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INTERPRETATION OF THE REMAINS OF THE CHURCH OF THE MONASTERY OF SAN JERÓNIMO DE BUENAVISTA (SEVILLE) BASED ON A MULTIFOCAL APPROACH AND THE CREATION OF A DIGITAL MODEL

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Abstract

After the French invasion and the disentailment of ecclesiastical property in Spain in the 19th century, the monastery of San Jerónimo de Buenavista in Seville fell victim to neglect, looting and ruin. Archaeological prospections begun in 1988 yielded evidence of the foundations and some of the paving of the lost areas, but the parts of the monastery's church that are still standing today have barely received any attention beyond establishing certain spatial relationships with the underlying remains. To examine the construction and spatial characteristics of the building, we developed a digital model based on a photogrammetric survey, a stratigraphic interpretation of traces, a spatial analysis based on the geometric systems of formal control that were used at the time, and the identification of typological references. The aim of these overlapping approaches was to obtain the most objective understanding possible.

Keywords:

Archaeology, church, photogrammetry, vaults, geometry.

1. Introduction

The surviving remains of the monastery of San Jerónimo de Buenavista comprise most of the structure of the galleries in the main cloister, some of the adjacent wings, the wall panel corresponding to the Epistle side of the church, a bell tower, and parts of the perimeter wall. (Fig. 1).

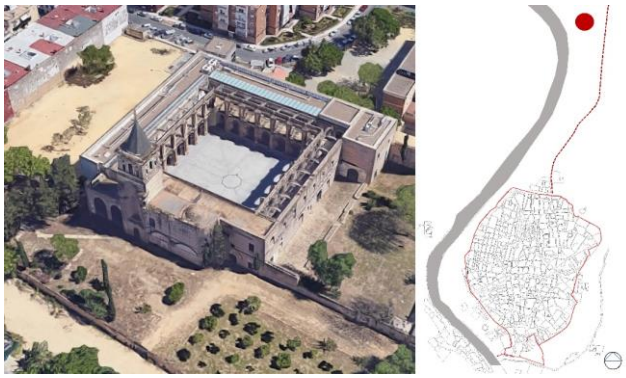

Fig. 1: Aerial view of the complex (Google Earth) and situation of the monastery with respect to the city of Seville

Today, the monastery is integrated into the urban structure of the San Jerónimo district in the northern sector of the city of Seville, at approximately half a league (2.3 km) from the city centre to the closest gate in its walled enclosure, on the road that connected the city to the centre of the Iberian Peninsula via Extremadura. Known as the *Vía de la Plata* ("Silver Road"), this was one of four routes which the court used to travel to Seville in the 15th and 16th centuries, according to the records and the map drawn up by the Valencian cartographer Juan de Villuga in 1543 (Ferreira-Lopes, 2020). This road was also the umbilical cord with the main Hieronymite monastery located in Guadalupe, from which its first prior was sent, Brother Diego Martínez de Medina.

The most detailed study of the monastery, carried out by the historian Antonio Sancho Corbacho (1949), makes reference to the main written sources: the chronicles of the Hieronymite Father José de Siguenza (1595/1907); the brief account of Fernán Arana de Valflora (1766), which merely indicates that the church was Gothic; the account of the origin of the complex included in the *Anales Eclesiásticos y Seculares de la ciudad de Sevilla* of Ortiz de Zúñiga (1795); the description of the complex provided by Felix González de León (1844, pp. 491–194), who saw the finished building; and the later description provided by

José Gestoso (1892), who visited the monastery in ruins. Our knowledge of the church is further assisted by the relationship established between the Hieronymites and the Ponce de León family during the 15th and 16th centuries (Carriazo, 1998), and the inventories and records of assets that existed before the looting in the 19th century, since they refer to specific spaces in the building (Fernández, 2009).

To these written sources we must also add the iconographical references that offer images of the building before and after it fell into ruin, such as the lithograph by Mariani from 1859, the drawing by Díaz from 1869 (Sancho, 1975), and the photograph by Nadin from 1924, recorded by José García-Tapial (1992). That study and the reports of various archaeological interventions carried out by the archaeologists Florentino Pozo and Miguel Ángel Tabales (1991, 1992) furnished the first architectural interpretation of the monastic complex.[1] While the archaeological surveys revealed the exact shape of the apse, the base of the walls corresponding to the Gospel side and the sacristies, and the height of the flooring at different points, they did not provide a stratigraphic-construction interpretation of the enormous wall corresponding to the interior longitudinal elevation of the church.

In a later monographic study of the monasteries of the Hieronymite order, Ruiz Hernando (1997) provided a detailed inventory of all such monasteries founded in the Iberian Peninsula, shedding considerable light on typographical considerations that have proved extremely valuable for filling in some of the gaps in our interpretation of the construction and the documentation pertaining to the Buenavista monastery. He examined several recurring spatial elements in the architecture of these monasteries from 1415, the year in which they were constituted as free-standing, centralised constructions that obeyed a set of rules designed to control the monastic organism. One of these characteristics was the spatial link between the choir loft and the chancel for the exaltation of the liturgy through the influence of vocal and instrumental music, and the configuration of flows and spaces that allowed the shared use of the church by the dignitaries who helped fund the monastery, royal visits, and the daily activity of the monks.

Based on this same typological approach, recent advances in the knowledge of the systems of geometric and formal control applied to Gothic and Renaissance vaults (Palacios, 1990; Rabasa, 2000; Moreno 2017) have provided a more rigorous appreciation of the form likely adopted by the lost vaults in this monastery since we have been enable to link the surviving stone remains with the geometry and proportion of their plan.

From an archaeological point of view, we have a methodology that has been well contrasted, based on the work of Harris (1991), the methodological bases proposed by Caballero (1995) and the systematization of paramental analysis proposed by Tabales (2002).

2. Methodology

This study is based on a holistic approach to the subject matter, drawing on different disciplinary fields such as historiography, archaeology and architectural analysis. Our aim was to seek solutions to the issue of knowledge through the margins and commonalities shared by these disciplines, using the appropriate strategies in each case:

- Graphic surveys based on photogrammetric data capture enabled us to develop a digital model of the remains with a sufficient degree of accuracy to analyse the form and dimensions of the construction elements.
- The identification of differentiable units and their topological and temporal relationships shed light on the stratigraphic sequence derived from the construction process and the subsequent transformations.
- A document review furnished the background information that enabled us to establish a logic and rationale for these processes and define reasonable time frames.
- The study of the geometric framework offered a spatial structure that cast more light on the architectural design and its formal references.
- The typological analysis highlighted the recurring formal elements that enabled us to view the building as part of a set of buildings with shared characteristics.

This article describes all these analyses and culminates in a reasoned, scientific perspective that contributes to our knowledge of the spatial structure of the monastery's church. The threads

[1] The excavations were carried out between September 1988 and May 1990.

that link the different stages of this journey are the graphics and infographics, conceived as instruments and vehicles of knowledge as well as efficient media for visualising the processes of transformation and the abstract geometric systems of formal control adopted in the architectural design. The result is offered as a model of the analysed reality and a reasoned interpretation of the preserved remains.

3. Execution of the work

3.1 Massive capture of metric data and survey

The aim of the metrics capture was to be able to survey the remains of the elevation corresponding to the Epistle side of the church, and to do so with a degree of accuracy that would enable us to document the dimensions and forms of the construction elements, the heights of cornices and the traces of vaults. This would then enable us to match all these new data with the survey of the floor plan conducted after the archaeological excavations (Fig. 2). It was particularly important to obtain geometric information about the *tas-de-charge* elements of the vaults and the sections of the Gothic pilasters and their Renaissance overlays since these are the only surviving witnesses of the lost aerial structures. Equally essential were data about the curvatures of the wall arches in the choir and the section of the vault corresponding to the tower. In addition to the elevation, we needed information about the cross section of the church and the variations in thickness of the preserved wall.

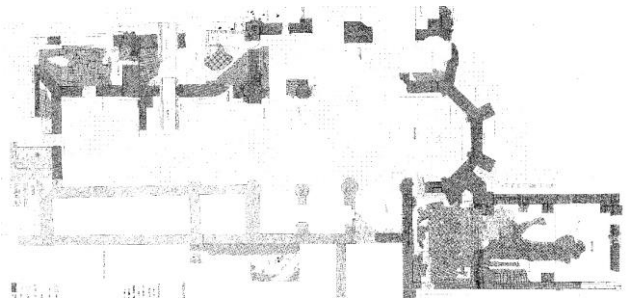

Fig. 2: Floor plan of the church obtained from the archaeological excavation. (Pozo & Tabales, 1991)

To obtain all this information, we used convergent photogrammetry (Martín, 2014) from a total of 164 photographs of 7952x5304 pix taken with a Sony ILCE-7RM3 camera and Sigma 14-24mm F2.8 DG DN lens, with a focal length of 24 mm. For the shots, we have worked with an approximate Ground Sampling Distance (GSD) between 0.10 and 0.25 cm. (this was not an aerial photogrammetry work, but a terrestrial one, so the concept of GSD is not significant, but it can help to know the level of definition of the capture).

Agisoft Metashape software generated a dense point cloud and then a 3D mesh which we overlaid with a texture obtained from the original photographs. To ensure the correct orientation and scale of the photogrammetric model, we calculated the coordinates of 23 control points which then allowed us to use a common coordinates system both for the model and for the plans we consulted. The coordinates were obtained using topographical methodology with a manual total station Leica TS02. The relative accuracy of the model, after correct scaling and orientation, was ±1 cm. The model enabled us to generate orthophotographs of the most significant elevations of the complex. These then formed the basis for the graphic survey that aimed to supplement the archaeological floor plan (Fig. 3).

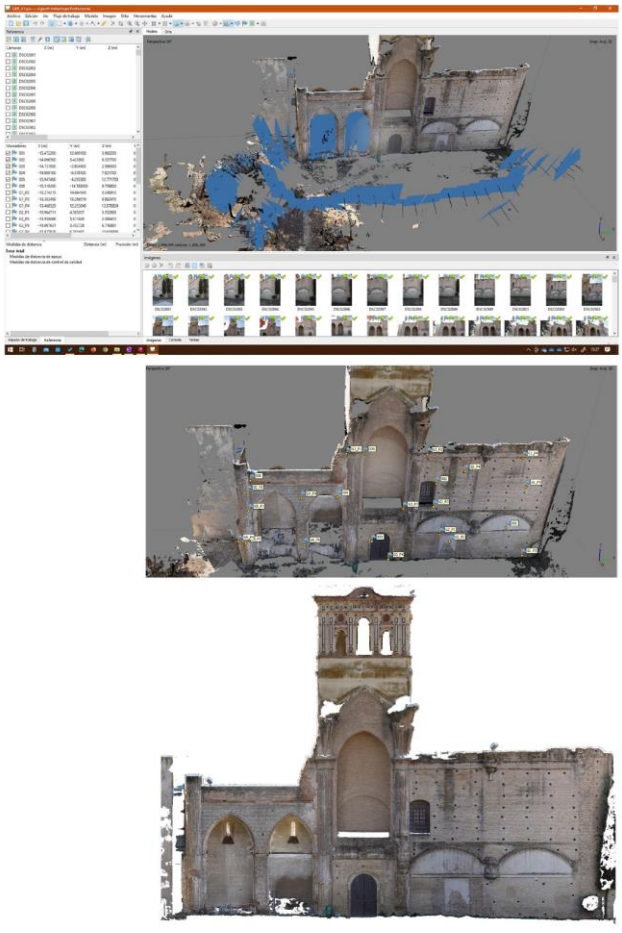

Fig. 3: Photogrammetry workflow: orientation of the photographs, control points and orthophotograph generated.

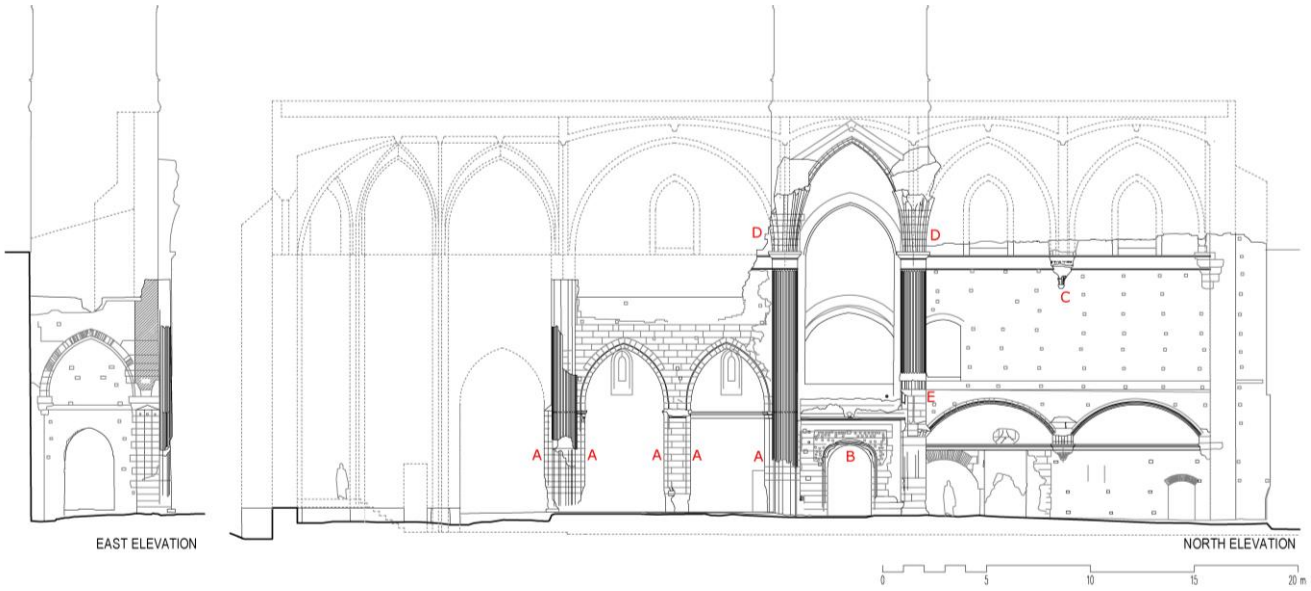

Fig. 4: Elevation indicating inventoried elements

3.2 Inventory of special elements

In this section we highlight a series of special architectural elements which, in addition to forming part of the stratigraphic analysis, offered valuable chronological indicators due to the significance of their form and position as parts of vaults, arches, walls and openings, showed with letters in the figure below (Fig. 4):

- Beneath the robust Doric demi-columns we identified the Gothic ones with fillets that Sancho Corbacho observed. Although considerably degraded due to the ruinous state of the church, these fillets appear almost intact in certain points such as the springing blocks of the vault tas-de-charges and where the pilaster meets the front arch of the choir. Through the point cloud we were able to draw the horizontal section of the two overlaid states with a sufficient degree of accuracy, verifying that some of the Gothic fillets were reduced to achieve the Renaissance semi-circle (Fig 5). The bases of these pillars could be located beneath the current height of the floor since this was originally situated at a depth of 0.75 m, although we are currently unable to check their condition and configuration. This type of pilaster first appeared in Seville with the construction of the city's cathedral around 1440–50, having originated in the Norman Gothic area and then been exported to the south of the Iberian Peninsula through masters such as Isambart, Carlín and Normán (Jiménez, 2013).

- The jambs and archivolts that form the entrance arches to the side chapels display ornamental remains that were refashioned to be clad and form smooth planes (A). The decoration of these elements was usually in the form of thistle leaves. Meanwhile, between the fillets on the Gothic pilasters we identified the remains of pommels or hemispherical pearls. Thistle leaf ornamentation is documented in Seville from the late 15th century, notably on the envelopes of the chapels of San Pedro and San Pablo in Seville Cathedral (Fig. 6) and on the rose windows of the rear walls of the two arms of the cathedral. Pommel ornamentation is less common in Seville, appearing most frequently in the work of the Castilian master Juan Gil de Hontañón, who appears to have borrowed these motifs from other masters of European origin associated with works sponsored by the Catholic Monarchs, such as the Colonia in Burgos and Juan Guas in Toledo.

- We identified two remains of door chambranles, one in the chapel under the tower and the other in the section adjacent to the entrance (B). In both cases, all the Gothic decoration has disappeared, leaving only a pitted effect on the wall (Fig. 7). The first one represents the remains of a fleuron concealed by the ledge on which the organ rests, over a basket-handle arch that was subsequently reworked into a semi-circular arch. The other is a curved gable that has practically vanished entirely, leaving only the imprint of its upper section.

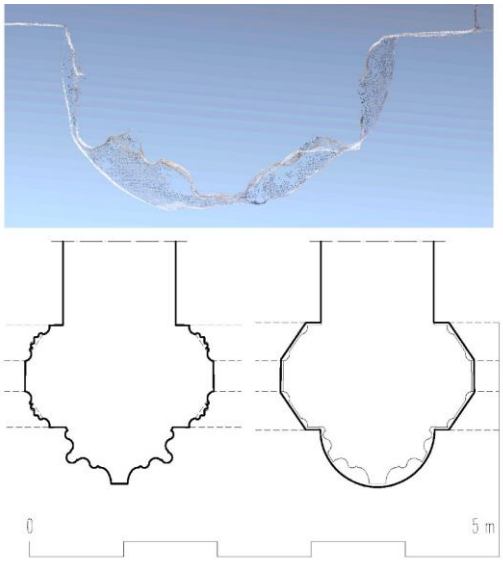

Fig. 5: Orthophoto of the photogrammetry of the pilasters and floor plans of the state before and after the Renaissance adaptation.

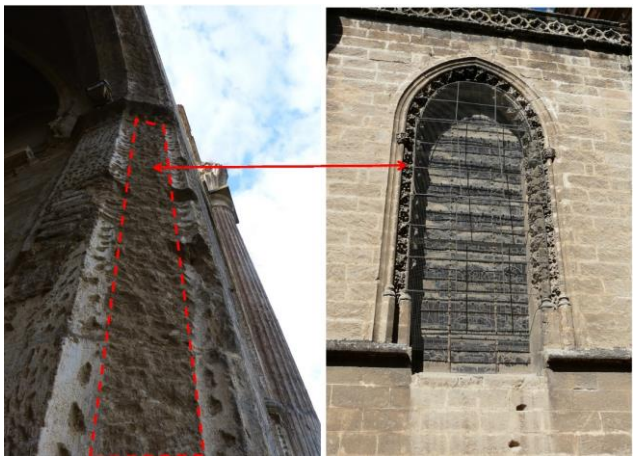

Fig. 6: Left: Traces of ornamentation on the chapel jambs; right: typological reference in the window of the chapel of San Pedro in Seville Cathedral. Late 15th century

Fig. 7: Chambranle traces in the chapel under the choir

- The vaults above the choir loft and the ground-floor choir rest on robust corbels, thus leaving the perimeter walls free of pilasters to accommodate the choir stalls (C). These corbels have an ornamental coating and bosses around a hexagonal base, forming a canopy, which in turn rests on a thistle leaf corbel (Fig. 8). Although greatly deteriorated due to their transformation in the 16th century, it is still possible to discern a configuration similar to the models found in buildings of the late 15th century sponsored by the Catholic Monarchs, such as San Juan de los Reyes in Toledo.

- A pair of tas-de-charges on Doric capitals has survived, maintaining a direct relationship with the aforementioned filleted pilasters (D). These remains are sufficient to confirm that they correspond to the tas-de-charge which in each of the pilasters serves as the springing block for two vaults with diagonal ribs and tiercerons, because they form a total of nine ribs whose directions on plan can be obtained from the flat projection of the point cloud. Two of these ribs correspond to the wall arches, another to the transverse arch, another two to the diagonal ribs, and the remaining ones, all with a smaller section, are the tiercerons. This type of vault is documented in Seville from the late 15th century. The brick bonds in the ashlar courses that form each tas-de-charge, and the curvature of the ribs, shed light on the form these vaults adopted, and also on the cross section of the church.

- At the point where the west pillar of the tower meets the choir there are five undressed courses of masonry in the shape of the pilaster envelope (E), as well as the section of the cornice that would have formed the choir front in the nave (Fig. 9). The undressed part of the pillar would have been concealed in the haunches of the choir vault and furnishes information about the envelope of the Gothic pilaster and contemporaneous nature of the dressing of this pilaster and the choir vaults. At this point a new tas-de-charge emerges to receive the ribs of the choir vault, which would also have been composed of diagonal ribs and tiercerons.

- The last of the special elements are two giant Doric Order demi-columns composed of a fluted shaft, which corresponds to the cladding of the previous Gothic shaft. This overlay explains the absence of entasis (F). The flutes in the lower third of the shafts adopt a different form, acquiring a torus that coincides with the height of the cornices on the chapel entrance arches, which in turn

corresponds to a third of the height of the column. Meanwhile, the collar around the top of the shaft continues on the wall in the form of a cornice. All of these articulations, and the ornamental traces on the arches and jambs of the side chapel entrance arches, confirm the existence of a global project to translate the church's formal elements into a sufficiently evolved Renaissance language, which was completed with the operations carried out in other spaces, such as in the passing points between the cloister galleries and the choir, and the construction of a monumental staircase.

Fig. 8: Left: corbel in the choir loft; right: tas-de-charge over one of the pilaster capitals

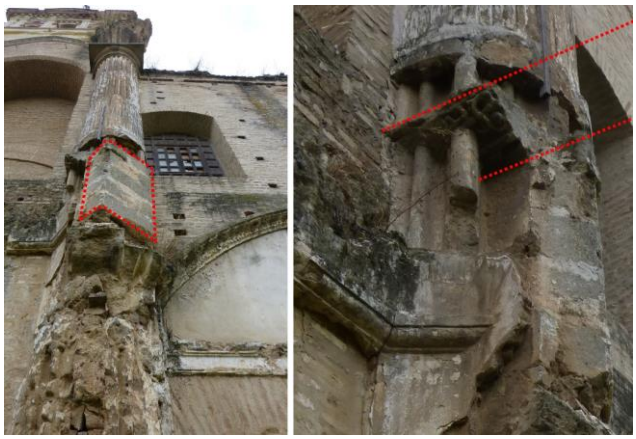

Fig. 9: Joint between the mouldings on the choir front and the vault with the pilaster

The first six elements likely formed part of a Late Gothic project that may have comprised two building phases. The first two described above, located in the lower part of the wall, likely date from around 1480, the date to which we ascribe the thistle leaf and pommel ornaments; the other elements take us to the end of the 15th century, coinciding with the expansion of the church and the sealing of the vaults. The appearance of these elements coincides with the time when the monastery was increasingly used as a temporary residence for the Catholic Monarchs and the place from which they organised their regal entries into the city, beginning in 1477.

The later elements correspond to the high point of the community in 1491, when the monastery achieved its largest congregation and the liturgical celebrations acquired their most splendorous moment, thanks to the royal presence. The adaptation of the church pilasters, chapel entrance arches and walls to a more Roman-style language may be viewed as a transitional operation that suppressed all Late Gothic ornamentation. Given the presence of the tas-de-charges, we believe that this adaptation did not affect the vaults, which were preserved because of their structural nature. This operation occurred at a time of formal and spatial change in the second half of the 16th century, although it had begun with the work of the great cloister, around 1526, according to the design of the Cantabrian master Diego de Riaño. Similar adaptations are found in the churches at the Carthusian monasteries in Jerez de la Frontera and Granada, albeit dating to a later period and using a Baroque language. In these cases, the modifications also affected the wall elements but spared the vaults, where only the surface ornamentation was altered.

3. 3 Stratigraphic interpretation

The starting point for the stratigraphic analysis of the visible remains of the church was the aforementioned archaeological campaigns, which yielded many of the underlying structures. The excavated remains are currently concealed but the graphical documents associated with these interventions enabled us to determine their position and situate them both on the floor plan and elevation, comparing them with the graphic survey conducted as part of this project.

We began the analysis process by identifying the different stratigraphic units (SU) and recording their main material and building characteristics, as well as the discontinuities between them. For each of these units we established whether they were earlier, contemporaneous, or later than the adjacent units based on their physical relationships: both direct

(joint, support, abutment, covering, cut and filling) and indirect (equivalence and equality). We then created a graph with the identified stratigraphic relations to show the chronology of all the elevations analysed (Harris matrix), considering six building phases based on the available historical data. The key method followed was the one proposed by Caballero Zoreda for the stratigraphic analysis of historical constructions (Caballero Zoreda, 1995) (Figs. 10 and 11).

It is also important to note that due to the degree of destruction of the original building following the secularisation of the monastery, which for practical purposes resulted in the demolition of all the wall elements that did not compromise the structural stability of the cloister and adjacent towers, we made the decision to exclude most of the *negative stratigraphic units* consisting in the loss or elimination of the claddings and decorative elements, whose existence we determined from the pitted effect of the stone or from historical photographs (Murillo & Utrero, 2004). The inclusion of these units in the elevations would have overlapped with the other units which these claddings conceal and which, in our opinion, sheds light on the chronology of the building elements. The negative stratigraphic units identified are represented by a linear mesh over the colour indicating their chronological phase.

As our initial stratigraphic unit we took the construction of the church apse, materialised in the preserved remains by means of a mortar and stone rubble filling between an interior layer of brick and an exterior layer of ashlars (SU 100) (Fig 12). We detected the relationship between these

Fig. 10: Plans based on the stratigraphic interpretation. Church floor plan with numbered zones: 1. Chancel; 2. Founders' chapel; 3. Arcosolium of the tomb of Leonor Nuñez; 4. Screens in front of the chancel and choir; 5 Staircase leading to the roof over the chapels; 6. Ante-sacristy; 7. Church nave; 8. Side chapels; 9. Choir; 10 Choir library.

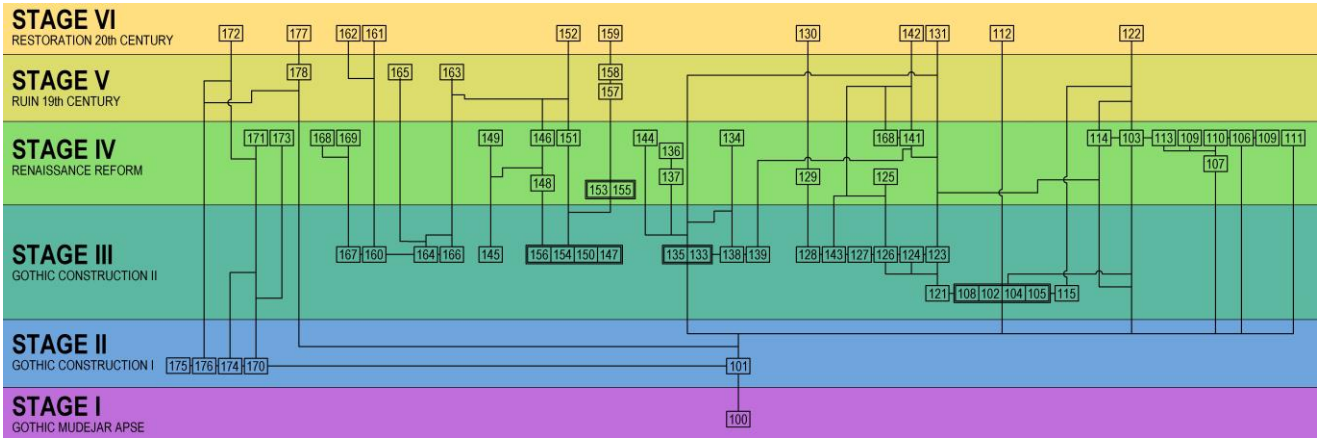

Fig. 11: Resulting Harris matrix

elements and the ones visible today in the springing line of the ashlar-stone pilaster, which defines the outer boundary of the chancel and would have supported the now lost arch of the adjacent chapel.

The change in the building system and the use of stone in this support, analogous to the following modules, led us to situate at this point the beginning of the next stage, which likely consisted primarily of the construction of the following three chapels. Judging from what we can see in the chapels, the construction of these spaces combined the use of ashlar stone on the pilasters, the entrance arches and the wall between them and the nave, with brickwork for all other walls and the webbing of the vaults (SU 101) (Fig. 13). Stone was also used for the ribs in the vaults, which likely rested on corbels that have since been lost. Except for the pilaster between the two chapels still standing, which does not project from the church wall, the other pilasters were formed by a series of fillets along their full length, like the ribs in the vaults.

Fig. 12: Church apse after the archaeological excavation (Pozo & Tabales, 1990)

This is clearly observed in the two preserved pilasters, as explained in a previous section of this article, and judging from the elements visible in the floor plan derived from the archaeological excavations we may deduce that the lost pilaster, at the edge of the rear facade, would have had a similar configuration. This entire phase was subsequently severely impacted when the original decoration of the architectural elements was replaced with a classical programme. This would have consisted in filling in parts of the pilaster fillets and removing some of the mouldings on the arch imposts. We also identified the pitted traces of what we believe to have been decorative elements, located in the oblique zones of the chapel entrance arches, both interior and exterior, and on the arches and jambs (SU 111,107) (Fig. 6).

Of particular note is the severe deterioration of the lower part of the pilasters, which has led to the disappearance of practically the entire bases of these elements, although we were able to identify a fragment of a horizontal moulding next to the pilaster adjacent to the entrance from the cloister. The tiny dimensions of this sample and the partial filling in of the adjacent surface make it difficult to visualise its configuration, beyond confirming the existence of an element that in any case we would expect to find in the lower part of Gothic supports. We were also able to identify the breakage of the intermediate arches connecting the chapels (SU 173). The masonry differs on one side and the other of these walls, which suggests that these elements would originally have formed arcosolia facing the worship area of the church and that they were subsequently opened up and converted into through-arches. Alternatively, they may have incorporated smaller through-openings on the interior side of the original arches.

Fig. 13: Left: preserved chapels on the Epistle side; right: detail of U163

The next phase, which likely completed the construction of the initial church, offers relative continuity with respect to the materials used on the pilasters and walls. Although it is difficult to identify a clear interface between these two phases, we were able to establish the boundary between them based on two types of criteria. In the first place, the change of material on the outside wall of the two preserved chapels in the section we defined as the "crossing" in previous parts of this article, where ashlars were used up to the height of the vaults over these chapels and thereafter a continuous brick wall (SU 102 and SU 104). The height where this change of material likely occurred would have ensured the structural stability of the side chapels and delimits the two phases. Meanwhile, in the space under the tower we clearly identified a change in the design of the building. The east pilaster is visibly engaged with the wall that separates the last chapel from the transition space between the cloister and the church, which is plain to see from inside this space. However, also visible is the abutment of the outer wall facing the church, which at certain points reveals the inclination of the planes that would have formed the pilaster jamb. This, and the moulding fragment identified in the lower section, confirms that the configuration of this pilaster would have been similar to the previous ones and conceived to receive the support of an arch like the ones in the preserved chapels. On the other side, the interior brickwork of the side wall of the vestibule is visibly imbricated with a small section to the east. Thereafter, an ashlar-stone elevation would have accommodated a door with a basket-handle or ogee arch, where the more prominent pitted effect in the *alfiz* frame around it suggests the elimination of the chambranle decorative elements that we mentioned in an earlier section of this article. We therefore situate at this point a change of criteria in the development of the floor plan and elevation before the completion of the section currently occupied by the tower.

The next two sections, corresponding to the church entrance, would each have been covered by a vault that supported the choir loft; above this it is still possible to see the stone moulding and supports of the ribbed vaults. The wall displays homogeneous brickwork with alternating courses of stretchers and headers and reveals the traces of the putlog holes used in its construction (SU 166) (Fig. 13). The lower part incorporated a through-opening in an ashlar panel, now greatly altered, which judging from the traces of its elimination would have culminated in a small gable (SU 148). The last section had two niches or openings, of which the larger once sported a brick segmental arch that was subsequently sealed.

The next phase, which we consider to be contemporaneous with the construction of the tower, resulted in the modification of the interior appearance of the building following the replacement or concealment of the Gothic decorative elements with a classical programme. We can ascribe the following operations to this phase:

- Disposition of Doric demi-columns with fluted shafts on the stone filleted pilasters. The volume of these elements likely contained the previous ones, although at certain points some of the original fillets would have been partly filled in. In the lower third of the complete demi-columns, with the exception of the one at the edge of the choir, the flutes have toruses coinciding with the impost line of the chapel arches.

- As already indicated, the decoration of the jambs and entrance arches to the side chapels was likely removed and replaced with a smooth cladding. Similarly, the Gothic horizontal mouldings were overlaid with classical ones. In the upper section, preserved in the area near the church entrance, a brick fillet was inserted at the same height as the joint between the capital and shaft.

- Also dating to this phase are the remains of the wall claddings that have been preserved in different areas and appear as larger surfaces in photographs from the 19th century.

- Associated with the construction of the tower, the arch of the organ opening was reinforced with

another, somewhat clumsily executed, brick arch (SU 129).

- The original entrance to the ground-floor choir from the monumental staircase would have been sealed, perhaps partially, to form a niche, and a new door with a brick segmental arch was likely opened next to the pilaster, in relation to the door leading from the cloister to the staircase area, the intention being to free up the entire plane of the wall to accommodate choir stalls.

After the monastery was abandoned, a succession of events caused the church to fall into a state of ruin. In fact, the rare remains preserved suggest a process of systematic demolition that only spared the structures necessary to guarantee the stability of the cloister. It is important to note in this respect the negative units corresponding to the elimination of entrance wall of the church (SU 163) (Fig. 13) and the walls of the last preserved chapel next to the rear wall (SU 178).

The last phase would have consisted of the consolidation and restoration actions carried out in interventions during the 20th century, notably the sealing of many of the openings in the wall, including the one that originally accommodated the organ (SU 130), the reconstruction of the parapets on the flat roof over the chapels (SU 112) and the one over the entrance vestibule (SU 131), and the repair of the demi-column capitals (UE 122 and UE 122).

It is important to bear in mind that the result of the stratigraphic interpretation developed on the preserved material remains, in the form of a historical timeline of the building, is inevitably partial because the succession of events conditioned both the preserved remains and the ones that are impossible to identify from their material traces. It is therefore useful to combine this interpretation with other types of analyses such as those conducted in this case (iconographic, architectural, geometric, etc.) in order to compensate for the challenges in identifying the existence of now lost elements.

3.4 Configuration of the spaces through written documentary sources

The works at the monastery could not commence until its independence from the Guadalupe monastery had been officially approved, which occurred in 1426. The following year, Ortiz de Zuñiga indicated that the monastery was "expanding its structures at the expense of its maintenance", in reference to the donations received from the parents of Diego Martínez de Medina, the monastery's first prior (Ortiz, 1795). By 1434 the essential structures had still not been built because Nicolás Martínez, the monastery founder and Brother Diego's father, was buried in the chapel of Santiago at Seville Cathedral, the monastery church having walls but no roof. It was not until 1446 that the church structure was sufficiently advanced to accommodate burials, in this case that of the first prior, Brother Diego, who passed away that year. Despite the absence of exact dates, earlier sources enable us to surmise that the church chancel, made up of the polygonal apse and the rectangular section in front of it, was well under way in the first half of the 15th century. From 1450 onwards, with a new prior and the support of cardinals and senior ecclesiastical dignitaries like Cardinal Cervantes, a driving force behind the construction of the cathedral and other foundations under the guardianship and patronage of the Hieronymite priors, the church acquired a new impetus, almost certainly adhering to the initial floor plan and design.

In the 1470s the monastery received several visits by the monarchs who, as they did at many other contemporary constructions which they frequented, undoubtedly influenced the new direction adopted by the project. Documentary records confirm that the monastery was involved in organising the regal entries into the city. This royal presence continued with Charles V and Philip II. The presence of monarchs and the increasing importance of the Hieronymite order have been interpreted as the reason for the church departing from the initial design and embracing Late Gothic forms between the 1470s and the end of the 15th century, coinciding with the expansion of the project.

The most accurate documentation on the final state of the church, comprising all the phases described in the archaeological analysis, is González de León's account dating from soon after the secularisation of the monastic complex. He saw the finished building before it was vacated to install a glasswork. In his description of the church, González de León refers to three distinct parts in the spatial structure of the nave: the chancel, the nave and the choir, separated by screens (Fig. 14).

The church, built entirely in stone from Martellila and designed in the Gothic style, comprises a fairly long and wide nave flanked by dark chapels. The chancel, which includes other chapels, is separated from the nave by a high

screen, as is the ground-floor choir at the church entrance. It has a vaulted ceiling and spacious flat roofs above. The paving is made of blue and white tiles from Genoa. The main altar rises above the high chancel and is made of gilded wood in the Gothic style, executed to perfection and with meticulous attention to every detail: it contains a statue of Saint Jerome and other worthy saints. On the Gospel side, inside the chancel, there were two chapels before the French arrived, the second one accessed via the first one. (González, 1845, 2: pp. 244)

If we pause to consider this description, it becomes clear that the chancel, which corresponds to the earliest building phases, was formed by a polygonal apse with a straight vaulted section, in keeping with the Sevillian Mudejar style that García-Tapial noted (1992) (1). Thanks to its depth, it was able to accommodate other chapels, as mentioned in the transcribed text above: one on the Epistle side and a double one on the Gospel side, the latter being "two chapels, […] the second one accessed via the first one" (2), achieving the same liturgical orientation as the church. In the straight sides of the apse chamfer, shorter in length, would have been the door leading to the sacristy on the Epistle side, and on the Gospel side a sumptuous tomb installed in 1479 inside an arcosolium, the final resting place of Leonor Núñez, second wife of Juan Ponce de León (3) lying sumptuously on the left-hand side of the chancel, in a gilded tomb, at the height of the main altar, above some gilded lions, with the countess's arms in a set of shields on the tomb, while the arms of the count her husband are in the arch above the tomb; and so refined and honourable is the countess's tomb that the fathers of this house have been reprimanded many times for giving her such an honourable burial, saying that a queen could not have received any better (Carriazo 1998, p. 89).

This chancel was separated from the church nave by a screen (4), which is mentioned in the cited text and in the inventory drawn up in 1810 (Fernández, 2009). In our interpretation, we add to these elements a staircase leading to the roof (5), which may have been located next to the apse, thus explaining the solid wall between the latter and the sacristy building. The spiral staircase fits in perfectly with the existing traces and also functionally, because as well as leading to the roof it likely accommodated the monastery's first printing house. Access to the staircase would have been from the space preceding what was the initial sacristy and which, after the construction of the new one, became the ante-sacristy (6).

According to González de León's account, the rest of the church was made up of "a fairly long and wide nave (7), flanked by dark chapels", a reference to the minimal light that filtered through the loophole openings that were sealed following the construction of the cloister, begun in 1526 (8). The entire nave was likely covered by "stellar vaults". This definition refers to tierceron vaults, since they are the type that form star shapes. We can at least confirm that the vaults would have been based on diagonal ribs and tiercerons, although we know nothing of their decorative arrangement because these vaults incorporate other ribs and therefore adopt numerous formal variations. The closest testimony regarding the existence of these types of vaults in Seville at the end of the 15th century is found in the carving of the choir stall hoods in the cathedral (Pinto, 2016).

The part that has received the most attention in the documentary sources is the choir (9), due to its spatial scale and the importance of the furniture, formed by two sets of high and low stalls and a lectern, both in the choir loft and in the ground-floor choir. We know from documentary evidence that in 1480 Seville Cathedral sold a series of old choir stalls to the Hieronymite monastery for 250 maravedis (Martin, 2004, pp. 368; Hernández, 2014, p. 70), which sheds light on the date when the vaults over this space were completed. Those same studies also record forty-four choir books, a quantity that suggests the existence of a choir library (10), which must have been located close to the ground-floor choir and connected to the choir loft.

3.5 Appearance of the monastery church in the iconography

There are several views of the monastery before it fell into ruin. The oldest one is taken from the south-east and was drawn by the Sevillian artist Luis Mariani between 1859 and 1860 for a collection of lithographs entitled *Panorama de la línea ferroviaria de Sevilla a Córdoba* [Panoramic Views of the Seville-Córdoba Railway Line] and published by the lithographer Carlos Santigosa. Two later ones, by the artist Gumersindo Díaz, were taken from the south-west and north-west of monastery between 1869 and 1889 (Sancho, 1975, p. 46). Mariani's image is a finely executed view of the monastery in terms of the framing and

proportion of the elements. This architectural view of the monastery building was completed with a landscape frame and figures in the foreground that allude to the purpose of the aforementioned lithography collection. In this image, the figures in the foreground identify the access road to the city, from which the drawing of the monastery was made, the middle ground shows the railway running between crop fields, and the monastery appears in the background. The second image is a view of the complex from a closer position, executed in a more natural and direct manner. The third one is a hasty sketch that captures only the most significant elements of the complex and bears witness to its advanced state of ruin. Three images offer valuable supplementary information as chronological indicators and a record of the shape of the monastery, which we will assess according to the degree of iconicity permitted by the techniques and procedures with which they were executed.

Focusing on the first image, if we select the part that shows a distant view of the south and east facades of the monastery, we observe several curious elements. If we compare it with the floor plan drawn up by García-Tapial (1992) (Fig. 14), we see that, given the distance at which the drawing was made, the author of the picture treated it as a rotated orthogonal projection of the monastery in which the external corners of the monastery, the tower and the dome over the staircase between cloisters are executed with considerable precision. We assume that the drawing was made from the old access road to the city, some 325 metres away from the monastery, on what is the present-day Av. Dr. Fedriani. This reference is symbolised in the image by the horseman, who also defines the height of the horizon line. We may therefore deduce that the church nave formed a single volume closed on the east side by a polygonal apse, with spurs culminating in pinnacles, and high windows between the spurs. The height of the nave walls corresponds to the base of the bell chamber. We can shed further light on this latter relationship by comparing this image with a photograph taken by José María González Nadin in 1924 (Fig. 15). This shows the imprint of the lost Epistle side wall on the east facade of the tower, traces nowadays lost following the latest restoration works. On this same side of the tower we can also discern the trace of one of the spurs prior to its construction and the joint with the sloping roof of a space built at a later date on the site of the sacristy, which was almost certainly the monastery's first printing house.

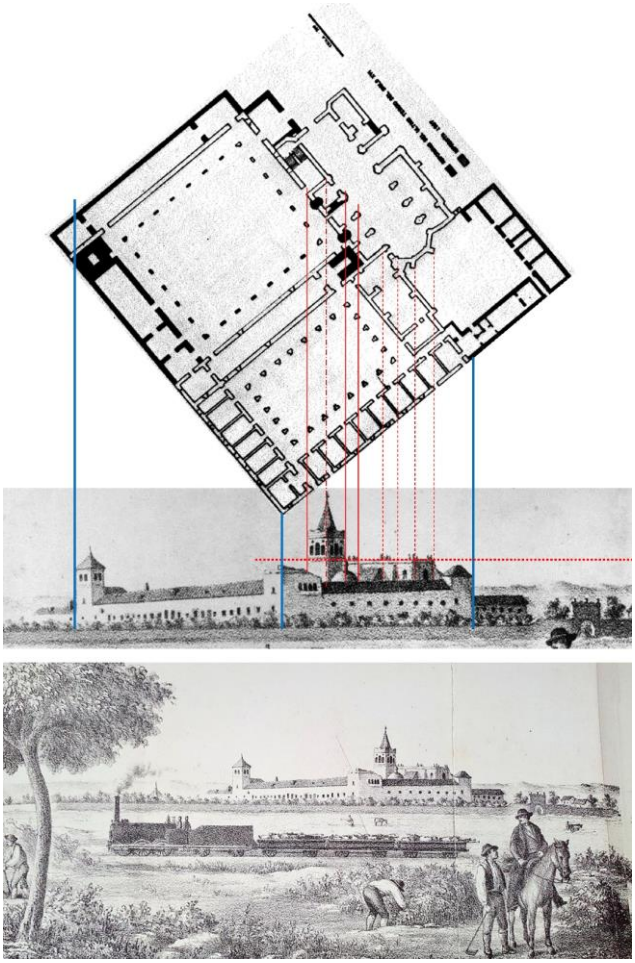

Fig. 14: Comparison of Mariani's view with the monastery floor plan. Composition by the authors based on Mariani's drawing and García-Tapial's floor plan (1992)

Nadin's photograph also reveals something else that enables us to relate it to Gumersindo Díaz's drawings: the north wall of the tower contains one of the side arches for the church vaults. If we compare it with the third drawing, made in 1886 from the north-west angle of the complex, we see that at this time a large section of the Epistle wall was still standing, with five-pointed side arches of the same height as the one one preserved but with different spans. We can easily locate the one that coincides with the tower, beneath which is a large shaded opening where the organ was situated, and in the preceding section we see another smaller opening corresponding to the entrance to the choir loft. Although the image does not provide the sizes and proportions of the elements, it does enable us to verify their existence and the topographical relationship between them.

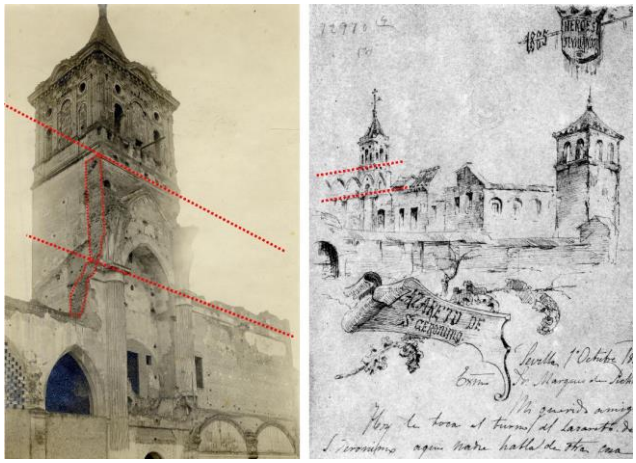

Fig. 15: Left: photograph by Nadin showing the wall interface (Fototeca de la Universidad de Sevilla); Right: drawing by Gumersindo Díaz (Sancho 1975)

From these images, which correspond in turn to different stages in the looting of the building, we may deduce that the outer nave facade had a uniform height coinciding with the mouldings at the base of the bell chamber, and that the nave itself formed a single volume with a polygonal apse where the changes in floor plan reveal the chamfer and the flying buttresses culminating in little pinnacles and the series of flat roofs, as described in González de León's text. On the inside, we can see that the church nave was covered by a series of vaults on engaged pilasters, whose side arches were similar in height to the preserved one corresponding to the tower. These vaults required external spurs, which become less robust above the tas-de-charges. It is also possible to see how the nave and apse once had a continuous cornice surmounted by partially preserved high windows.

3.6. Underlying geometry of the elevation and floor plan

Like all its contemporaries, the building analysed is the result of an architectural project that obeyed a spatial concept consistent with the period in which it was designed and erected. The entire project is reflected in written documents related to contracts and purchases as well as design drawings that have not been preserved. However, the traces and extant remains shed light on the geometry that served as a framework of formal control and a vehicle for converting the idea into the built work, which we can identify in similar buildings.

We used several premises to propose a geometric framework consistent with the preserved remains. In the first place, the church building was the result of the transformation of the space at the same time that it was actually being constructed between 1426 and 1500, and it therefore contains designs corresponding to both the initial and final idea. This meant that we were unable to obtain a single geometric system for the whole building, and the discontinuities between the different systems may be a reflection of these readjustments and changes. As our second premise we used the measurements verified through the archaeological prospection conducted between 1988 and 1990, and the photogrammetric survey of the elevation. From the archaeological prospection, we know that the height of the church floor coincides with that of the cloister. From the iconography, we verified that the top of the wall coincides with the part of the bell tower mentioned above and that the vaults were of the same height. As our third premise we adopted the shapes of the side arch and the cluster of ribs on the tas-de-charges on the two preserved pilasters or demi-columns, where we were able to measure the curvatures with a sufficient tolerance margin. The fourth and final premise was offered by the joint between the pilaster and the wall traces of the choir vaults, where the segmental-arched entrance of the ground-floor choir and the curvature of the side arches begin.

These premises revealed that the design of the apse in the initial Gothic Mudejar project may be obtained with a reasonable degree of accuracy from a formal control system that was frequently used at the time (14th and 15th centuries), consisting in a circle that circumscribes the regular octagon documented in the excavation. The centre of the circle provides the position of the central keystone from which the ribs extend towards the octagon vertices, which correspond with the axes of the spurs (Fig. 16). Meanwhile, the radius of the circle marks the centre of the following elongated vault that lends depth to the chancel. The circle diameter of 9.45 m (11 yards and 1 foot) is equal to the width of the nave. These simple geometric operations provide the shape and measurements of the apse plan, where we verified that the proportion of the straight section is approximately 3:5 (*superbitienstertias*)

These proportions revealed that the church nave is organised around four sections with vaults of variable proportions. In the first one, almost a square, which we defined as a false crossing, there is a difference of 97 cm between the sides. Since

this does not correspond to any known proportion, we believe it is the result of a readjustment of a 1:1 proportion with respect to a preexisting shape due to the advanced state of the original project, which did not contemplate this proportion. The largest dimension corresponds to the length of the nave, while the other one reflects the width of the chancel. The second section, which accommodates the tower and the organ tribune, has a 2:3 proportion (*sexquialtera*), while the last two, which accommodate the choir, once again vary in proportion, corresponding to approximately 3:4 (*sexquitertia*). All of these proportions are typical features of the medieval period, with the *sesquitertia* ratio representing the greatest perfection (Palacios, 2009b, p. 87).

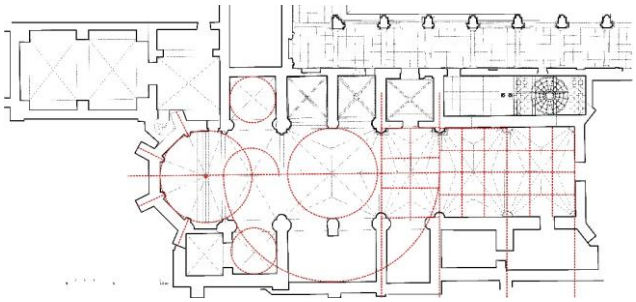

Fig. 16: Geometric framework of the church floor plan

The proportion of the preserved side chapels is approximately square, while all the others have variable dimensions. The depth of these chapels likely determined the position of the north wall of the cloister gallery and the dimensions of the spaces between that element and the choir, and the floor plan of the tower itself. The photogrammetic survey of the tas-de-charges reveals that the ribs of the tierceron vaults are based on the aforementioned proportions and configured according to the rectangle of each section. We can gain an approximate idea of how the tiercerons were obtained by joining the vertices to the intersection of the axes with the circle circumscribed between the pilasters. This system is found in more evolved building solutions, typically from the late 15th and early 16th centuries (Palacios, 2009a, pp. 77-84) (Fig. 17). From the intersection of these lines we can obtain the keystones of the tiercerons, from which the rampant ribs extend to the central keystone. In this type of vault, the diagonal ribs are usually semi-circular and determine the height of the central keystone and the curvature of the rampant ribs. This defines the basic structure, but these vaults can adopt extremely complex forms if they include other straight or curved ribs, none of which would affect the composition of the tas-de-charges.

We obtained the cross section of the church from the archaeological floor plan, the traces of the top of the wall observed in the tower and the tas-de-charges of the vaults over the preserved wall. These latter elements provided the design of the transverse arch. To obtain the height of the central keystone, we assumed that the diagonal arch was semi-circular, a recurring geometry in late 15th-century vaults (Palacios, 2009b, p. 31). With this geometry and the nave cross section, we assumed the floor heights documented archaeologically, resulting from a proportion of 2:1 (*dupla*). The preserved side chapels reveal a height that is half that of the nave. If the chapels were built before the nave, we can confirm that they conditioned the latter's height by means of a *dupla* proportion.

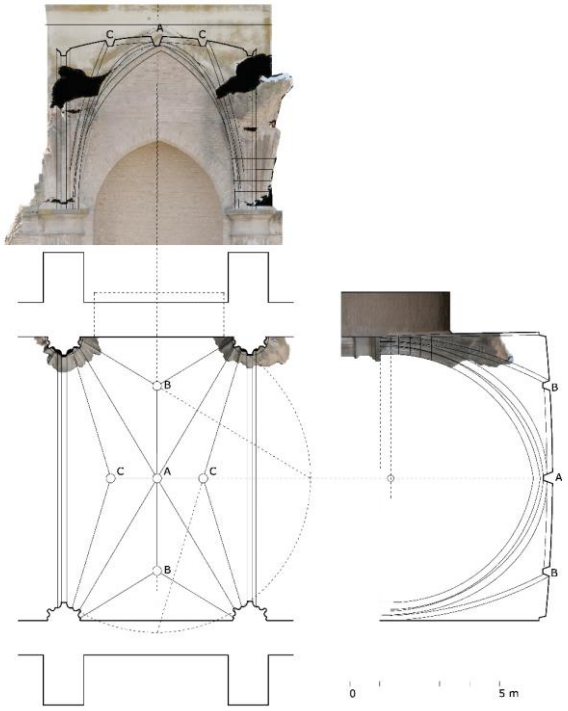

Fig. 17: Geometric framework of a vault based on the orthogonal projections of the scanned *tas-de-charges*

3. 7. Spatial and functional typological references

Ruiz Hernando's work on Hieronymite monasteries details a significant number of churches that are similar to San Jerónimo de Buenavista and therefore helps to fill the material and spatial gaps in our knowledge of this building. For example, we may deduce that there was no single pattern at Hieronymite monasteries until at

least 1415, when the first general chapter set out common rules which, despite the absence of any references to architecture, did adopt the Carthusian model as the benchmark (Ruiz 1997, 41). This marked the beginning of a boom in the construction and foundation of a large network of monasteries that facilitated the constant sharing of knowledge. The analysis of all the monasteries reveals certain recurring formal elements: the single-nave type flanked by chapels, each one connected to the next by little arches; the polygonal apse sealing a high chancel raised on a dais; the existence of a highly developed choir loft at the church entrance, connected to the upper and lower galleries of the cloister by means of spaces categorised as vaulted vestibules and monumental staircases; and the existence of bell towers.

a. The choir responds to the splendour in the organisation of liturgical ceremonies, with music exerting a strong influence. According to Ruiz Hernando (1997, p. 56): "A close relationship of mutual dependence is established between the choir and the chancel, the former being the place from which to watch the ceremonies in the latter, and the altar is therefore raised to compensate, as far as possible, for the difference in height between the two spaces. This is achieved by means of a flight of steps leading up to small platform where the altar and altarpiece are located."

There was a period of transition in the adoption of these choir loft solutions related to the implementation and development of choral music in the Iberian Peninsula between 1400 and 1460, and its subsequent golden age under the patronage of the Catholic Monarchs (Diaz, 2017, p. 194), with repercussions for the spatial articulation of the churches that were either built or renovated during this time. One of the most visible impacts was the presence of a high tribune for the organ, usually located on one side of the nave section preceding the choir (Martin, 2004, p. 45). Organs require a deep opening to accommodate their apparatus, which in turn required perforating the side wall of the church, as we find in the Hieronymite churches of El Parral, Valparaíso, Armedilla, Alba de Tormes, and others. In the case of Buenavista, this great opening would subsequently form part of the tower and is situated between the two spurs of the elongated vault over the corresponding nave section. When the bell tower was built in the second half of the 16th century, this opening had to be reinforced with a second relieving arch to join the existing one, both concealed by the organ. This choir structure was completed with other related spaces such as vestibules and access staircases from the cloister galleries, which at Buenavista acquired monumental proportions worthy of the monarchs and illustrious personnages that frequented them. We assume the existence of a choir library due to the large number of volumes the monastery held, and it must have been located near the chapels at the church entrance, on the Gospel side, accessed via a door like the one on the Epistle side. The structure was likely very similar to the one documented at other monasteries, and almost identical to the choir library at the old Dominican monastery of San Pablo in Seville. Another similarity with this Dominican monastery is the width of the nave, and we can therefore form an idea of the space and its possible furniture through other published reconstructions (Pinto, 2015).

b. The chancel was the burial place or pantheon of the patrons and donors, distributed between the adjacent side chapels, the apse walls and the crypts beneath the dais on which the altar and altarpiece were situated, in keeping with the pattern at other Hieronymite churches (Ruiz, 1997, p. 76).

c. Judging from the preserved remains, the church nave was formed by a quasi-square section adjacent to the chancel flanked on both sides by two chapels, and three sections of elongated vaults occupied by the choir and organ and tribunes. The existence of a crossing was common in Hieronymite churches and frequently used for the burials of the founders and descendants, according to Ruiz Hernando (1997, p. 77). Sancho (1949) proposes a crossing with two arms in the floor plan that accompanies his work, but the archaeological prospection did not yield any evidence of arms whatsoever. The idea of a crossing can be imprinted on a building simply by the use of a section with a square vault as opposed to a sequence of elongated vaults, even if it has no arms, in keeping with a solution frequently adopted in the 15th century (Ruiz, 1997, p. 73). The pairs of side chapels in these sections also reflect a widespread model following the construction of the El Parral monastery in Segovia, designed by the masters Juan Guas and Martín Sánchez Bonifacio. The time frame for the construction of the El Parral church (1472-1500), is similar to the one estimated for the construction of the Late Gothic churches of the Buenavista and Valparaíso monasteries, both deeply connected through the main monastery in Guadalupe.

4. Results of the work

Cross-referencing information from different documentary sources and knowledge strategies enabled us to develop a model of the building that answers the questions posed, at least as far as permitted by the facts known for certain. For this reason, the model is also at the precise point that enables us to assign value to fragments in relation to a now lost complex. The recurring formal elements are sufficient to gain an idea of the spatial structure and imagine multiple final solutions which the model cannot furnish as facts. Despite those gaps, the model enables us to view the ruin from a new dimension that makes sense of the preserved fragment (Fig. 18). This model depicts the church at the end of the process of completing its nave, in what is known as the Late Gothic period, between 1480 and 1500. After the completion of the church, and a few years later, a Renaissance reform took place that did not affect, as already mentioned, the spatial structure of the church, only the ornamentation of the surface elements of the walls. The level of reliability of the resulting image is based on the adoption of a vaulting system consistent with the period in which its construction is documented, basically tercelet vaults whose traces have remained. But, as mentioned in previous sections, there are no material or documentary testimonies that allow a reliable approximation to the final solution, so we remain in the configuration of the tercelete that is always the geometric base of this type of vaults.

The church building actually represents a series of overlaid realities, as revealed by the ruin. The Renaissance remodel reveals the shared elements between the Gothic and Renaissance languages, and the points where they diverge. The abandonment of vegetal decoration and Late Gothic ornament, and the acceptance of tierceron vaults in the classical discourse, shed further light on this fragmented organism.

In this work, the preserved remains analysed with archaeological methodology have been as important as the available documentary sources, and the interpretation that can be made of them, especially the iconography. The degree of reliability was assigned according to the role the drawings play and the representational methods and intentions in the configuration of each image. We treated the photographic images in two ways: as a graphical document, and as a device from which to obtain a rigorous three-dimensional model of the object of study through photogrammetry. The resulting model contains fragments of all of these sources: stratigraphic-construction interpretation, photographs, drawings, descriptions, etc. We combined all of these to create a chronological discourse that explains, as far as possible, a destructured synchronic reality. The final image reflects this flow of information, leaving room for future contributions that may bring greater certainty.

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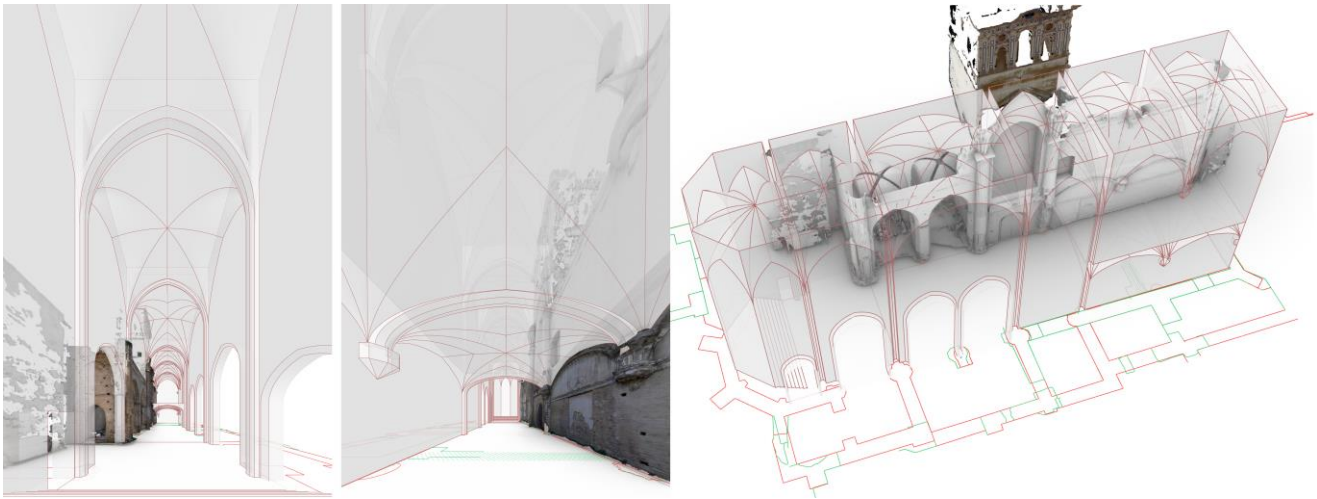

Fig. 18: Visualisations of the interior of the church after the construction of the nave at the end of the 15th century.

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