The King, the Architects and the Philosopher: Invention in Mallorcan Architecture around 1300

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'One of the most astoundingly original designs in existence and, beyond question, the work of one of the greatest masters of the Middle Ages'. With these words, the architect Ralph Adams Cram described in 1932 the cathedral of Palma de Mallorca (Fig. 3.1).[1] He could have claimed more or less the same for Bellver Castle, built at the same time and less than three kilometres from the cathedral (Fig. 3.2). Since the eighteenth century, much has been written about their history and their unusual architectural composition.[2] My approach aims to reflect on some aspects of the decision-making involved in the early stages of both projects.[3]

Why were a new cathedral and castle begun in Mallorca in the first years of fourteenth century? The answer to this question has a great deal to do with the consolidation of an extremely young kingdom, Mallorca, whose origins can be traced to James I of Aragon (1213–1276), who conquered the island of Mallorca in 1229 and the kingdom of Valencia in 1238. In his will of 1272, he divided the kingdoms and territories he possessed into two parts. His son Peter would inherit Aragon, Catalonia and Valencia. Another son, James, was given a new kingdom consisting of the islands of Mallorca, Ibiza, and Formentera, the counties of Roussillon and Cerdagne, and the seigneury of Montpellier (Fig. 3.3).[4]

When James I died in 1276, the division became effective. Peter III succeeded to the throne of Aragon, but he did not accept his father's decision, opposing James's inheritance. Some years later, given that he was married to Constance of Hohenstaufen (the granddaughter of Emperor Frederick II), Peter accepted the crown of Sicily as a consequence of the Sicilian Vespers (1282). His brother James then joined the French king, Philip IV, and Pope Martin IV against Peter (1283). Peter died in 1285, but the war went on. Alfonso III, Peter's son, attacked James of Mallorca in Perpignan and invaded the island. Alfonso's death in 1291 brought his brother, also called James, to the throne of

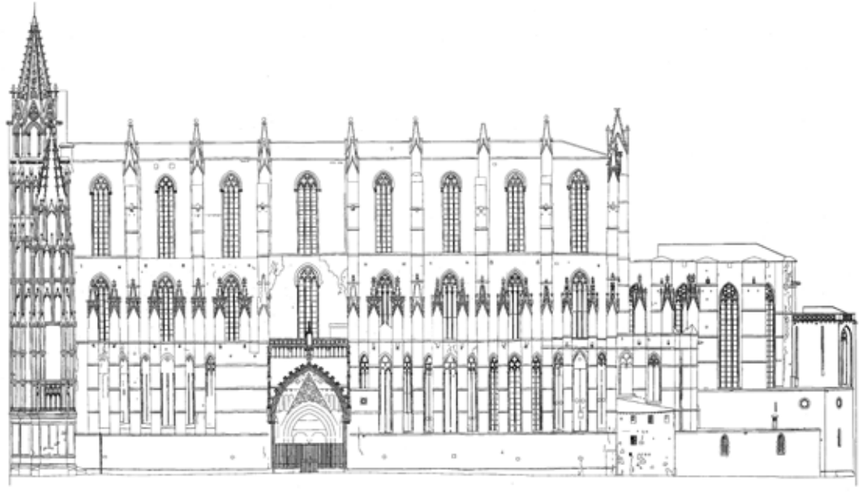

Fig. 3.1
Cathedral of Palma de Mallorca, elevation. In Joan Domenge, *L'obra de la seu. El procés de construcción de la catedral de Mallorca en el tres-cents* (Mallorca: Institut d'Estudis Baleàrics, 1997), Fig. 22.

Fig. 3.2
Bellver Castle, Mallorca, courtyard (begun before 1309).

Aragon. For twenty years, two kings—uncle and nephew—reigned with the same name and ordinal, James II, one in Aragon and the other in Mallorca (Fig. 3.4). In 1295, urged by Pope Boniface VIII, the nephew returned Mallorca to his uncle, who pledged fealty to him. James II of Mallorca could finally go back to the island, thus starting the second part of his reign, in which he undertook to completely transform Mallorcan society. He enacted laws, founded new towns, reorganised farming and—most pertinent to this essay—initiated large building projects.[5]

The need to defend the entrance to the city of Palma from the west, where the recent invasions had come from, represented more than sufficient reason to build Bellver Castle quickly. As for the cathedral, this was grounded in the wish to replace the former mosque which had been 'purified' and converted into a church dedicated to the Virgin Mary. [6] The new building would also serve as a pantheon for the new dynasty.

Indirect sources tell us that the monarch, the clergy, and the faithful from the city and the diocese collectively bore the costs of building the cathedral. Unfortunately, we only have written testimony of the sovereign's wish. In a codicil added to his will in 1306, James II ordered a chapel dedicated to the Trinity to be built in a suitable place in Santa María, with enough space for his tomb.[7] He also provided the substantial sum of two thousand Mallorcan pounds for the cathedral works.[8] In 1309 he authorised collections in Menorca 'ad opus Ecclesiae Sedis Maioricarum'.[9] We do not know when building began, but from

Fig. 3.3
Map of the kingdom of Mallorca. In David Abulafia, *Un emporio mediterráneo: el reino catalán de Mallorca* (Madrid: Ediciones Omega, 1996), map 1.

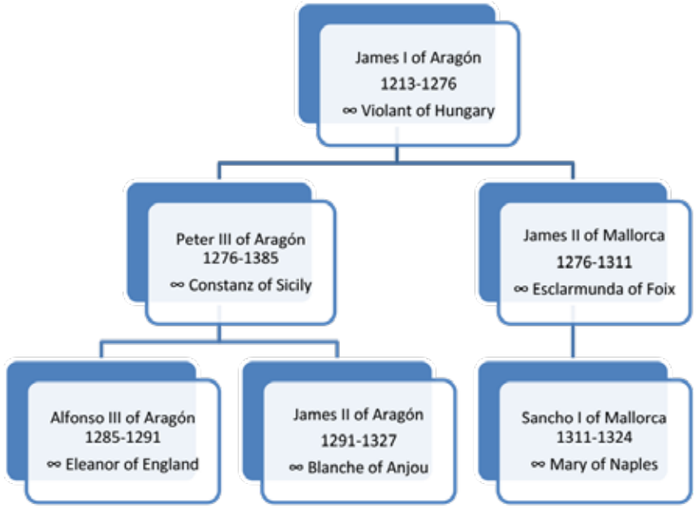

Fig. 3.4
Family tree of the Monarchs of Aragon and Mallorca (1229–1334) (produced by the author).

two other documents it can be inferred that it was before James II's death in 1311. The first document records that in 1313 payment was made for work done on the east end ('lo cap', or 'the head') following James II's instructions;[10] the second, a letter of 1327 from Prince Philip of Mallorca, affirms that the works in the cathedral east end were begun by his father James II.[11]

There is nothing unusual about these resolutions, but both patrons and architects opted for unique shapes in the cathedral and in the castle, substantially deviating from the norm. At first glance, Palma Cathedral consists of the juxtaposition of three architectural volumes in which right angles dominate, each larger than the other: the Trinity Chapel, the Royal Chapel, and the nave and aisles (Fig. 3.5).[12] Massive orthogonal buttresses flank the chapels, making a strong visual impact. Conversely, as Alexandre Cirici memorably described it, Bellver is a 'festival of circles', with a circular courtyard surrounded by a two-tier gallery with round arches in the lower part and intersecting pointed arches in the upper (Fig. 3.6).[13] Between the gallery and the external wall, also circular, are halls, rooms, stairs, a chapel, a kitchen, and so on. Three semi-circular towers mark the perimeter, alternating with four cylindrical defence posts. The entrance is protected by a fourth, larger tower on the outside, also circular. The plans for the cathedral and castle could not seemingly be more different from one another. Nevertheless, both are based on elementary geometrical shapes, combined to create designs that were extraordinarily unconventional at the time.

These differences have not prevented some academics from attributing at least one stage of both buildings to the same architect, Pons Descoll, who specialised in walls and fortresses. Writing in the nineteenth century, Jaime de Villanueva considered Descoll capable of leading the cathedral construction works.[14] He took part in the construction of La Almudaina (Mallorca's Royal Palace) in 1309 and in the royal palace of Perpignan (with a plan, according to Durliat, that rigorously combines squares and rectangles, inspired by the Emperor Frederick II's castle of Lagopesole in Basilicata).[15] Marcel Durliat agreed with Jean-Louis Biget in identifying Pons Descoll as the same master Pons who built Albi Cathedral in 1293–95.[16] For the cathedral's east end, another master has also been suggested: Jaume Fabre, who was on the island in the second decade of the fourteenth century, before being asked to resume Barcelona Cathedral's works in 1317.[17]

Some scholars state that the initial stage of the cathedral would have consisted solely of building the Trinity Chapel and the Royal Chapel, in order to connect them to the

former mosque which continued to be used for some decades.[18] One of the hurdles to understanding the initial design is the lack of information regarding the exact dimensions and location of the mosque. In 1238, nine years after the conquest, the Almudaina Mosque was consecrated as a cathedral and dedicated to the Virgin Mary.[19] The lapse between consecrating former mosques and replacing them with edifices more in keeping with Christian architectural tradition varied widely in medieval Iberian kingdoms.[20] In Mallorca, James II's decision to build a chapel for his tomb in 1306 is the first undisputed reference to the new cathedral.

As Gerardo Boto has pointed out, choosing a cathedral as a burial place for the monarch was exceptional in the funerary tradition of the Aragonese dynasty, whose kings mostly preferred abbeys, but it was not uncommon in Castile, Navarre and other European kingdoms.[21] Furthermore, there were no important monasteries or collegiate churches on the island. The exceptionality of such a choice parallels the exceptional shape of the funerary chapel. James II's will does not specify its location. The Almudaina Mosque was probably too small to house the chapel, contrary to what happened with another royal chapel in another city conquered from Muslims, the amazing royal funerary chapel set up in Seville Cathedral, which took advantage of several aisles of the huge former mosque.[22]

Under James II's impulse, work on the innovative new cathedral started soon after 1306. The few references we have to the early years of construction make clear the lengths that were taken to achieve a magnificent cathedral. In order to make space for the cathedral's east end, the king commanded that part of the Mirador be pulled down.[23] The letter from the king to his representative in Menorca in 1309, granting permission to collect alms for the building, confirms that authorities were involved with the support of the local population.[24] It is important to point out that in at least one payment in 1313, the city contributed forty percent.[25] Joan Domenge has shown that the building of the cathedral was possible thanks to a confluence of initiatives.[26] Thus, the start of the new cathedral was an endeavour which included the participation of the monarch, the councillors of Mallorca, the clergy (Bishop Guillem de Vilanova, r. 1304–1318, gave 250 pounds) and the faithful of the diocese.[27] Prince Philip's letter of 1327 reveals that testamentary dispositions in favour of the cathedral building were numerous.[28] Although the Trinity

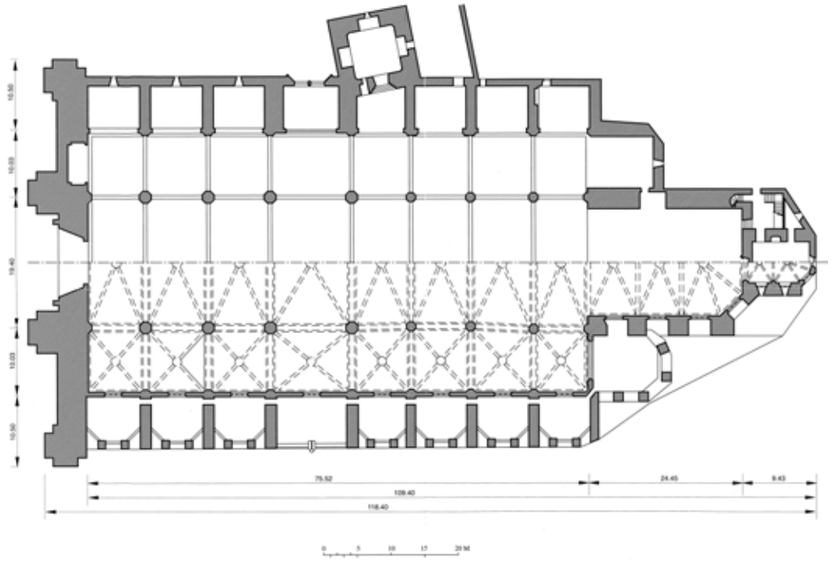

Fig. 3.5
Cathedral of Palma de Mallorca, plan. In Joan Domenge, *L'obra de la seu. El procés de construcción de la catedral de Mallorca en el tres-cents,* Fig. 20.

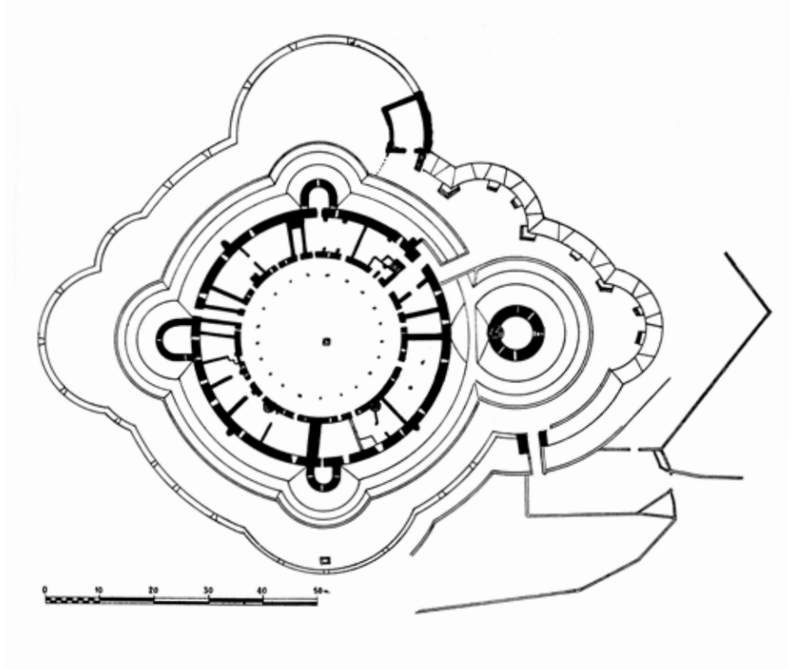

Fig. 3.6 Bellver Castle, plan. A. Jiménez in Marcel Durliat, *L'art en el regne de Mallorca* (Mallorca: Editorial Moll, 1989), Fig. 28.

Chapel was reserved for the sovereign, everything points to the clergy and populace being equally involved in the new edifice from the outset, as shown by the coat of arms of the city of Mallorca carved on a keystone of the Royal Chapel.[29] It is easier to understand the council's participation in a project that, from the very beginning, included not only places for the king and the canons, but also nave, aisles and chapels for the laity.

The Trinity Chapel is arranged on two levels, with subsidiary spaces in the ground floor (Fig. 3.7). Marcel Durliat believed it recreated a type of two-storied mausoleum of ancient origin.[30] Scholars have cited other funerary models, from the mausoleum of Theodoric in Ravenna to the royal chapels in Seville and Córdoba, and even San Isidoro in León.[31] Nevertheless, the intended funerary function of the lower room (Fig. 3.17) is more than doubtful. From the beginning, as evidenced by strainer arches built from the outset in the external walls (Fig. 3.8), arches were planned and built in both side walls of the upper chapel, probably to be used as funerary arcosolia (Fig. 3.9). Conversely, the rectangular room at the lower level, with a splayed window and covered with two rib vaults, contains nothing which makes its original purpose completely clear. The pointed niche set in the northern wall and the original niches in the southern room were probably intended to serve as reliquaries. Both corridors leading to the central room could be closed by means of doors (the northern one is currently preserved). Despite all this, when James II died in 1311 his corpse was not entombed in the Trinity

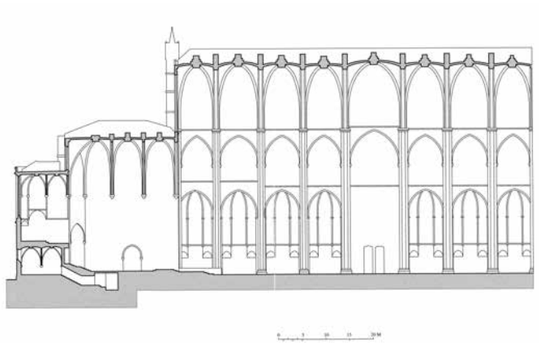

Fig. 3.7 Cathedral of Palma de Mallorca, section. In Joan Domenge, *L'obra de la seu. El procés de construcción de la catedral de Mallorca en el tres-cents*, Palma, 1997, Fig. 21.

Fig. 3.8 Cathedral of Palma de Mallorca, discharging arches in the external sides of the Trinity Chapel (left: north; right: south) (early fourteenth century).

Chapel.[32] This did not prevent the fact that some years later, in 1330, it was described as 'the chapel of the lord king James' ('la capeyla del senyor rey En Jacme').[33]

In 1929, the architect Guillem Forteza developed a hypothesis that gained much support. In his opinion, the Royal Chapel was conceived as a cathedral without aisles, and with six bays and a presbytery, that is to say, four more bays than it has today (Fig. 3.10).[34] Advocates of this hypothesis argued, among other reasons, that there is a long tradition of buildings with a single nave in southern France and in Gothic architecture in the Mediterranean in general. Although Forteza's supposition was rejected by Emilio Sagristà with solid arguments, and was described by Gabriel Alomar as a 'deceitful fantasy', the idea that the first plan included only the Trinity and Royal Chapels has had many followers, particularly Pierre Lavedan.[35] Marcel Durliat distinguished three successive projects and defended the idea that the first project, 'robust and a bit rude', included the Trinity and the Royal Chapels, which he attributed to Pons Descoll. For him, this first design had limited ambition.[36] The addition of aisles would thus have been part of a second project, more ambitious and refined, following a pattern very popular in large Gothic churches in Catalonia—though in order to maintain the Royal Chapel, the architect was prepared to forego an ambulatory, adding side apses instead. The third project, 'colossal' and definitive, would have raised the nave much higher (expressing what Durliat called 'geni barceloní', that is, a kind of Barcelonese ingenuity).[37] Recently Joan Domenge, author of the most comprehensive study on the fourteenth-century building process, referred to Forteza's proposal as 'plausible' and introduced some nuances to the three-stage process described by Durliat.[38]

Fig. 3.9 Cathedral of Palma de Mallorca, funerary arcosolium in the Trinity Chapel (early fourteenth century).

In the face of the surviving evidence, certain hypotheses about Palma's building process have been gradually abandoned: for example, nobody asserts today that the cathedral was begun by James I the Conqueror. Nevertheless, there is still controversy over the relationship between

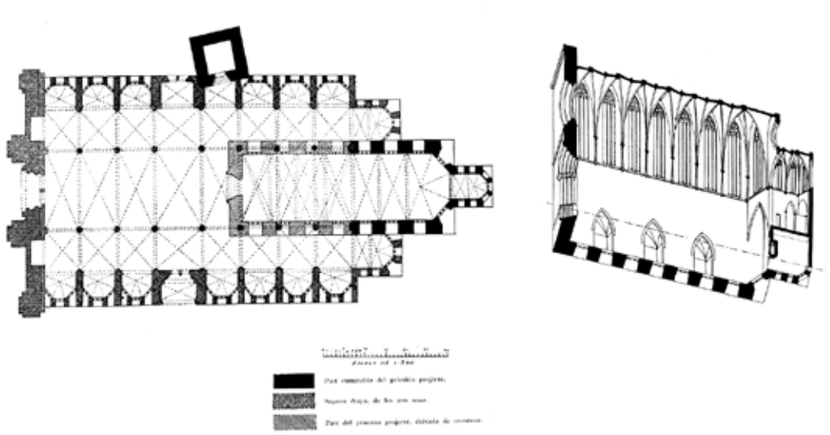

Fig. 3.10
Cathedral of Palma de Mallorca, Guillem Forteza's hypothesis (black: first project built; diagonal lines: first project not built; crossed lines: second project). In Guillem Forteza, 'Estat de l'arquitectura catalana en temps de Jaume I. Les determinants gòtiques de la catedral de Mallorca', in Miquel Seguí Aznar (ed.), Guillem Forteza. *Estudis sobre arquitectura i urbanisme*, vol. 2 (Barcelona: Abadia de Montserrat, 1984).

the Trinity Chapel and the Royal Chapel, on the one hand, and between both chapels and the nave and aisles, on the other. Some find that the Trinity Chapel 'denotes in its style a date of construction earlier than the rest'.[39] Others, in accordance with Sagristà and in contrast to Forteza's followers, consider that the initial project envisioned the enormous church as it is today, with the Trinity Chapel, the Royal Chapel, the parallel apses, and a huge nave with aisles and chapels between buttresses.[40] It is this position with which I myself am aligned.

In fact, in addition to the reasons outlined by Sagristà, the inspection of masonry and the analysis of measurements suggest that the Royal Chapel was designed, from the very beginning, as the east end of a great building.[41] Where the Royal Chapel's lateral walls turn at the junction with the nave, they swell to form half-piers with uninterrupted masonry courses. As Joan Domenge notes, these half-piers are consistent with the octagonal piers that support the arcades between the nave and aisles (Fig. 3.11), and it is clear that they were intended to support enormous arches, rather than connecting permanently with the former mosque (the roof of the Almudaina Mosque must have been much lower than the vaults of the Royal Chapel, which rise to 27.4 metres).[42]

It must be remembered that Mallorca Cathedral is neither a parish nor a mendicant church, which in the Iberian kingdoms were the type that most often had a single nave. It is certainly the case that in southern France some cathedrals were designed in the last third of thirteenth century with a single nave, as at Albi, whose dimensions and monumental east end far exceed the Royal Chapel in Palma. In my view, it is unthinkable that, around 1300, a cathedral would be designed with a single nave 15.85 metres wide and 24.45 metres long (or more or less fifty metres according to Forteza's proposal). It would be too small compared to the other cathedrals of the time in Catalonia or southern France.[43] And not only in comparison with cathedrals: the parish church of Santa Eulalia in Palma de Mallorca, which held several major events for the Mallorcan monarchs and was built at a similar date to the cathedral, has three naves with chapels between the buttresses, plus an ambulatory opening onto three large polygonal and two rectangular chapels. It measures more than sixty metres in length and is twenty-seven metres wide.[44] The church of San Francisco in the same city, where mass was first held in 1286, has a single nave with chapels

more than seventy metres long and almost thirty metres wide. The Dominican church in Palma, no longer in existence, measured sixty metres long and thirty metres wide. Is it conceivable that a building destined to be the cathedral and royal pantheon would have been designed to be much smaller than the parish and conventual churches in the city?

Further reflection on the initial project may be useful. After 1250, cathedral buildings in the crown of Aragon were usually designed with a chevet composed of an ambulatory and radiating chapels. Why was this not done in Palma? Obviously, it was not a question of space. Mallorca Cathedral measures 118 metres from the east wall of the Trinity Chapel to the western façade, and its nave, aisles and side chapels are about sixty metres wide. By comparison, Barcelona Cathedral, which has an ambulatory, is ninety-three metres long and forty metres wide. The site in Palma certainly allowed for a large cathedral with ambulatory. But the architect and the sponsors preferred a very different and extremely original solution: on the one hand, the Trinity Chapel, reserved for the monarch, would occupy a place of honour both in location and elevation, and on the other, both clergy and laymen would have enormous and extraordinary spaces at their disposal. The most conventional feature of this solution, an east end with three polygonal apses, in fact has many parallels in southern French Gothic architecture.[45]

The existence of a single project is not incompatible with the partial modifications of details that can be seen in the building and that are attributable to the intervention of successive architects or different construction workshops. Although the walls demonstrate changes in various places, I do not think that during the first stage of construction alterations were sufficiently consequential to indicate the implementation of a second project. Constructed during the first phase were the walls flanking the Trinity Chapel, the lower levels of the side walls of the Royal Chapel up to the point where they meet the lateral apses (Fig. 3.12), and all of the Trinity Chapel, including the side spaces (very much modified during subsequent centuries).[46] By contrast, changes are evident in the elevations of the Royal Chapel. The Trinity Chapel squinches are half cones and the length of their diagonal front is equal to the distance between the squinches; meanwhile, the Royal Chapel squinches have ribs, and the length of their diagonal front is significantly smaller than the distance between them (Fig. 3.13). Likewise, while the three eastern

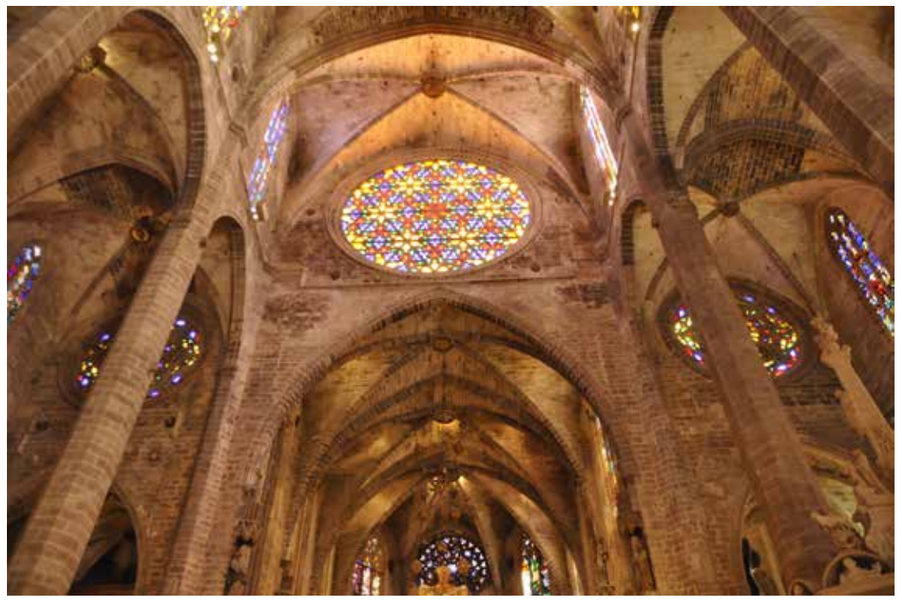

Fig. 3.11
Cathedral of Palma de Mallorca, arch opening into the Royal Chapel, rose windows, pilasters, and pillars (fourteenth century).

Fig. 3.12
Cathedral of Palma de Mallorca, east end (early fourteenth century).

windows of the Trinity Chapel are similar to each other—perhaps deliberately making reference to the chapel's dedication, and in contrast to the lack of light which enters through the lateral windows—in the Royal Chapel the arch which opens onto the Trinity Chapel is much wider and more luminous than the windows that flank it. Moreover, the mouldings of the tracery and window jambs of the Royal Chapel are different to those employed in the windows of the Trinity Chapel. Similarly, the southern buttresses of the Royal Chapel differ from the northern ones, both in terms of their dimensions as well as in the carving of the ashlar of the passageways that pierce them (Fig. 3.14).[47] All these differences lead one to think that the first architect was replaced during the Royal Chapel's construction. The new architect (Jaume Fabre?), or perhaps a third architect, would have designed the junction with the lateral apses.[48]

These modifications, which predate the obvious adjustments in the high level of the

Fig. 3.13
Cathedral of Palma de Mallorca, squinches in the Trinity Chapel (left) and the Royal Chapel (right) (early fourteenth century).

Fig. 3.14
Cathedral of Palma de Mallorca, passageways piercing the buttresses of the Royal Chapel (left: north; right: south) (early fourteenth century).

northern aisle's eastern wall observed by Alcover (and later by Durliat), do not necessarily imply deviation from the broad outlines of the initial design.[49] The greatest challenge came when the enormous nave was built. Octagonal piers 1.49 metres wide support diagonal pointed arches whose span reaches almost twenty metres, while the distance between piers is 17.81 metres. This makes Palma Cathedral one of the great creations of Gothic engineering (Fig. 3.15). José Carrasco noted that 17.81 metres is equivalent to nine Montpellier canas, the measurement then in use in Mallorca (with one cana equalling 1.98 metres), while the Royal Chapel's width (15.81 metres) equates to eight canas.[52] The most interesting thing is that, as calculated by Carrasco, the radius of the arches in the Royal Chapel and the main nave is the same—six canas—which allowed the architect to raise them with the same formwork. These coincidences lead one to think that the arches in the Royal Chapel and main nave might have been designed by the same architect. Of course, common units of measurement were used in the Trinity Chapel, the Royal Chapel and the nave.

From the very beginning, the cathedral's design included innovations not seen in the region. Each of its three sections—the Trinity Chapel, Royal Chapel, and nave and aisles—has a different height, ground level and layout. The Trinity Chapel has two different kinds of windows and lacks buttresses. The exterior of the Royal Chapel is strictly divided between windows and buttresses that are almost square in plan. The aisles have two buttresses per section, the same as the side chapels. Every chapel has the same rectangular layout, with the corners angled over squinches.

The absence of an ambulatory affects the hierarchical layout of chapels for worship. It is not likely that religious arrangements in the cathedral were left to the architect. The bishop and canons of Mallorca were well aware of cathedrals designed with a chevet (comprising an ambulatory and radiating chapels), such as those in Narbonne, Barcelona and Gerona. Guillem de Vilanova, bishop of Palma when work started (1304–1318), had formerly been a canon in Barcelona. Why would the clergy have accepted or encouraged such a different east end? Some transaction, or even an alignment of the king's intentions and those of the clergy, may have supported the initial decisions. The sponsors would have reached an agreement on the design of three sections laid out from east to west. In this way, the Trinity Chapel would be a royal space ('la capeyla del senyor rey En Jacme'), as

confirmed by the figure of the king praying to God in the keystones (Fig. 3.16).[54] What is now known as the Royal Chapel was never regal, as it was dedicated to the Virgin, with more than sufficient space for the choir of canons. The nave and aisles, with their many chapels, were the place of worship of prosperous Mallorcan lay society.

Scholars have not sufficiently considered the unusual geometrical complexity and careful distribution of rooms, doors and staircases in the east end, while some plans even lack the spaces flanking the Trinity Chapel, as if they were not part of the original project.[55] In my opinion, the adjective 'rude' employed by Durliat does not do justice to the design of the east end.[56] Architectural composition and circulation planning reveal a peculiar finesse (Fig. 3.17). Pairs of doors and corridors equate in dimensions, design, and stone-cutting, and spiral staircases are settled in the prolongation of the Royal Chapel side walls, beside the squinches, in such a way that their presence does not affect the building strength. This truly inventive solution is unparalleled in Gothic architecture, as far as I know, as are the side spaces and the elevation of the Trinity Chapel in relation to the Royal Chapel.

It is probably not by chance that the walls under the Trinity Chapel are exactly three Montpellier canas apart, that the Trinity Chapel height is almost exactly seven canas,[57] that each of the three sides of the east end measures almost exactly four canas,[58] and that the Royal Chapel's width is eight canas. These measurements were most likely used because of their symbolic value. Obviously, the number three refers to the Trinity. Could the number four, and its multiples eight and sixteen, be related to the quaternary systems so common in the books of Raymond Llull, of whom we shall say more below?[59] Arithmetic, numerology and geometry are the foundations of Palma's cathedral design, whose precision and absence of ornament made Forteza and Torres Balbás, *inter alia*, associate it with an architect specialized in fortresses such as Pons Descoll.[60]

The orientation of Palma Cathedral, pointing exactly at the spot where the sun rises at winter solstice, was highly unusual in medieval churches, particularly in Iberia. The first rays shine on the windows of the Trinity Chapel on Christmas Day.[61] It is not known whether the orientation of the cathedral was conditioned by that of the earlier mosque. Most scholars have suggested that the mosque was aligned with the cathedral tower, which is set at an oblique angle to the cathedral. If that is true, the qibla wall would correctly face

Fig. 3.15
Cathedral of Palma de Mallorca, nave and aisles (fourteenth century).

Fig. 3.16
Cathedral of Palma de Mallorca, keystone in the Trinity Chapel with the figure of the king praying to God (early fourteenth century).

Mecca.[62] In 1979 Gabriel Alomar sketched a hypothetical floor plan of the mosque which showed the minaret on the northern side of the courtyard (sahn), where the tower stands today.[63] His proposal is difficult to accept, because the qibla would be facing southwest. The discovery of Islamic tombs inside the cathedral in 1999, with a different orientation, also sheds doubt on his suggestion.[64] The issue will only be resolved by means of further archaeological evidence: only then will it be possible to confirm whether the mosque's orientation had a significant influence on the cathedral.

The orientation of the edifice towards the winter solstice shows a desire to praise the Nativity, celebrated with great splendour in medieval Mallorca. Although Palma Cathedral is dedicated to the Assumption of the Virgin, the sculptures of the Annunciation in the middle of the Royal Chapel (Fig. 3.18) commemorate the Incarnation. The dedication to the Trinity reflected the devotion of the king and clergy: the compiler of the Palma Cathedral's *Llibre Vermell* in 1359 wrote that he dedicated his work 'in honour of the Holy Trinity, from which emanates all good, and in honour of the Virgin Mary, who is the head and room of the Cathedral of Mallorca'.[65] She is the head ('lo cap'), as the Royal Chapel is to the building as a whole; and she is the body, as in the Gothic tabernacle-sculpture of the Virgin Mary that presided over the main Gothic altarpiece of the Royal Chapel (Nostra Dona de la Seu, today in the Trinity Chapel),

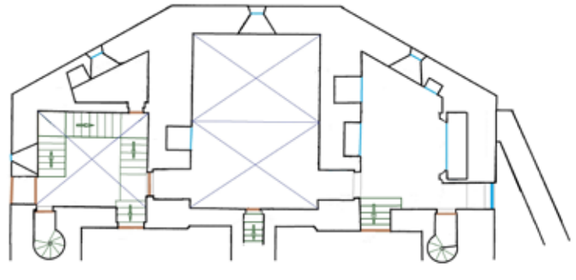

Fig. 3.17
Cathedral of Palma de Mallorca, east end lower level plan (produced by the author).

Fig. 3.18
Cathedral of Palma de Mallorca, the Royal Chapel (early fourteenth century).

with a receptacle at her side for the Host (Fig. 3.19). Trinity and Incarnation were united from the very first moment in the cathedral project.

It is appropriate here to remember that the Trinity and the Incarnation are the main subjects in the apologetics of the most famous medieval Mallorcan: Raymond Llull. Born at some time in the 1230s, Llull was a noble who changed his life after having five visions of the crucified Christ over five nights. From then on, he spent his life trying to find a way to persuade non-Christians, mostly Muslims but also Jews, of the truths contained in the Christian faith. Several passages in his prolific literary outpourings include imaginary dialogues among scholars from the three religions, through which Llull tried to demonstrate that the Christians were in possession of the truth. The two subjects treated in most detail in the discussions between Christian, Jew, and Muslim representatives were, in fact, the Trinity and the Incarnation.[66] Llull wrote a book on the subject (*Liber de Trinitate et Incarnatione*) in Barcelona in October 1305, a few months before James II of Mallorca expressed interest in building the Trinity Chapel.

Llull exerted a powerful influence over James II. Before his conversion, Llull was James's tutor, seneschal and steward. Years later, James II called him to Montpellier and supported him in founding Miramar Monastery, which Llull built on the island of Mallorca to train clergy who could preach Christianity in Arabic. At Llull's initiative, its church was dedicated to the Trinity.[67] Preaching to Muslims and debates among the three religions were a daily reality in Mallorca in the second half of the thirteenth century and concerned more than Llull. In 1313, Bishop Guillem de Vilanova bemoaned that, in the past, the number of Catholics on the island had been very small.[68]

Llull never lost contact with James II. He visited him at his headquarters and, following an absence of eighteen years, went to the island several times after 1299, during the period when the king began building grand edifices. It is not known whether James II's piety was as strong as Llull's, but it is clear that they shared a devotion to the Trinity, not uncommon at the time.[69]

The extent to which the king, bishop, canons, and the cathedral's first architect shared Llull's intellectual concerns, with geometry chief among them, is also unknown. In 1299 Llull wrote a book on the subject, the *Liber de geometria noua et compendiosa*, which included theoretical passages but also passages that applied to buildings.[70] Although it is obviously not necessary to be a follower of Llull to design such a strongly geometrical building as the cathedral of Mallorca, it is nonetheless striking that specific principles

in the composition of the cathedral remind us of Llull's specific interest in geometric and arithmetical combinations. A fundamental part of Llull's book is devoted to the way in which diverse geometrical figures contain others, a basic principle in the design of Mallorca Cathedral. Its east end consists of a segment of hexadecagon annexed to a rectangle.[71] The segment contains a second smaller rectangle (the Trinity Chapel), which in turn contains triangles in its plan (the squinches). Something similar happens with the Royal Chapel, the rectangular base of which joins the segment and contains the triangles of the squinches. This last solution is replicated in every chapel.[72]

Few studies link Llull to this cathedral, an area that deserves more study. Only Tina Sabater, on analysing the elevation of the Trinity Chapel six metres above the Royal Chapel, perceptively considered it 'an expression of the place James II gave to himself and was given to him by his contemporaries, a place between God and men, as Ramón Llull wrote in the *Doctrina Pueril*'.[73]

Conversely, academics have cited Llull in their writings on Bellver Castle. Alexandre Cirici based his study on fragments from Llull's *Arbre de Ciencia (Tree of Science)* to suggest that the architect used circles to create what Llull called the 'great edifice', mystically related to divinity.[74] In 1986, Yvette Carbonell-Lamothe relegated to a footnote her thought that Bellver Castle was a 'chateau de la philosophie', writing that 'the curious layout of its parts, the tendency for repeated circles, show that we are in a time of the philosophical ideas of Ramón Llull, a contemporary and perhaps partly inspiring the work'.[75] In an introduction to the castle in 2010, Pau Marimón writes that 'Bellver could have been created as a moral parable in Llull's style', although he defines this idea in vague terms only.[76] Joan Domenge considers that Llull's praise of circular shapes could have had an impact 'on the requirements the king assigned his architect'.[77] Finally, in September 2016, an exhibition on Bellver and Llull's squaring circle emphasised the relationships

Fig. 3.19
Cathedral of Palma de Mallorca, Gothic image-tabernacle of the Virgin Mary (fourteenth century).

Fig. 3.20
Bellver Castle, Mallorca, upper gallery (begun before 1309).

between the castle and the Mallorcan philosopher.[78]

Bellver Castle has an extremely striking floor plan (see Fig. 3.6).[79] The construction did not follow the principle of adapting to the terrain, but to the finest geometry of the circle, which immediately evokes Llull's thinking. Observing the plan brings to mind the circular diagrams that Llull employed to give a visual demonstration of the principles of his art, diagrams that the philosopher explained using architectural terms, so that each of the subdivisions of the circle was called a 'chamber'.[80] Moreover, the *Liber de geometria noua et compendiosa* of 1299 dedicated several chapters to issues of applied geometry, reviewing the best shapes to be used for different types of building. Among these is a 'fortress with tower' and 'a church or palace with tower', although neither of these recommends circular shapes.[81] However, various passages in the second book confirm the importance of the circle with expressions such as 'The figure of the circle is the mother of all figures'.[82] In the chapters dealing with geometric figures, Llull explains how to draw a circle composed by an inner circle and two circular crowns, all three of them equal in surface area. It seems that the architect applied the formula to achieve a perfect division in Bellver Castle, where the surface area of open spaces, namely the courtyard and gallery, occupies as many square meters as the circular crown of rooms.[83]

However, despite opportunities to do so, Llull did not praise the role of architects or their art, from which one can deduce that it was not Llull who sought to embody his thoughts in specific edifices.[84] Construction elements in the cathedral, such as doors, arches, ribs and corbels, are very different from those in Bellver in terms of dimensions, stonecutting and mouldings (Fig. 3.20), which suggests that the construction warden was not the same person. Nevertheless, both buildings seem to take inspiration from Llull's principles of geometry. Could it have been the king who transmitted Llull's ideas to the architects, as Domenge supposed in the case of the castle? After all, James II proved to be especially interested in construction activities, not only by commissioning his own palaces and castles, but also in establishing regulations for towns, where he gave details of what had to be done with existing buildings that obstructed the new urban layout.[85] Furthermore, Llull finished his book on geometry 'in Paris in the month of July, year of

Our Lord 1299' shortly before going back to Mallorca, where he met the king. Works in the castle and the cathedral began soon afterwards.

In conclusion, the architectural programmes of Mallorca Cathedral and Bellver Castle were innovative from the initial plans onwards. In the cathedral, spaces, shapes and sculptures proclaim Christian dogmas particularly opposed to Islam. The organisation of the cathedral into three sections was determined before construction began and probably had as much to do with a symbolic intention as with marking out distinct areas for the three groups that co-financed the work (king, clergy and the faithful). The architectural plan and its uncommon forms—including the Trinity Chapel, the Royal Chapel, and the nave and aisles—reflected these intentions from the outset, and for the most part these plans continued to be respected during the long building process.[86] The architect who designed Mallorca Cathedral used geometric formulae in a manner that was unusual for cathedrals but which shares commonalities with Llull's book of 1299. In a similar vein, the shapes employed in Bellver also point to a higher principle, that of geometrical perfection based on a combination of circles. Even though the architect or architects cannot be identified with certainty (though for the cathedral it was most likely Pons Descoll), we find similarities in the creative processes, and we know there was a common sponsor for both buildings: King James II. Nevertheless, although it is tempting to relate spiritual intentions in the cathedral project and the application of geometry in both buildings to Ramón Llull's literary works, the idea that he played an active role in either project must, ultimately, be rejected.

1. Ralph Adams Cram, *The Cathedral of Palma de Mallorca: An Architectural Study* (Cambridge, MA: The Medieval Academy of America, 1932), p. 5.

2. Joan Domenge i Mesquida, 'Traces d'una fortuna historiogràfica', in Aina Pascual (ed.), *La Seu de Mallorca* (Palma de Mallorca: José J. de Olañeta, 1995), pp. 11-15; Joan Domenge i Mesquida, *L'obra de la seu. El procés de construcción de la catedral de Mallorca en el tres-cents* (Palma: Institut d'Estudis Baleàrics, 1997), pp. 25-48.

3. I am extremely grateful to Mercè Gambús and Catalina Mas for permission and help in inspection and measurement of Mallorca Cathedral. Likewise, I would like to express my gratitude to David L. Simon for his careful consideration of my paper.

4. David Abulafia, *Un emporio mediterráneo: el reino catalán de Mallorca* (Madrid: Omega, 1996), pp. 3-39; Pau Cateura Nennàsser (ed.), *El Regne de Mallorca a l'època de la dinastía privativa* (Palma: Institut d'Estudis Baleàrics, 1998); María Barceló Crespí, *Jaume II de Mallorca, Savi e bon rei, Retrat d'un monarca* (Palma: Ajuntament de Palma, 2014), pp. 25-48.

5. Juan Vich y Salom and Juan Montaner y Bujosa, *Documenta Regni Majoricarum (Miscelánea)* (Palma de Mallorca: Amengual y Muntaner, 1945), pp. 67-74; Joan Domenge i Mesquida, 'Arquitectura palatina del reino de Mallorca. Símbolos de poder para una efímera dinastía', *Anales de Historia del Arte* 23, núm. esp. 2 (2013): p. 81; Mercè Gambús Saiz and Pere Fullana Puigserver (eds.), *Jaume II i la Catedral de Mallorca* (Palma de Mallorca: Catedral de Mallorca, 2012).

6. For the rhetoric of purification see, for example, Julie Harris, 'Mosque to Church Conversions in the Spanish Reconquest', *Art History* 158 (1997), pp. 158-162.

7. 'Item, volumus et mandamus quod, in dicta ecclesia Beatae Mariae Sedis Maioricarum, in loco decenti, construatur una capella intitulanda Sanctae et Individuae Trinitatis et ibi sit spatium sufficiens ad sepulturas ubi volumus sepeliri … et ad haec facienda et complenda, si ea nos non compleverimus in vita nostra, adstringimus ipsum heredem nostrum universalem'. Marcel Durliat, *L'art en el regne de Mallorca* (Mallorca: Moll, 1989), p. 128n23.

8. 'Dimitimus operi ecclesie dicte sedis duo milia libras monete curribilis in Maioricis, sive ibi sepeliamur sive non'. Durliat, *L'art*, p. 130n33.

9. Durliat, *L'art*, p. 130n34.

10. 'Per la obra, la qual lo senyor Rey de bona memoria mana que fos feta en lo cap de lesgleya de la Seu'. Vich, *Documenta*, p. 108.

11. 'Cupientes insuper honorabile opus dudum inceptum in capite dicte ecclesie Beate Marie per illustrisimum dominum Jacobum memorie recolende Regem Maioricarum genitorem nostrum'. Emilio Sagristà, 'La catedral de Mallorca. El enigma de la Capilla de la Trinidad', *Boletín de la Sociedad Castellonense de Cvltvra* 28 (1952): p. 27.

12. Since the beginning, the Trinity Chapel was reserved for royalty. Despite its name, what is called the Royal Chapel was, in fact, the presbytery. Because of building works, it was shared for years with the lay faithful. In fourteenth century, the Royal Chapel was called just 'the head' (*lo cap*).

13. Alexandre Cirici, *Arquitectura gótica catalana* (Barcelona: Lumen, 1968), p. 263.

14. Jaime de Villanueva, *Viage literario a las iglesias de España*, vol. 26, *Viage a Mallorca* (Madrid: Real Academia de la Historia, 1851), pp. 105-6.

15. Durliat, *L'art*, pp. 133 and 148-50. With respect to Bellver Castle, Pere Salvat headed the chapter of masters in the *Libre de Beilveer del ayn de M CCC IX*, with the highest salary and three 'macips' (apprentices, servants). See Jaume Sastre, 'El Llibre d'obra del Castell de Bellver (1309-10)', *Bolletí de la Societat Arqueològica Lul·liana* 63 (2007): p. 172. Durliat thought he was not an architect but a foreman. See Marcel Durliat, 'Les châteaux des rois de Majorque: origine de leurs partis architecturaux', *Bolletí de la Societat Arqueològica Lul·liana* 839 (1985): pp. 47-9.

16. Durliat, 'Les châteaux', p. 55.

17. Durliat, *L'art*, pp. 133 and 140.

18. Jaime Sastre Moll, 'El finançament de les obres (s. XIV i XV)', in Pascual, *La Seu*, p. 37.

19. Consecrating congregational mosques after conquest was common practice in Iberian cities, but it did not happen in Mallorca. Villanueva (*Viage literario*, pp. 75-98) thought that Almudaina Mosque was Mallorca's congregational mosque, an idea echoed by a large number of scholars, but he was probably wrong.

Ricard Soto i Company concludes that Mallorca's congregational mosque lies below the church of Saint Michael. See his 'Mesquites urbanes i mesquites rurals a Mayurqa (Estudi documental i problemes d'interpretació)', *Bolletí de la Societat Arqueologica Lul·liana 37* (1979): p. 116.

20. Sometimes, it was only decades, as in Zaragoza, Tudela and Lérida. Conversely, construction of the Gothic cathedral of Toledo, conquered in 1085, did not start until 1226. The mosques in Huesca and Seville stood for almost two hundred years after the Moors were expelled, and Córdoba Mosque still exists today.

21. Gerardo Boto, 'Panthéons royaux des cathédrales de Saint-Jacques-de-Compostelle et de Palma de Majorque. À la recherche d'un espace funéraire qui n'a jamais été utilisé', in *Espace ecclésial et liturgique au Moyen Âge* (Lyon: Maison de l'Orient et de la Méditerranée, 2009), p. 301.

22. Juan Carlos Ruiz Souza compares the Trinity Chapel in Mallorca with the Royal Chapel in Seville Cathedral because of their shared arrangement on two levels. See his 'Capillas Reales funerarias catedralicias de Castilla y León: Nuevas hipótesis interpretativas de las catedrales de Sevilla, Córdoba y Toledo', *Anuario del Departamento de Historia y Teoría del Arte (U.A.M.)*, 18 (2006): p. 23.

23. 'Per exemplar la plassa del dit Mirador per lo cap de lesgleya de la Seu qui si deu fer'. Durliat, *L'art*, p. 130n35.

24. Durliat, *L'art*, p. 130n34.

25. Durliat, *L'art*, p. 130n35.

26. Domenge, *L'obra*, p. 87 and chapter 5; and Jaume Sastre Moll, 'El finançament de les obres (S. XIV i XV)', in Pascual (ed.), *La Seu*, pp. 37-9.

27. His successor, Ramón de Cortsaví, gave one hundred pounds to the Mirador's works ('operi miradorii civitatis Maioricensis'). The Mirador was partially destroyed to allow space for the new east end: Villanueva, *Viage literario*, pp. 177-8; Durliat, *L'art*, p. 131.

28. 'Relatu fidedigno noviter intelleximus quod ex ordinatione testamentaria et voluntate plurium defunctorum debentur per eorum heredes et manumisores diverse pecunie quantitates que converti debent iuxta illorum ordinationem ultimam et voluntatem tam operi ecclesie Beate Marie Sedis Maioricarum quam pro capullis [sic] construendis et hedificandis in eadem'. Sagristà, 'La catedral de Mallorca. El enigma', pp. 26-7.

29. Domenge, *L'obra*, plate 12.3.

30. Durliat, *L'art*, p. 129.

31. Boto, 'Panthéons', pp. 292-93.

32. According to Gabriel Alomar, James II's provisional sepulchre in the fourteenth century was between the Royal Chapel and the mosque. See Gabriel Alomar, 'La capella de la Trinitat i les tombes dels reis de Mallorca', in Pascual, *La Seu*, p. 212. In contrast, Gerardo Boto believes that James II's first tomb was placed in the Royal Chapel. See Boto, 'Panthéons', p. 294. Later, the tomb was located in the main nave. The current sepulchres of the Majorcan kings in the Trinity Chapel were produced in 1946.

33. Durliat, *L'art*, p. 129n27. The Trinity Chapel has been compared to two-storied palace chapels such as the Sainte-Chapelle in Paris or the Holy Cross in Perpignan, which have altars on both levels, unlike Mallorca. See Boto, 'Panthéons', pp. 292-3n75. In my opinion, it bears no significant relation with them. This is not the place to discuss the Trinity Chapel's rectangular plan or the use of squinches, which, as many scholars have pointed out, is similar to the chapel in the Royal Palace of Perpignan. See N. J. Stym-Popper, 'Séance du 28 Avril', *Bulletin de la Société nationale des Antiquaires de France* 1948-1949 (1952): p. 5; Durliat, L'art, p. 129.

34. Guillem Forteza, 'Estat de l'arquitectura catalana en temps de Jaume I. Les determinants gòtiques de la catedral de Mallorca', in Miquel Seguí Aznar (ed.), *Guillem Forteza. Estudis sobre arquitectura i urbanisme* (Barcelona: Abadia de Montserrat, 1984), 2: pp. 5-28.

35. Emilio Sagristà, 'La catedral de Mallorca. Contribución a su estudio a propósito de una hipótesis propugnada por el arquitecto D. Guillermo Forteza sobre el primitivo proyecto de la catedral de Mallorca', *Boletín de la Sociedad Castellonense de Cultura* 24 (1948): pp. 120-62 and 165-74. Pierre Lavedan, *L'architecture gothique religieuse en Catalogne, Valence et Baléares* (Paris: Henri Laurens, 1935), p. 162 and thereafter. Lavedan still considers James I the Conqueror to have begun the new cathedral.

36. The design had 'la simplicitat del pla i la severitat de la maqueta'. Durliat, *L'art,* pp. 140-1.

37. Durliat, *L'art*, pp. 136 and 140-1.

38. Joan Domenge, 'La catedral de Mallorca: Reflexiones sobre la concepción y cronología de sus naves', in Christian Freigang (ed.), *Gotische Architektur in Spanien. La arquitectura gótica en España* (Frankfurt am Main and Madrid: Iberoamericana Vervuert, 1999) p. 161; Joan Domenge, *L'obra*, p. 132-63.

39. Gabriel Alomar Esteve, 'La capilla de la Trinidad, panteón de los reyes de la casa de Mallorca', *Cuadernos de arquitectura* 6:10 (1949): p. 21n1. Xavier Barral differentiates four stages, the first being the Trinity Chapel. See Xavier Barral 'Catedral', in Joan Sureda Pons, Baleares. *Mallorca, Menorca e Ibiza* (Madrid: Encuentro, 1994), p. 85. Still in 2010 Jaume Sastre affirmed that James II's intention was to build a royal chapel annexed to the apse of the converted mosque. See Jaume Sastre Moll, 'El finançament de les obres de la seu de Mallorca', *De computis. Revista Española de Historia de la Contabilidad* 12 (2010): p. 87.

40. 'Fue ya desde el primer momento, concebida para tener tres naves con sus tres ábsides, cual hoy los tiene'. Sagristà, 'La catedral de Mallorca. Contribución', p. 174. See also pp. 120-62 and 165-74. For a similar perspective, see Boto, 'Panthéons', p. 291.

41. Despite Sagristà's mistaken chronology, account must be taken of his comments on windows, canopies, buttresses, the thickness of the walls, arcosolia and access arches: Sagristà, 'La catedral de Mallorca. Contribución'.

42. Domenge, 'La catedral', p. 173.

43. Even single nave French cathedrals built in the twelfth century, like Toulouse, were wider.

44. On these churches, see Durliat, *L'art*, pp. 662-9 and 106-14.

45. Saint-Vincent in Carcassonne, Saint-Paul in Clermont-l'Hérault, Saint-André in Montagnac, the cathedral and Saint-Dominique in Perpignan, Saint-Laurent in Roujan, Notre-Dame-de-l'Asomption du Vigan, etc. See Raymond Rey, *L'art gothique du Midi de la France* (Paris: Laurens, 1934); Françoise Robin, *Midi Gothique. De Béziers à Avignon* (Paris: Picard, 1999). The apse's disposition and dimensions also bring to mind large Romanesque cathedrals in southern Italy and Sicily.

46. It is impossible to know what happened in the lower parts of the walls, completely hidden by choir stalls and liturgical furnishings.

47. In the southern wall buttresses, two courses meet at the apex of the arch vertex; in the northern wall buttresses the apex of the arch is carved from a single block.

48. The side apses were probably built later in order to allow access through provisional doorways.

49. Sagristà, 'La catedral de Mallorca. El enigma', p. 19; Durliat, *L'art*, p. 136.

50. 'Canne: mésure ancienne valant à Montpellier 1m, 984'. See J. Renouvier and A. Ricard, 'Des maitres de Pierre et des autres artistes gothiques de Montpellier', *Mémoires de la Société Archéologique de Montpellier* 2 (1841): p. 340. José Carrasco Hortal, 'La catedral de Mallorca. Mesures i models', *L'Avenç* 289 (2004): pp. 36-9. I replace Carrasco's measurements with my own, which are closer to the multiples of Montpellier canas.

51. As is well known, Gothic architects took full advantage or the potentialities of pointed arches, span and rise of which can be different using the same circumference.

52. The Trinity Chapel ground floor measures exactly three canas width (5.95 metres); the outside chevet eastern wall, four canas (7.93 metres); as we have seen, the distance between piers in the main nave measures nine canas (17.81 metres); the distance between piers sustaining diagonal ribs equates to ten canas (19.93 metres); and the nave octagonal piers' width reaches six hand spans (1.49 metres), the hand span being another unit of measurement from Montpellier, equivalent to one eighth of a cana.

53. M. Nebot, 'Don Guillermo de Vilanova cuarto Obispo de Mallorca (1304-1318)', *Bolletí de la Societat Arqueológica Lul·liana* 14 (1913): pp. 262-4.

54. The rhomboidal keystone in the northern room displays two pales, most likely James II's heraldic arms. Other rhomboidal keystones under or beside the Trinity Chapel probably originally had the same arms.

55. Leopoldo Torres Balbás, *Arquitectura gótica. Ars Hispaniae, Historia Universal del Arte Hispánico* (Madrid: Editorial Plus-Ultra, 1952), 7: p. 213.

56. Durliat, *L'art*, p. 140.

57. According to my measurements, it was 13.70 metres; seven canas make 13.88 metres.

58. According to my measurements, it was 7.86 metres; four canas make 7.93 metres.

59. Carles Llinàs, *Ars Angelica. La gnoseología de Ramon Llull* (Barcelona: Institut d'Estudis Catalans, 2000), pp. 54-55.

60. Forteza, 'Estat de l'arquitectura' p. 24; Torres Balbás, *Arquitectura gótica*, p. 214.

61. As the orientation of Palma Cathedral is 123° from the north, and sunrise on the winter solstice at the latitude of Palma de Mallorca is 120°, the error is minimal, although very surprising for the period. Perhaps there is no error: the sun shines on the windows not quite at sunrise, but a few minutes later, when it rises on the horizon. I'm very grateful to José Puente Martínez for this information. The orientation of Palma Cathedral causes an effect of light that may have been planned from the start. On Candlemas (February 2), between 8:30 and 9:00 a.m. local time, the rays of the sun fall through the eastern rose window (*the oculus maior*) on the cathedral's west wall, just below the western rose window: Daniel Ruiz Aguilera and Josep Lluis Pol Llompart, 'Els efectes de la llum solar a la seu de Mallorca', *Actes d'Historia de la Ciència i de la Tècnica* 3:1 (2010): pp. 37-47.

62. The orientation of qibla walls in the mosques of al-Andalus varies widely, and there are instances close to the tower direction as well as to the cathedral's 123°. See Mónica Rius, 'La Alquibla en al-Andalus y al-Magrib al-Aqsà', *Anuari de filologia. Secció B, Estudis àrabs i islàmics* 3 (1998-1999), pp. 17-358.

63. G. Alomar Esteve, *Ensayos sobre Historia de las Islas Baleares hasta el año 1800* (Palma: Cort), 1979, p. 62.

64. Antonio Pons Cortés, *La Consueta de aniversarios de la Catedral de Mallorca y la documentación funeraria como fuente para la historia de la arquitectura medieval* (PhD diss., Universitat Autònoma de Barcelona, 2015), p. 146.

65. 'A honor de la Sancta Trinitat, de la qual tot be devayla e a honor de Madona Sancta Maria, la qual és cap e cambra de la Seu de Mallorchas'. Gabriel Llompart, 'L'escultura gòtica', in Pascual, *La Seu*, p. 54.

66. 'For Llull, the most negative thing about the Jews was their inability to see the inherent truth in his reasoning for the existence of the Trinity in the Godhead, and for the Incarnation'. See Harvey J. Hames, *The art of conversion. Christianity and Kabbalah in the Thirteenth Century* (Leiden: Brill, 2000), p. 117.

67. Pere Villalba i Varneda, *Ramon Llull. Escriptor i Filòsof de la Diferència. Palma de Mallorca, 1232-1316* (Bellaterra: Universitat Autònoma de Barcelona, 2015), pp. 145-52.

68. 'Cum aduch in dicta insula pauci catholici haberentur'. Vich, *Documenta*, p. 116.

69. Llull wrote of James II: 'tiene mucha devoción en cuanto al modo en que se debe honrar a Jesucristo, predicando entre los descreídos'. See Abulafia, *Un emporio*, p. 15.

70. Ramón Llull, *Nova et compendiosa geometria,* Biblioteca Pública del Estado en Palma de Mallorca, MS 1036, n.d., ca. 1401-1450, Biblioteca Virtual del Patrimonio Bibliográfico, http://bvpb.mcu.es/es/consulta/registro.cmd?id=397927 (English version: Raymond Llull, *The New Geometry. Liber de geometria nova et compendiosa*, accessed 31 January 2019, http://lullianarts.narpan.net/NewGeometry.pdf). For more on the *Liber*, see Carla Compagno, 'El *Liber de geometria noua et compendiosa* di Raimondo Lullo', *Àmbitos. Revista de Estudios de Ciencias Sociales y Humanidades* 31 (2014): pp. 35-45.

71. The angles formed by each pair of the three eastern walls are around 23°. In a regular hexadecagon the angles are 22.5°. The first phase of the Llull's *Art* is known as the 'quaternary phase', because of the relevance of number four and its multiples (the principles were grouped up to sixteen units), later replaced by the 'ternary phase'. See Anthony Bonner, *L'Art i la lògica de Ramon Llull. Manual d'ús* (Barcelona: Publicacions I Edicions de la Universitat de Barcelona, 2012).

72. In Mallorca Cathedral the number three, related to the dogma of the Trinity to which James II dedicated his burial chapel, might be discerned in a number of elements that are otherwise unusual in fourteenth-century cathedrals: the building comprises three perfectly distinguishable and perfectly interrelated sections, and three huge circular windows dominate the eastern walls of the nave and aisles. The builders linked the Trinity Chapel to the Father, as his image dominates the keystone, while in the Royal Chapel the Son is referenced through the mystery of the Incarnation, as seen in the statues in the centre of its side walls. Did they think of the Holy Spirit when designing the eastern rose window that illuminates the central nave? Light, fire, illumination, and spiritual unction are other attributes of the third person in the Trinity that would be perfectly mirrored in the light flooding the area for the faithful through a star formed by twelve triangles. This perhaps alluded to the twelve fruits of the Holy Spirit, as enumerated by St. Paul in the epistle to the Galatians. As far as I know, the tracery on the eastern rose window is unique in Gothic architecture, consisting of a Star of David formed by twelve isosceles triangles (and by the intersection of six triangles that are sub-divided exactly like one of the figures in Llull's book on geometry. See *Llull*, *Nova*, fol. 28v. The rose window has been repaired on several occasions, so it is not clear whether the design is exactly the same as that drawn up in the fourteenth century. It is probably also not coincidental that the Royal Chapel area is seven times larger than that of the Trinity Chapel.

73. Tina Sabater, 'Jaume II promotor de les arts. La Capella de la Trinitat de la Seu de Mallorca', in Rosa Alcoy Pedrós and Dominique Allios (eds.), *Le plaisir de l'art du Moyen Âge: ommande, production et réception de l'oeuvre d'art; mélanges en hommage à Xavier Barral i Altet* (Paris: Picard, 2012), p. 204.

74. Cirici, *Arquitectura*, pp. 262-3.

75. Yvette Carbonell-Lamothe, 'Les relations artistiques entre le royaume de Majorque et le Midi de la France: bilan des connaissances et perspectives de recherche', in *IV Jornades s'Estudis Històrics locals. El Regne de Mallorca i el Sud francés* (Palma de Mallorca: Institut d'Estudis Baleàrics, 1986), p. 57n17.

76. Pau Marimón Ribas, *El descubrimiento de un símbolo. Guía temática del Castillo de Bellver* (Palma: Ajuntament, 2011), pp. 11-13. With no other argument than numerical coincidences, he relates the four watch posts to the four elements, the three main towers to the powers of the soul, and the twenty-one supports and arches in the lower gallery to the result of multiplying the seven virtues by the three powers.

77. Joan Domenge, 'Les residencies dels reis a Mallorca', in Olivier Passarrius and Aymat Catafau (eds.), *Un palais dans la ville*, vol. 1, *Le Palais des rois de Majorque à Perpignan* (Canet: Trabucaire, 2014), p. 328.

78. *Ramon Llull i Bellver. La quadratura del cercle*, exhibition in Bellver Castle, 21 September 2016–31 October 2018.

79. On its design, see Jos Tomlow, 'Castillo de Bellver auf Mallorca. Ein Versuch zur Deutung der Entstehung und Gestalt eines Unikats', in Freigang (ed.), *Gotische Architektur*, pp. 227-49.

80. In Llull, the word 'chamber' (*camera* in Latin) refers to any box with something written inside. Bonner, *L'Art*, p. 35.

81. *Llull, Nova*, fols 26v and 27v: a fortress and a church or palace with a tower, or a hall with no tower.

82. *Llull, Nova*, fol. 33v.

83. *Llull, Nova*, fol. 9v: 'In this figure of three circles, a doctrine is provided for placing circles within one another, where each circle is equivalent in containing capacity to each of the others, regardless of the fact that one is located inside another'. This proportion also brings to mind Villard de Honnecourt's formula to design a cloister 'autretant es voies com el prael'. See MS Fr 19093, fol. 20r, Bibliothèque nationale de France, ark:/12148/btv1b10509412z.

84. Time and again Llull explains the usefulness of his geometric figures without including architects among potential recipients. When he wrote on mechanical arts, he preferred car-

penters to builders because their work in wood brought them close to the Cross. See Ricardo da Costa, 'Las definiciones de las siete artes liberales y mecánicas en la obra de Ramón Llull', *Anales del Seminario de Historia de la Filosofía* 23 (2006): p. 140.

85. Vich, *Documenta,* pp. 71-4.

86. The bishop and canons agreed in 1386 to continue the original and magnificent building design: 'et sicut alia construantur in altum, et iuxta formam magno decore conceptam et inceptam fieri in ipsius primario fundamento'. Sagristà, 'La catedral de Mallorca. El enigma', p. 17n2.

4

Architectural Practices in Spain, 1370-1450: Documents and Drawings

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