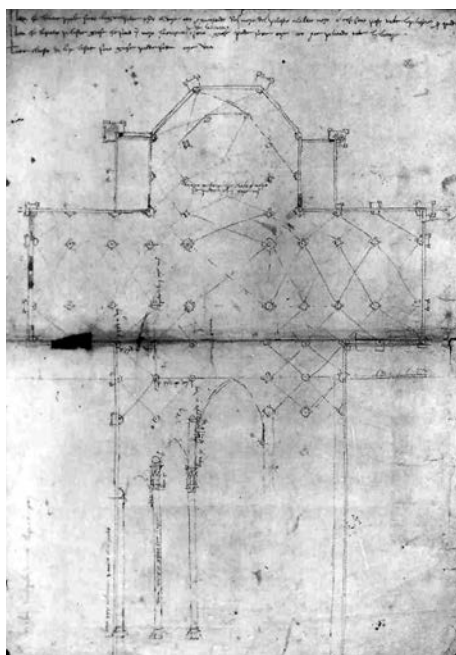
8. Esquema de la Catedral de Milán. Antonio di Vicenzo, 1390. Bolonia.

la planta. Por esto pudieran referirse a la altura total (incluso bóvedas), necesitándose para su determinación un elemental dibujo de sección, quizás como el de Antonio di Vicenzo para el *duomo* milanés 12 (fig. 8).

Por ello se formula una hipótesis gráfica similar en UD, tomando ejes de elementos y caras interiores de muros perimetrales (salvo el del transepto), y aplicándose las mismas proporciones 1/1 y 1/1,5 de la planta. Este sencillo esquema, una vez particularizado con el patrón de 4 pies, va a explicar las cotas rotuladas y lo construido (fig. 9A). Así, las capillas laterales pudieron proyectarse con una relación transversal ancho-alto de 1/1 (quedando la cornisa a 26,66 pies), utilizándose 1/1,5 para las naves laterales y central (rematándose capiteles a 60 y 90 pies respectivamente). A partir de ahí se trazarían arcos ojivos semicirculares, peraltados en las naves laterales 1 UD (4 pies=111,45 cm=luz/10) y en la central 1,5 UD (6 pies=167,18 cm=luz/10). Con ello, las claves quedarían a 50,72, 92,28 y 132,05 pies de altura, cuyo redondeo a valores enteros da las cotas rotuladas.

Este peraltado, además, tenía en la nave central y transepto una clara intencionalidad: junto con la flecha de los arcos ojivos supone un valor equivalente a la altura de un crucero cuadrado generado con simples ojivos semicirculares, sin peralte (132,42 pies). Esta coincidencia sugiere nuevamente un crucero enrasado con las naves concurrentes, sólo cualificado por los terceletes, solución que forzaría la sobreelevación de las mismas, y que acabaron secundando las colaterales. Todo ello sería coherente, además, con la ausencia de una cota específica para este singular espacio.

Aunque la Capilla Real y crucero cambiarían al construirse, en el cuer-



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po de naves el plan se seguiría hasta culminar cornisas y capiteles, incluso en los peraltes previstos 13 (fig. 9B). Y también, relativamente, en las bóvedas, debiéndose su menor altura al paso del esquemático dibujo 'a ejes' a la montea real de los ojivos, cuya luz y flecha efectivas disminuyen por el grosor de los elementos. Principalmente por ello, las alturas libres (1330, 2490 y 3580 cm) resultaron inferiores a las rotuladas en pies (equivalentes a 1421, 2591 y 3678 cm). Éstas parecen ser claramente valores 'de proyecto', que sólo tendrían sentido antes de 1438, año en que se documentan las primeras cimbras (fig. 10).

Conclusiones

El análisis abordado permite comprender mejor el proyecto catedralicio sevillano, así como los propios procesos de diseño góticos, para los que el dibujo de la planta era determinante. La estudiada contiene las principales determinaciones proyectuales, generándose mediante una trama ortogonal, regida por sencillas relaciones, y que establece un esque-

7. Cathedral Southwest view.

8. Milan Cathedral scheme. Antonio di Vicenzo, 1390. Bolonia.

(132,42 feet). This coincidence suggests again a space with the same height as the concurrent aisles, only qualified by the tercelets. This solution would force the superelevation of the nave and the transept, and finally it was applied to the aisles too. All this would be also consistent with the lack of a specific dimension for this singular space.

Although the final built of the Royal Chapel and the transept would be different, the plan was used quite faithfully until culminating the cornices and the capitals, and even in the superelevation of the vaults 13 (fig. 9B). The smaller effective height of the latter would correspond to the logical dimensional differences between the schematic 'axe' drawing and the real outline of the diagonal arches, whose effective clearance distance and vertical clearance decrease due to the element thickness. Mainly for the latter, the vertical clearances (1330, 2490 and 3580 cm) were lower than those labelled in feet (equivalent to 1421, 2591 and 3678 cm). These seem to be clearly 'project values', which would only make sense before the year 1438, when the first formworks are documented (fig. 10).

Conclusions

The carried out analysis provides a better understanding of the Seville Cathedral project, as well as the Gothic design processes themselves, in which the design of the ground plan was decisive. The studied one has the main projectual determinations, and it is generated by an orthogonal grid, ruled by simple relationships, establishing a dimensionless scheme, yet well-proportioned, of the building. This scheme would be materialized in the work with a first metrical pattern, soon reduced to 4 Castilian feet, a process that explains both the annotated dimensions and what was built. The need for such adjustments could originate the Bidaurreta trace, which was a new plan to continue the work.

The plan would be drawn at the beginning of the work, perhaps when Carlin arrived to the Seville Cathedral over the years 1434 to 1435, reducing it from a larger trace, being sufficient to graphically determine the analyzed dimensions. The survival of the drawing in the cathedral workshop until the end of the century would explain some added labels or sketches. Furthermore, it could influence other church projects of the so-called 'Sevillian Cathedral gothic', because the conspicuous metric or graphic composition analogies. ■



9. Esquemas altimétricos: A. Hipótesis sobre la traza. B. Comparación con lo construido.

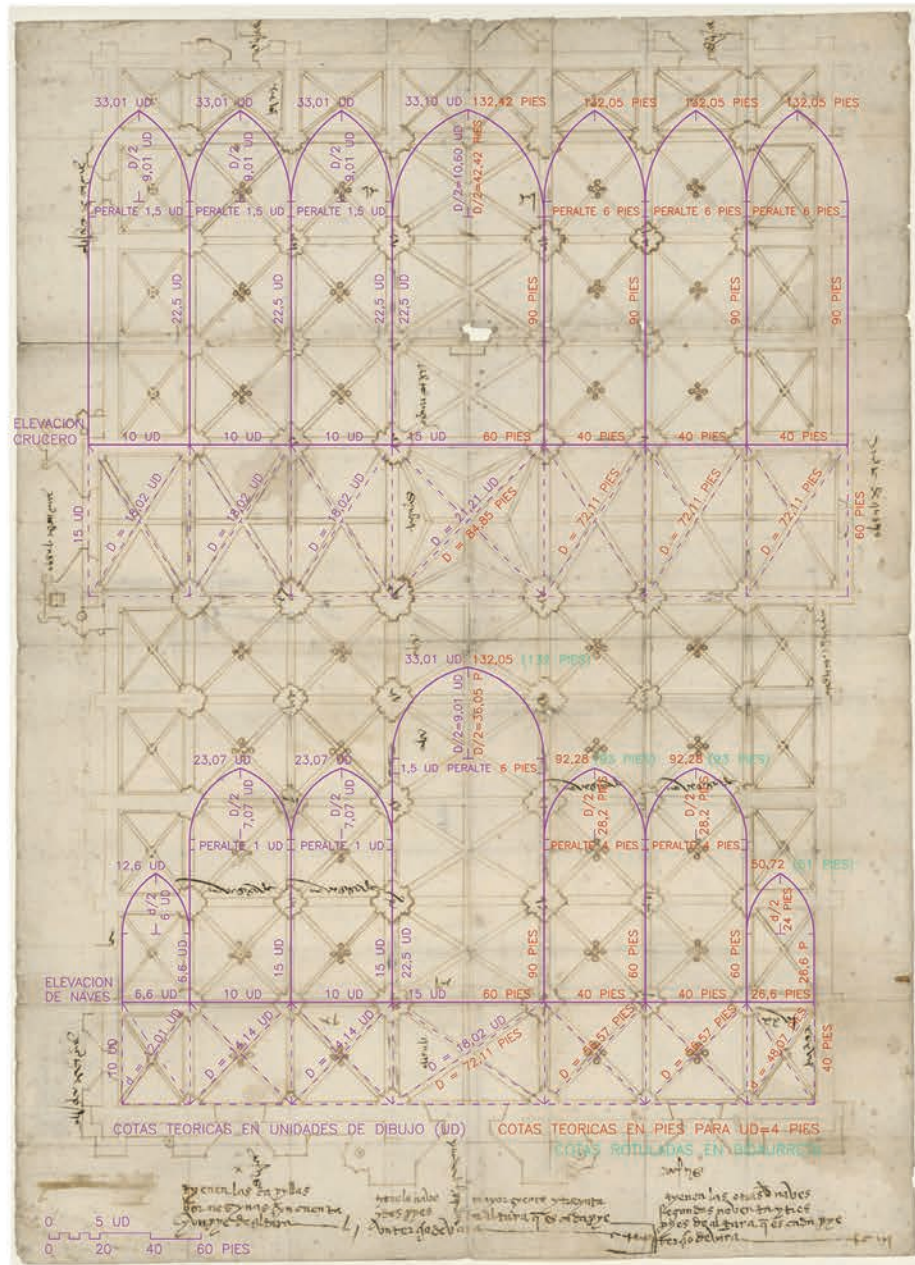
9. Altimetric schemes: A. Graphic hypothesis drawing on the trace. B. Comparison with the constructed work.

NOTES

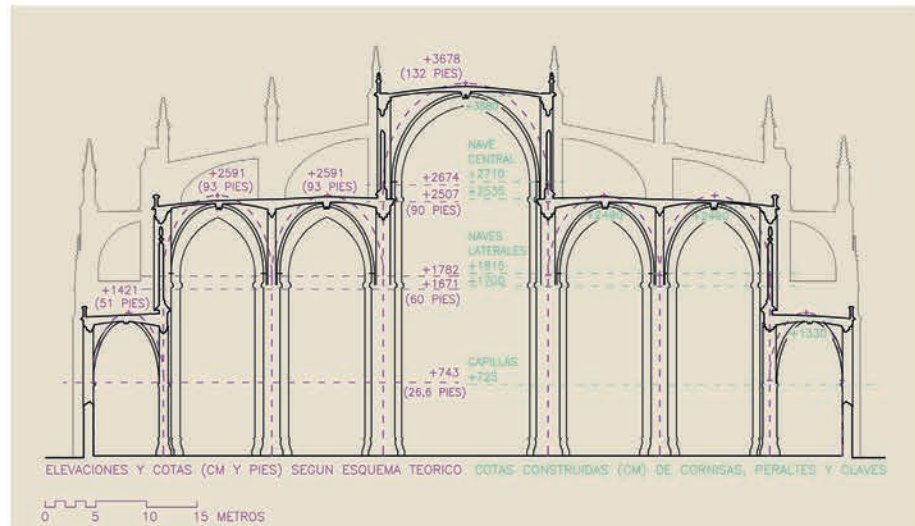
- 1 / Funding from the Spanish MINECO is gratefully acknowledged. Project HAR2012-35152/ARTE: 'Gótico catedralicio sevillano. Arquitectura y ciudad en los ámbitos de influencia de la Catedral de Sevilla'.
- 2 / Some treaties like the Lechler's one have different proportion systems for the composition of the ground plan, independently of the building size.
- 3 / According to Bucher (1968, p. 51): 'We know from the impractical scales used in most Gothic over-all plans, that the architects (...) would proceed from one basic repeated distance to which they gave a reasonable number of feet. This module and its major geometric subdivisions were available as a standard on the site or in the lodge'.
- 4 / The Castilian yardstick (83,59 cm) was very common in Andalusia during the late medieval stage (García 2011). According to De Soprani (1946) it was subdivided into three feet (27,86 cm), these into 12 inches (2,32 cm), and these into 12 lines (0,19 cm).
- 5 / This thickness is a tenth of the nave clearance distance, a ratio existing in the Lecher's treaty, which also dimensions the buttresses by their protrusions.
- 6 / During the building construction the perimeter wall and its buttress (4+2 feet) were thinned; besides also the wall between chapels (5 feet) and the nave and transept pillars (13 feet). This suggests an early chronology for the plan, because it would not make sense to label a dimensioning not carried out in the work.
- 7 / This implies a 1/240 scale for the annotated dimensions.
- 8 / The equivalence 1 line=1 foot would imply a very common 1/144 scale for the original trace (Alonso and Jiménez 2009, pp. 25-26). Beside the 1/108 scale, derived from 1 line=1 handspan, was also quite common.
- 9 / The theoretical 60 feet (1672 cm), 40 feet (1115 cm) and 26,66 feet (743 cm), respectively were 1617, 1092 and 702 cm on average in the building.
- 10 / This resource is often detected in the Castilian Gothic, allowing generate a larger buildings (García 2011). The operation could be graphical (diagonal/side of the square) or using a numerical approximations, such as the 7/5 of the treaty written by Lechler ([1516] 1856, fol. 51v).
- 11 / Coincidentally, the used paper is detected in 1434 at the Cathedral, as well as in 1449 and 1500 (Alonso and Jiménez 2009, pp. 17-18).
- 12 / This drawing superimposes both the ground and section plans, with the dimensions being only specified until the starting of the vaults, but not their overall heights (except the dome one). These heights derived from their own geometric logic, usually generated with semicircular diagonal arches (Ackerman 1949).
- 13 / The 60 and 90 feet (1671 and 2507 cm) pillars heights were finally constructed in the work as 1700 and 2535 cm high, respectively, with a 115 and 175 cm super-elevations, respectively. The 26,66 feet (743 cm) theoretical height of the chapel cornices was in fact 725 cm high (heights measured from the original tiling, 15 cm underneath the present one).

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