

Santa Maria del Mar in its context

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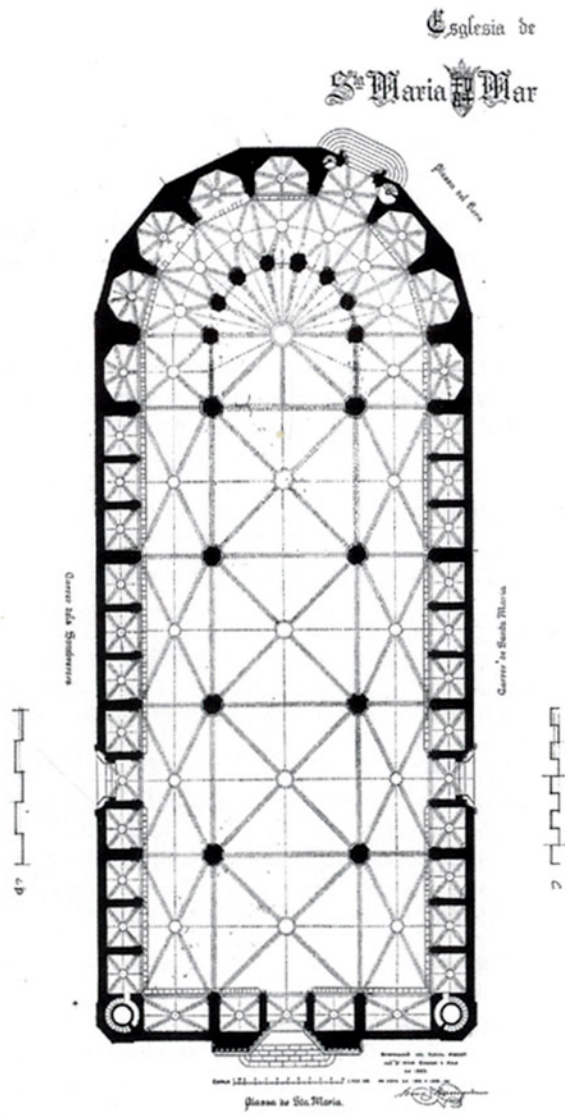


Fig. 0

A contemporary understanding of Catalan Gothic architecture demands both archaeological and historical fieldwork that, by acknowledging and comparing its built examples, examining the systems of measure used in their construction and establishing cross-relationships between various socio-cultural phenomena, creates an awareness of the value systems by which these peoples judged their world. Prudence advises not to jump to unfounded conclusions, as modern worldviews inevitably influence interpretations. The perception of the architect's trade is relevant in this regard, as, in its noblest sense, it has called upon resources and operations that have enlightened both the autochthonous and international corpus of work through to the present.

An indexation of interrelated topics could be organized thus:

- A. The end of Greater Catalonia: treaties with the north, conquests south and eastward, which will not be broached but taken instead as a point of departure.
- B. The renovation of ideas, Scholasticism and Lullism. One finds the paradigmatic cases of Suger de Saint Denis and Ramon Llull, the role played by *disputatio*, the equilibrium regarding *auctoritas* and the emergence of coherence through *concordantia*. These categories can be included within a larger field, that of contextual phenomena, especially as per the dynamics of the three monotheistic cultures and their possible historical parallelisms: the development of Jewish Cabbalism, the problems arising from the Albigensian heresy, the Parisian disputes against Averroism, etc.
- C. The pragmatic nature of everyday life. Geometry and autochthonous systems of measure, which are material both constructive and conceptual. This is the most crucial section, and surprisingly, despite its simplicity, that which has largely been ignored by scholars.
- D. The specific case of Santa Maria del Mar as the manifestation of a rigorous flexibility.

A. The end of Greater Catalonia: treaties with the north, conquests south and eastward.

At the beginning of the northern Gothic, Catalonia¹ was closely linked to Languedoc. In 1149 Ramon Berenguer IV called upon the monks of Fontfroide, in the diocese of Narbonne, to found the soon to be powerful abbey of Poblet. In 1152, the Santes Creus abbey was merged with Grandselve, near Toulouse, which had been the founding abbey of Fontfroide. In addition Santes Creus was imitated on a smaller scale at Vallbona de les Monges.

The sequence of the founding of Cistercian abbeys in Spain is clearly delineated by Lambert² (p 285): Citeaux/Clairvaux/Grandselve/Fontfroide, Santes Creus/Poblet, Vallbona/Piedra, Benifazá, Santa María la Real, San Vicente deValencia, Valdigna/San Bernardo de Valencia, etc³., along with a series of characteristics which he refers to as the Hispano-Languedocian Gothic School: "Initially (...) the composition of the buttresses with half-columns anchored inside the churches, then their progressive adaptation to the usage of pointed-arch vaulting and the considerable space they occupy in relation to the general dimensions of the building.

The Hispano-Languedocian architects built huge pillars, thus giving a considerable width to the transverse arches above them and especially to the arcades flanking the central nave (transverse arches) to be able to withstand the thrust of the pointed-arch vaulting which they estimated to be substantial and was not reinforced on the exterior by anything but buttresses, since by that point flying buttress had still not been developed."⁴

Whether through ignorance, an economy of some elements or modesty, the differences between southern Gothic and its Catalan counterpart are manifest; logically so, as two centuries pass between the beginning of the former and the mature works of the latter. Positions regarding the phenomenon of the Albigensian revolt made for a reshuffling of both the the religious orders (the failure of the Cistercians before the heretics, yet also before the Papacy, which

recruited the Mendicant Friars to form its own personal militia) and the kingdoms (the configuration of France and the reorientation of Catalonia towards the kingdom of Aragon). The alliances between Peter II and the County of Toulouse, and the subsequent disaster of Muret (1213) did not merely do away with the potential for a Greater Catalonia, but also with the life of its monarch, requiring thus a pragmatic spirit of the young James I, bringing him to establish a peace with the north through the Treaty of Corbeil, enabling him thus to look to the south and east to expand his kingdom's influence. This, together with the obligations which the Mendicant Orders were to impose came to substantially alter methods of construction, which would achieve results with an appreciable economy of means.

The Catalan Gothic blossomed amidst a "period of plenty" (1250-1350), "the years of James I, Peter the Great, James II, Peter the Ceremonious; of Ramon Llull, Muntaner, *The Chronicles*; of Sicily, Sardinia, Greece; the Consulate of the Sea, the Council of One Hundred, the Courts..."⁵ This must be understood within the context of Catalonia's having been the first of the European nation-states of that epoch.

The dynasty of the Catalan Counts, themselves strongly bound to a concrete territory, language and long-standing cultural tradition, "has as a characteristic that it combines that which in other regions was kept separate: a deeply-rooted feudal monarchy that was installed in larger and larger territories and initially one, but as time passed many, merchant cities possessing of solid municipal statutes yet without sovereign power; the latter populated by ruling, warring and merchant classes that profited under this situation, thus benefiting the overall sovereignty of the realm."⁶

Catalan Gothic architecture and culture were to produce a synthesis of the multiple tensions experienced across its lands. Examining it today we encounter a plural society: Catalan Gothic architecture "coincides with a moment of vast commercial, political, seafaring and military expansion... Cultural contacts with France were strong, indeed as were similarities in the two

countries' lifestyles, thanks to the French consorts of Catalan kings. In their vast domains, the Catalan princes could inhabit palaces characterized by an uncommon sumptuousness, exemplified by the Aljafería in Saragossa or the Ziza in Palermo. One must see Catalan Gothic architecture as a function of the other systems with which the Catalans were familiar, especially those of Gothic France, Mudéjar Aragon, Arab-Norman-Byzantine Sicily..."

The option of simplicity, while not excluding greatness, manages to achieve an equilibrium between reaffirming what an architecture is and rejecting that which it is not. "Catalan Gothic architecture thus confers a positive charge to its identification between real matter and reason and a negative charge to the evasion of the material (Nordic Gothic) or the substitution of the idea of richness for that of logic, that is to say, the value of exchange (Islam, Byzantium) for the value of utility."⁷

Thirteenth and fourteenth-century Catalonia brimmed with cultural barter: commerce with the Italian cities promoted diplomacy and learning, the Albigeian phenomenon in the south of France spawned immigration to the north of the country, contact with Arab culture (in the Iberian Peninsula but also the Maghreb and the Mediterranean) permitted scientific, philosophical, astronomic and medical advancements otherwise unfathomable; the Cabbalistic movement, rooted in the south of France and in Girona, illustrates the apex of the symbolic and mystical imagination and the coexistence of cultures that came to be upset from both north and south, culminating in the wholesale persecution of entire segments of society. Meanwhile, the recuperation of a Neo-Platonism that heralded a future order (that of the Renaissance) had matured and catalyzed these phenomena at various moments; in short, quite simply too many elements pertain to and influence this timeframe, and to make any analysis one must duly select which few to analyse.

¹ *Elie Lambert: El arte gótico en España en los siglos XII y XIII. (Investigaciones realizadas en España desde 1920). Cátedra, Madrid, 1977.*

² *Lambert, op. cit. p. 285.*

³ *Martínez Buenaga, Ignacio: "La arquitectura cisterciense en Aragón. 1150-1350".*

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Institución Fernando el Católico (CSIC). Excma Diputación Provincial de Zaragoza (1998).

The passage starting p. 413 confirms Lambert's thesis.

⁴ *Lambert, op. cit. p. 113.*

⁵ *P. Vilar: Introducció a la història de Catalunya. Edicions 62. Petita Biblioteca Universal. Bcna. 1995, p. 78.*

Rafael M. Bofill: L'arquitectura nacional de Catalunya. La menystinguda personalitat de l'arquitectura catalana gòtica. Edicions La Magrana. Bcna. 1998. p. 121.

⁶ *Pierre Vilar: op. cit.*

⁷ *Alexandre Cirici Pellicer: Arquitectura Gòtica catalana. Lumen Barcelona 1968*

B. Environmental phenomena and dynamics between the monotheistic cultures: the development of Cabbalism, problems arising from the Albigenian heresy, the Parisian disputes against Averroism. The paradigmatic cases of Suger de Saint Denis and Ramon Llull, the role played by *disputatio*, the equilibrium regarding *auctoritas* and the emergence of coherence through *concordantia*.

In the epoch which produced the first examples of southern Gothic, dynamic socio-political changes and new ideas and practices resulted in a one-to-one relationship between models of thought as they viewed daily life, a relationship which enabled E. Panofsky to establish a parallel between the proceedings of Scholastic discourse and the structuring of the Gothic architectural organism⁸, considering that some habits proceeded from cathedral schools, universities and *studia* of the newly founded Mendicant Orders (the Franciscans in 1209 and the Dominicans in 1215.)

Nevertheless, the period spanning from 1130-1140 until 1270 and the area falling within a 150 kilometre radius centred on Paris were quite different from the period stretching from 1250 to 1350 and the lands through which Catalonia expanded during that time. It stands to reason to then contrast the dates of the commencement of work and the consecration of the choir at Saint-Denis (1137), the construction of Nôtre-Dame de Paris (1163-1196), the Portails Royaux of Chartres Cathedral (1195), the Pórtico de la Gloria in Santiago de Compostela (1186). Reims (1211), etc. At the same time, in the second half of the twelfth century there was a proliferation of heretical movements while the Papacy and the Holy Roman Empire sparred back and forth, each grappling for *auctoritas*. This rivalry and the heresy share a common trait; they destabilized institutions and materialized precisely when the institutions themselves were weakened. One can ascertain that the opposition between *regnum* and *ecclesia* for ultimate power finally calmed so as to enable the two to reach several agreements, including that of the meeting between their ultimate authorities in Verona (1184), nevertheless

soured by the Saracen conquest of Jerusalem (1187), the deaths of both Holy Roman Emperor and Pope in 1197 and 1198 respectively, and counterbalanced in Spain by the Castilians' and Aragonese' defeat at Alarcos (Ciudad Real) in 1195, which meant the Almohad domination of territories stretching from the Maghreb to the northern reaches of the Iberian Peninsula.

The people of the beginning of the thirteenth century lived with a sensation of instability that could only have been magnified by the images of the capital sins—*superbia*, *avaritia*, *luxuria*—by Romanesque and Gothic sculptors and kept vivid by orators and life itself. Even the elements seemed to be adverse at the end of the twelfth century: rains, flood, famine and epidemics only intensified the difficulties. Amidst these circumstances, and against all expectations, Innocent III was chosen as pope in 1198: a jurist with a great capacity for work, he was a pragmatist; a feudal lord by birth but yet a firm believer who disdained riches and luxury.

The Scholastic movement propitiated by the teachings of the Benedictines, and later spread by the Dominicans and Franciscans, was coincident with Suger de Saint Denis' dissemination of the Gothic style from the Benedictine monasteries, reaching its apogee in the great urban churches (the great names of the classical Gothic period are those of the cathedrals and in later years those of parish churches).

According to Panofsky's evaluation, in the first period cited, builders had been able to attend *disputationes de quodlibet*, events similar to modern concerts or public lectures, and though the social order was one of an emergent urban professionalism, guilds had not yet begun to form, thus leaving the only true urban profession that of the architect, an experienced and travelled man who was typically well-read and enjoyed great social prestige. Therefore the southern Gothic architect cultivated a "understandable and transmissible" attitude, itself derived from the *raison d'être* of early classical Scholastics, when they attempted to *establish the unity of truth*.

In other words, "sacred doctrine makes use of human rationalism, not to prove faith, but to demonstrate all that which is stated in the doctrine"⁹. Along the lines of this argument, human reason could argue or proportion similarities (*similitudines*) that the religious mysteries would then elucidate by analogy. Lastly, in order to explain faith by reason, one would have to delineate both the capacity and the limits of one's very system of thought. From this, it would be necessary to extract a schematic or formalism, which often turned out to be ridiculous, "with their imperatives of the totality (sufficient enumeration) of organization in line with a system of parts, and parts of homologous parts (sufficient articulation), distinction and deductive necessity (sufficient interrelation)"¹⁰. The Scholastics felt obligated to illustrate the order and logic of their thinking, both of which were to be clearly manifested in the Gothic cathedral.

Clearly, in the period 1250-1350 the situation in Catalonia was quite distinct from its Parisian counterpart between 1130 and 1270. As Paris' initial phenomenon was emblemized by the figure of Suger, the period from 1272 to 1280 is also rendered significant to Catalonia: 1272 saw Llull pen his *Ars Magna*, and the deaths of Sts. Bonaventure and Thomas Aquinas. Shortly thereafter, in 1277, Tempier, Bishop of Paris, condemned 219 theses supposedly taught at the Faculty of Arts of the University of Paris, at that time the epicentre of Christian thought, shifting Aristotelian procedures of thought towards recovered neo-platoism.

The singularity of Suger de Saint Denis is presented by Panofsky in a more provocative manner in his questions regarding the architect's role in the configuration of the Gothic than in his statements:

"Did Suger realize that by summoning (...) artisans "from all the provinces of the realm" he would foster in the hitherto relatively sterile Île-de-France that great, selective synthesis of the regional styles of France that would come to be known as the Gothic?"

⁸ E. Panofsky: *Arquitectura gótica y pensamiento escolástico.. Edics. de la Piqueta, Madrid, 1986. p. 40.*

⁹ Thomas of Aquinas: (*Summa Theologiae, I, q. I., art. 6, C*). (*Ibid. q. 1 art. 8, ab 2*).

¹⁰ Erwin Panofsky: *Arquitectura gótica y pensamiento escolástico. Ediciones de la Piqueta, Madrid, 1986. p.40*

"Did he ever suspect that the rose window of (St. Dennis) western façade (as far as has been demonstrated, the first appearance of this motif) was one of the great innovations of the history of architecture, destined to stimulate the creativity of innumerable masters such as Bernard de Soissons and Hugues Libergier?"

"Did he know, or sense, that his thoughtless enthusiasm for the metaphysics of light of Pseudo-Dionysus and John Scottus Eriugena would situate him on the threshold of an intellectual movement that blossomed with the proto-scientific theories of Robert Grosseteste and Roger Bacon on one hand, and on the other, a Christian Platonism that stretched from William of Auvergne, Henry of Ghent and Ulrich of Strasbourg to Marsilius Ficinus and Pico della Mirandola?"

These are questions through which possibilities filter, surrounded by a margin of doubt; for as possibilities they are not necessarily reality; a good thinker recognizes that they merely represent good conjecture.

Panofsky's affirmations, on the other hand, have all the security of his primary sources: "Suger was perfectly aware of the stylistic rift between his "modern" structures (...) and the classical Carolingian basilica (...) He perceived with acuity the problem inherent to the harmonization (*adaptare et coaequare*) of the "modern" with the "classical". And yet he was perfectly conscious of the aesthetic originality of the new style. He felt, and he causes us to feel, his architecture's spaciousness when he spoke of his new *chevet*, 'ennobled by the beauty of its length and breadth'; he felt its sublime verticality 'suddenly magnified in its height' by its supporting columns, and its luminous transparency when he described his church as being 'penetrated by the marvellous and uninterrupted light of the most glorious stained glass.'"¹¹

If one is to accept that these ideas spread contagiously, then the parameters of the Catalan situation must be differentiated from those of the international Gothic. Scholastic thought utilized two fundamental methods of reasoning to demonstrate truths: either by identifying

a cause after understanding its effect (*quia*), or by indicating the effects derived from a single cause (*propter quid*), habit determining one's particular syllogism.

However, Llull added to these two modes the demonstration *per aequiparantiam*¹², pursuing the interior identity of things, which are "*unum secundum esse*". That is, he sought out the harmonies between things in order to establish their coherence or equilibrium. In his words, "the universe of demonstrations would be rendered lame if demonstrations that relate the majority of principles with the minority in descending importance (*propter quid*) and ascending importance (*quia*) neglected to add a demonstration (*per aequiparantiam*) that established comparison by assuming both parts as equal". This mode of reasoning is not syllogistic, but since Llull accepted both of the habitual methods of Scholasticism, he did not enter in conflict with them.

Though Tempier's condemnation of the Averroists was largely forgotten in Scholastic circles, Llull was well aware of it and lauded Tempier's interest in the shift to the demonstration he had introduced.

While remembered as a Scholastic, Llull was more a Platonist¹³, who, in his attempts to fix the memory to divine names (or attributes) drew near the Platonic idea in his conception of how they had been conceived, bringing him "closer to the Renaissance than to the Middle Ages", or in a more precise way we could speak about a pre-humanistic intellectuality (Dr. M. Batllori). This same affirmation can be found in more than one study of the spatiality of the Catalan Gothic and its kinship to the German hall churches. Along the same lines one could situate the equilibrated, rather than hierarchical, character of its interiors. The soul's three powers, defined by St. Augustine as the reflection of the Trinity in man, helps to explain particular aspects of the usage of divine attributes and the character of the Lullian *Ars*:

As *intellectus*, it was to know or find the truth.

As *voluntas*, it was to train the will to love truth.

As *memoria*, it was to instruct the memory in remembering truth.

Above all else, Lull highlighted the importance of the will, without which memory could not perform; without either of which one could not aspire to hone the intellect.

This reflection of Augustinian ideas characterized him as a preacher, who refused to limit himself to the "ora et labora" of the Benedictines, linking him instead to the minor orders. Nevertheless, in his zeal to dispute with Jews and Muslims the superiority of the Christian faith, Lull's quotidian relationship with the monotheistic cultures is revealed.

Not merely his reasoning and writings but also the movement propitiated by them (Lullism) introduced nuances that differentiated them from Scholasticism. The two great medieval methods of the art of memory, applied to the rhetoric or oratory of clerics (that is, the art of memory in its medieval transformation, and the Ars of Ramon Lull) were specifically associated with the Mendicant Orders, one with the Dominicans and the other with the Franciscans. Owing to the monks' mobility, these methods spread across Europe. The Franciscans readily accepted Lullism, and a greater kinship between their order and the movement can be perceived.

Surprisingly, the coexistence of diverse aspects of the three monotheistic cultures has made modern scholars more hesitant to point out possible interrelations rather than identify either transcendental events or those shared by all of them. If the most creative moment of the Cordovan Caliphate (tenth century) had already begun to fade, and with it the most exquisite period of Islamic culture on the Iberian Peninsula, the mystical (or heretical?) tendencies of Hebrew and Christian cultures were in full bloom at this same time, as was the debate regarding the Islamic sources (Averroists) of Aristotelian thought.

It could be shown, then, that in the case of Jewish scholars and the Albigesian heretics a mystical experience was produced, providing "a starting point of enormous plasticity (...). In these alternate processes of developing and reducing structures, hypotheses came forth describing the nature of reality,

¹¹ E. Panofsky: "El abad Suger de Saint Denis". In "El significado en las artes visuales". Alianza Forma 1979, Madrid, p. 169.

¹² MOG (Raimundi Lulli Opera Omnia) III, vi, 156448).

See Ruiz Simon, Josep M.: "L'Art de Ramon Lull i la teoria escolástica de la ciencia". Quaderns Crema, Assaig. 1999. p. 258 and 373, where we can follow "the contempt of escolasticism for the authority arguments which had a solid tradition by the times of Lull. Boetius had already despised the resource to this kind or argument, ... which took advantage of opinions perhaps famous, but not necessarily well grounded". Peter Abelard quoted Boetius as well, before Lull, in his "Dialogus inter Philosophum, iudaeum et christianum". And written the same year (1305) as the "Liber ad equiparantiam" is the "Petitio Raymundi provonversione infidelium", dedicated to the Pope Climent V, recently elected. In any case several authors underline the relation of R. Lull thought with Hebrew and Arabic cultures.

¹³ Frances Yates (1966): *The Art of Memory*. Routledge and Kegan Paul. Reprinted by Penguin Books, 1978.

themselves determined and originally authorized by philosophical traditions, and surprisingly confirmed by the mystical experience (...) The mystic then transforms and alters the sense of that tradition on which he feeds (...) and old values take on a new meaning."¹⁴

One finds oneself before infinite possible combinations and the mystical exegesis presents itself as the essential character of the key to its revelation. The initial formula for the interpretation of the Scriptures through the Zohar – the sacred book of the Cabbalists – was either “the rabbi Simeon opened the verse” or that “the rabbi Simeon began (his lesson with the verse).” This opening or beginning was expressed by Origenes¹⁵ when he compared the Scriptures with a many-roomed house, each room of which had a key that would not permit access in or out, as it is the wrong key. The correct interpretation, then, is equivalent to the discovery of multiple possible connections – the choice of which key would allow one to enter.

This aspect of combination, as much as the search for or the cultivation of individual reason are qualities perceptible in the phenomenon which interests us (Catalan Gothic architecture, but also as manifested in the writings of Ramon Llull). The question of how one can find concurrence in the three monotheistic cultures and which was “the generating force of habits” in the epoch brings one to the historical affiliations of the aforementioned cultures, given that “they are elucidated by their point of departure (...) the parallels between some Cabbalistic affirmations regarding the Torah, those of some Islamic mystics vis-à-vis the Koran and those of the Christian mystics of the Biblical canon.” In this sense, G. Scholem adds: “I believe it possible to demonstrate this relationship in at least one case: that of the doctrine of the quadruple sense of the Scriptures.”¹⁶ That is, their literal meaning, belonging to history or narrative, their philosophical-allegorical meaning, moral or normative character and lastly, the mystical interpretation.¹⁷

To understand the background of the Albigesian heresy, scholars depart from the medium in which it developed. The Neo-Platonic Greek texts of Origenes and Pseudo-Dionysus the Areopagite, translated by John Scottus Eriugena (whose chief work “De divisione naturae” was a constant reference throughout the Middle Ages), together with letters and writings attributed to St. Paul and St. Andrew or their disciples, had been circulating since the tenth century. The education of the Neo-Platonists “caused them to imagine the human soul in a migratory process, dragged towards wrongdoing and the flesh, or contrariwise, transported towards the absolute; the divine.”¹⁸ In Scottus Eriugena the division into sexes as a consequence of original sin and the development of iconoclastic tendencies based on people’s ideas appear together.

In order to understanding the Albigensian phenomenon we must acknowledge the importance of the transformation produced at the turn of the first millennium (population explosion, the cultivation of new lands with the technological improvements made to the plough, the foundation of new urban areas) that generated prosperity and pillaging; abbots and bishops sought out lay defenders who, once installed in their advantageous situation, turned around and spawned violence, exacerbated between 1020 and 1030, according to G. Duby.

Likewise, this situation has a bearing on our understanding of the origins of the dualist or Manichaeistic tendencies, dating back to the Byzantine emperors’ eighth-century deportation of heretics whose beliefs were based on the conflict between the principle of good and that of evil.

Nevertheless, it is significant that “the heresy was propagated when the social conditions of the country came to change. The domestic climate had greater importance than external influences in fomenting the birth and expansion of the movement.”¹⁹

Bernard of Clairvaux’ campaign to the south, at the petition of the pope, marked the beginning in the decrease in the influence of the Cistercian order (1145); in the words of Bernard, faith is not imposed,

but won by persuasion, although his attitude was rather aristocratic. It could be said that his language betrayed him: the Cistercians used a refined Latin, they were foreigners, unlike the Military Orders, which mixed Latin with the langue d'oc, or exclusively the latter. One could perceive a confrontation between a rural, feudal world, and the new values that were emerging in the urban environment.

Despite this campaign, large crowds in and around Toulouse received the *consolament* of Bishop Niketos of Constantinople, who travelled in 1167 to Toulouse to organize the heretical faithful along the lines of the "seven churches of Asia".

The essence of Catharism can be determined from its attitude towards life, death and society.

When Innocent III named two legates from the abbey of Fontfroide (Raoul de Fontfroide and Pierre de Castelnaud), difficulties would surface. Diego de Osma and Domingo de Guzmán opted for "evangelical poverty and austerity", and the legates joined them in 1206. Their mission in 1207 was a failure, which precipitated the Albigensian crusade (1208) and the Council of Avignon (1209).

Domingo de Guzmán applied his patience and modesty, disappearing during the crusade, although news came to light of his sojourns through Toulouse, Carcassonne and Fanjeaux, with the gospel of St. Matthew and the Epistles of St. Paul as his baggage, following the same strategy: providing an example through poverty and the travelling word. The Dominicans planted roots in these marginal areas, adjacent to the city walls of Toulouse, and from there they extended in 1217 throughout Christendom.

The buildings that have remained to the present are an example of this modesty in construction, which influenced Catalan architecture as well.

¹⁴ Gershom Scholem (1960): "La Cábala y su simbolismo". Siglo XXI Editores, Madrid, 1978. pp. 8-9.

¹⁵ Origenes: "Selecta in Psalmos" (on the First Psalm), in Migne, *Patrologia Graeca*, vol 12, col.1080.

¹⁶ G. Scholem: *op. cit.* p. 38.

¹⁷ This quadruple sense appeared at the end of the thirteenth century in the works of three authors: Moisé s de León, the author of the main body of the Zohar, Bahya ben Aser and Yosef Chicatilla. The four sense are explained in different passages: in Zohar I, 19 b comparing the Torah with a walnut and the contours of its folds, in Zohar II, 99 a-b, in keeping with the character of the chivalrous tradition of the Middle Ages, and in Zohar III, 202 comparing the Torah with the Tree of Life.

¹⁸ P. Labal: "Los cátaros. Herejía y crisis social". *Crítica / Grujalbo*. Barcelona, 1984. p. 33.

¹⁹ Labal: *op. cit.* p. 42.

C. The pragmatic nature of everyday life. Geometry and systems of measure, both constructive and conceptual material.

Obviously the metre did not exist in the Middle Ages; nevertheless, one often finds references to Gothic monuments – Catalan or not – in measurements made with the decimal metric. However, something is lost, as in the translation of a poem. This way of working can stem from reluctance to transcribe measurements, ignorance, or the almost Napoleonic attitude of avoiding any diversity of systems of measure by using a common pattern.. Inadvertently, one forgets that the entire Gothic process of construction utilized a logic which evaporates when translated into metric, as metres were not the original unit used.

Briefly, it is appropriate to allude to types of measurement: one which corresponds to a rigorous construction system, in which measurements are of interest today insofar as they reveal clues to understanding the logic of structure; and secondly, an entire internally linked system of measurements (with multiples and subdivisions), which, in origin and use, is geometric and ergonomic, both in its construction and in the establishment of an empathy between building and occupant.

These systems can be seen to be derived from Roman systems of measurement, as K. J. Conant²⁰ has already shown apropos of his excavations at Cluny, which were adapted progressively to the uses and customs of commercial exchange and changes in territorial control.

The different measurements were affirmed at the Courts of Monzón in 1585, where a metrology was unified and vouchsafed in five volumes, designated G-22.²¹ Of the plethora of measurements referenced in 1585 only four deserve mention, which can be grouped into three blocks:

In the western region of Catalonia the *alna* was used (the term derives from Germanic *alina*, meaning a measuring stick, which initially corresponded to the cubit (*colzada*), a unit shared by many ancient cultures.

As is known, it was equal to one half-metre, and the Egyptians associated it with the *remen*, the distance from the base of the elbow to the upper part of the shoulder, in the relation of the square root of two, and in a golden ratio with the *megalithic yard*. In the case at hand, it varied considerably in its later evolution (0.88/0.89m in L'Urgell, Lleida and Camp de Tarragona, up to 1.225m in Montblanc and 1.06m in Pallars and Segarra or 1.16m in Seu d'Urgell).

Eastern Catalonia employed the *cana*, the *cana de Barcelona* (1.555 m) extending with slight variations throughout the city's area of influence, and the *cana de Montpeller* (1.98m), used in Tortosa and Vic, having been brought by the settlers who had fought in the Reconquest, and Majorca for obvious reasons (since the kingdom of Majorca included the Roussillon and the rights to the ports of Provence).

Linked to the *cana* one find the *destre* or *cana destre*, which came to be imposed as fundamental to all calculations and measurements, especially for those relative to rural and urban services, from *Les Ordinacions d'En Sanctacília* and the *Consuetuds de la Ciutat de Barcelona*, instituted by James I and compiled in 1262. Indeed, in the ambit of construction, many traditional customs and uses of materials have endured to the present day. When, later, the *cana* came to be introduced as the standard de rigueur – a situation which was to last until the 1849 imposition of the decimal metric system – the *destre* was conserved in territorial aspects of law. The *destre* is thus related with the *cana* in *Les Consuetuds* through the *mujada* (which term proceeds from the Roman *modiata*, defined as the area of 100 sq Roman feet), which in Catalonia was the area contained in a square of 45 *canas'* or 25 *destres'* by side. A simple calculation gives that the *destre* is equivalent to 2.80m.

In summary:

"The *cana* was the unit of measure particular to central and northern Catalonia and the Balearic Islands (...) One *cana* was divided into eight palms or 32 quarters, and was equal to two paces or six feet."

"The *destre* (or *cana destre*) was Barcelona's basic standard of measure in the Middle Ages. It was divided into 12 *pams destre*, each of which was further divided into 12 *minuts*, these in turn divided into 12 *linies*."²²

Elsewhere, the *vara valenciana*, which measured four palms and was equivalent to three feet, was introduced by James I after his conquest of Valencia.

One can see here the essential difference between the *cana* and the *destre* (and even between the *destre* and the *vara valenciana*) was not only one of size, but also numerology: the *cana* introduced simple mathematics by dividing each unit in half, whereas the *destre* permitted division by twos or threes. The implication of these measurement as per their use in drafting and the derivation of architectural proportion, then, is that the *cana* suggests a ratio based on the square root of two (it implies, for example, a square inscribed or circumscribed in another, larger, equal, or smaller square rotated 45°²³), while the *destre* favoured ratios based on the square root of three, which are found in the Sainte Chapelle in Paris and in Santa Maria del Mar, both derived from the *vesica piscis*, or intersection of two circles of equal diameter, one of which is centred on the circumference of the other (as we can see in Figs. 1 and 2).

The *vesica* is the construction of the equilateral triangle and the hexagon, in addition to the square and the octagon, and in simple projections allows both the pentagon and heptagon. It was, in sum, a simple system of measurement which allowed the generation of all the fundamental polygons. In addition, it implied simple manipulation: by dividing the diameter into an uneven number of segments, a second circle can be reflected along these, creating more or less pointed arches (de terç)²⁴, which signifies that several arches could be built with the same scaffold, with the resulting considerable economy of elements.

One arrives at a point in which it becomes difficult to separate the subdivisions of a unit of measure from their potential for geometric and architectural suggestion. Necessarily one must also recall the eloquent rigour of Catalan terminology: *mida* referred

to linear measure while *mesura* indicated surface or volumetric measurements. Thus the qualities of the Catalan Gothic were derived from this unique treatment of *mesura*; it did not consist of a series of cables upon which, as a matter of speaking, was strung a prodigious, plethoric volume of light, but instead as the space enclosed by a subtly balanced series of masses, in which the sobriety of its construction, rigorously rendered, yields integrated spaces.

²⁰ Kenneth John Conant: "Medieval Academy excavations at Cluny, IX: Systematic dimensions in the buildings". *Speculum. A Journal of Mediaeval Studies*. Vol. XXXVIII. January 1963.

²¹ See C. Alsina, G. Feliu, L. Marquet: "Pesos, Mides i Mesures dels Països Catalans". *Curial, Barcelona, 1990. An exhaustive treatment of the subject.*

As regarding southern France, see P. Wolff: "Commerces et Marchands de Toulouse. Vers 1350-1450. Note sur les Poids et Mesures". Paris, Librairie Plon. F. Cazanove et alt.: "Compoix et cadastres du Tarn. Étude et catalogue, accompagnés d'un tableau des anciennes mesures agraires". Conseil General du Tarn. Archives départementales, 1992.

²² C. Alsina, et alt.: *op. cit.*

²³ Hans Macody Lund: *Ad Quadratum*

²⁴ Bechmann R.: "Le milieu gothique". "Villard de Honnecourt". Picard, 1993

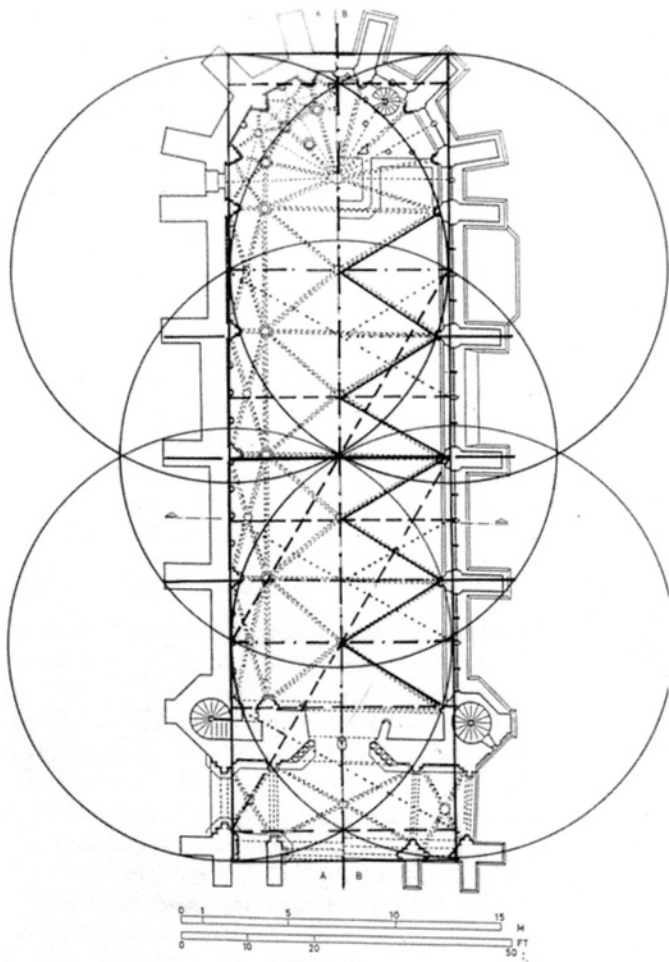
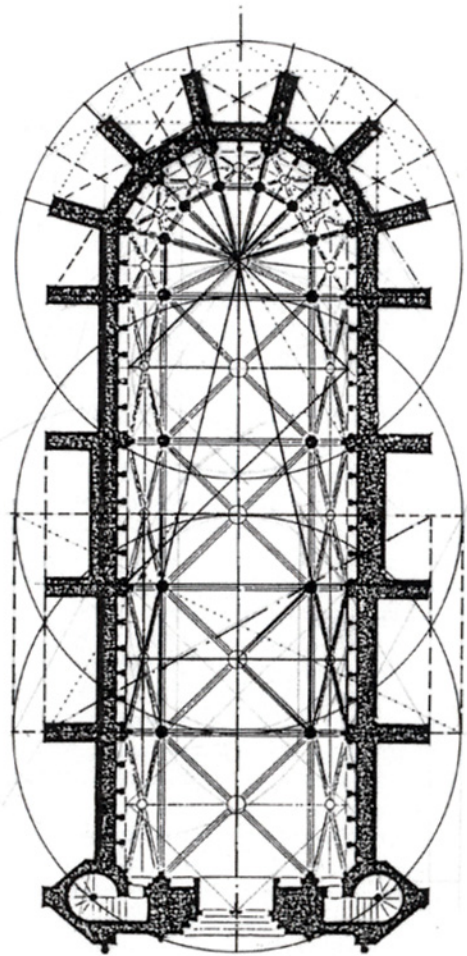


Fig. 1



Planta baixa de la Santa Capella

Fig. 2

D. Santa Maria del Mar in its context. Rigorous flexibility in building.

Urban context

The site occupied today by the church constituted the nucleus of the outlying district or *vilanova* "del Mar", also known as Portal Major, which experienced great prosperity owing to its proximity to the port, the old causeway, the Rec Comtal and the market across from the Castell Vell. The present-day Passeig del Born formed the centre of the neighbourhood, into which people converged from surrounding streets—Carrer del Mar (today Argenteria), Montcada, etc.—and the rows of waterfront houses in the Ribera neighbourhood.

Several readings can be made of the exterior appearance of the church (whose traces can be appreciated in Fig. 0); three of these readings are worthy of mention:

- The diagonal reading from Carrer del Mar—today Argenteria—which allows us to view the octagonal towers and principal entrance from an almost magical vantage point, situated against the Roman city walls, beneath the chapel of Saint Agatha, in the modern-day Via Laietana, with Plaça del Rei behind us. Here we can witness the dialogue between this church and the older urban fabric of the Gothic Quarter, while perceiving the superposition of cultures.
- The reading from Passeig del Born (Fig. 3), diminished in quality by later construction at the corner of Carrer Montcada, where we can see the apsidal end of the church and the Born door, which poses questions when we study the layout of the plan. This elevation

shows the simplicity of the structure, how it relates to pedestrian paths, and the coordination of construction, measure and scale.

Lastly, the reading from the sea or the head of the port, which provides us with a view of the entire length of the church, and an understanding of the relationship between the towers and the rest of the building. The towers seem to be much larger from a distance, yet their real geometry and size (octagonal prisms whose opposite sides are three canas apart) practically allow visitors with access to the roof to reach their arms around them, which reminds the ergonomic simplicity of this work.



Fig. 3

These are readings, of course, to be complemented by the indispensable experience of the interior and the unforgettable visit to the roof, where one palpably senses the qualities of the structure and can envisage the presence of the past.

Location and authorship

For the location of the new church, its patrons chose a site whose surface possesses all the traits of a *mujada*¹, and Berenguer de Montagut's simple layout invades the broad space of Passeig del Born, alongside the Fossar de les Moreres, by means of three clearly distinguishable areas, as can be seen in the series of vesicae in Fig. 4.

The first of these characteristic areas is defined by the main and side doors (Portal de Sombrerers, which opens into the most motley part of the city, and Portal de la Passioneria, or de les Moreres).

Located at the centre of the church, the area destined for the use of parishioners constitutes the second of these areas, in which the chapels show a compact exterior, raised on a plinth, in all exactly one half the height of the buttresses.

And the centre of attention, the area around the altar, comprises the third major area of the work. This area can be accessed via the Portal del Born (fig. 5), which poses many questions.

However, let us pause for a moment to focus on the units of measure used in its construction:

The access areas define a diaphanous space, almost uninterrupted by the two columns adjacent to the main entrance. The intercolumnations beneath wall and transverse arches fit perfectly with the surroundings of the main door and the groups of three side chapels, which coincide with the intersection of buttresses into the wall, spaced 4C from the columns (each unit

measures 9C, and each chapel 3C from extrados to intrados).

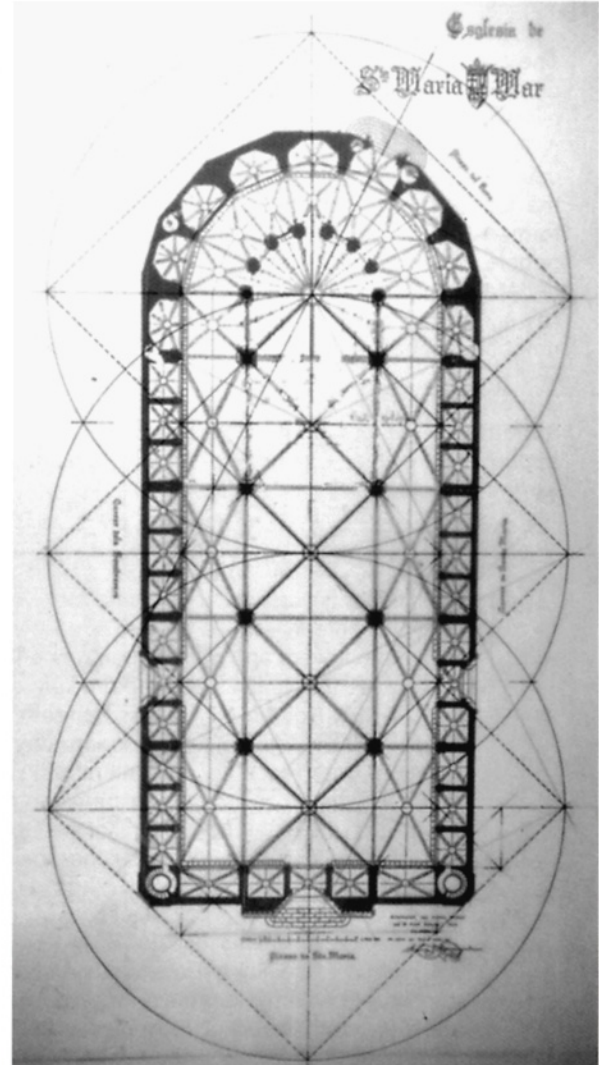


Fig.4

Examining the height in section (Fig. 6) confirms the re-use of plan measurements: the highest point of the arches defining the chapels is found at 9C/5D above the floor of the nave, equal to that at the main door. These 9C show a Pythagorean series of three numbers in the entry chapels: 3C from the base of the piers to the ceiling, 4C to the pediment which separates them from the central space, and 5C to the first plane of the roof. And these 9C are repeated again to define the base of the towers, upon which rise two telescopic octagonal drums whose arches illuminate the access to the higher levels. The constituent parts (Fig. 7) of these drums follow the sequence 2C, 4C, 4C (10C overall, reaching a total height of 28C, 7C above the 21C of the nave). Both 7C and 9C modulation are in evidence.



Fig.5

²⁵As we have already stated, the distance between the edges of the central columns is 9 canas or 5 destres, and a simple examination of the plan shows four intercolumnations plus the chevet, i.e. 45 canas or 25 destres, which amounts to a mujada.

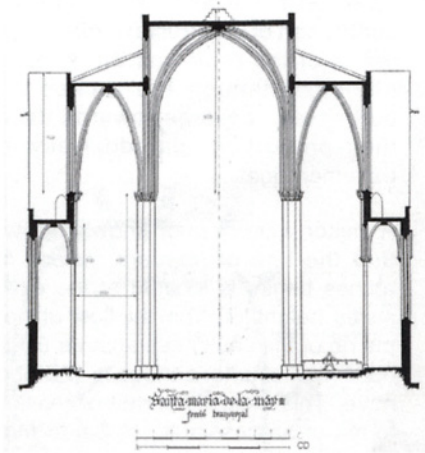


Fig.6

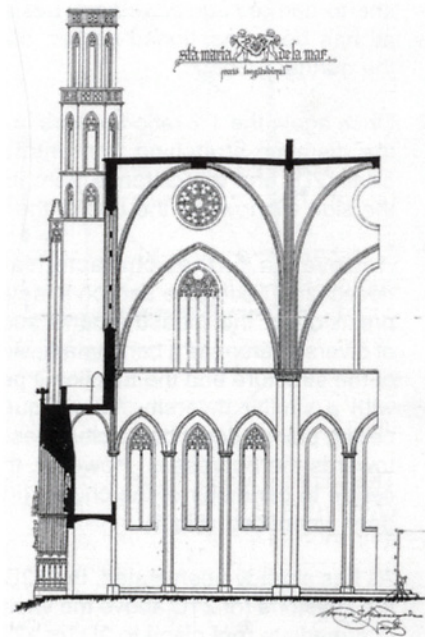


Fig.7

The central area includes the eight columns of the nave, 1C in girth and 10C tall. On top of these rests the central part of the structure, the enclosure of the highest levels of the nave and the sequence of aisles/roof planes. Although the arches of the aisles and buttresses converge towards these eight columns, their proportions paradoxically make them seem extremely light.

A visitor without prior knowledge would never guess that the line of imposts, where columns end and arches begin, is located at the exact midpoint of the aisles' height (6D from the floor of the nave), from which the rib of the vault rises another 6D to the boss, whose horizontal exterior surface is 12D above the floor of the nave. This yields a surfeit of mass that stabilises the forms of arches/vaults at Santa Maria del Mar (as in the Cathedral of Majorca) and their corresponding thrust.

This impost concedes height above and below on a one-to-one (*ad equiparantiam*) basis, an aspect which, as has been mentioned earlier, differentiates it from the northern Gothic.

Once again the 1:2 ratio appears in the aisle, between the distance stretching from intrados of buttress to pillar (2D) and the distance from impost or the sill of the side windows to the end of the buttress (4D).

However, a further characterisation of details is necessary. Taking the section in detail, we find that the precision of the measurements requires an element of diverse nature as a benchmark, since both the nature of the structure and the function it performs present us with a similar diversity. The sequence of roofs and ceiling planes describes a clear descent from the nave towards the buttresses. However, the floor rising from centre to perimeter of the church (in the side chapels) goes unnoticed (Fig.8).

As has already been stated, the 12D of height beneath the keystone (or 21C above the vaulting) is lower in the intermediate roof plane to 9D (or 17C), measured from the origin of the shaft of the column, and descends

again to 5D/9C at the roof plane above the side chapels. As a matter of fact, we are provided with a rational sequence of construction from street to roof levels with intermediate platforms, from which the quarried material can be laid in the building.

The sequences of 12D, 9D and 5D, or similarly, 21C, 17C and 9C, evidence a module of 2 and 3 destres or of 3 canas, but this precision highlights a different datum in each case: the floor of the nave, the origin of the shafts of the central columns, floor level side chapels raised in elevation with respect to the aisles.

Details of construction should then also be observed: the continuity of buttresses is best seen in the intermediate level of the roof plane in the form of a triangular pier reinforced by a half-prism rotated 45° to the aisles where it keys into the wall (Fig. 9). Its weight falls exactly on top of the pillars, and above it rainwater is collected and directed to the gargoyles located in the buttresses. Once again the units are simple: the reinforcing pier stretches one half the full 4 canas of height of the nave with respect to the roof pediment top (Fig. 10), yet without darkening the enclosure wall, permitting oculi which illuminate the higher reaches of the nave.

The considerable discrepancy between the floor height in the side chapels and the street outside (one cana) reveals the existence of a raised platform beneath the entire church. The function of the buttresses, supplemented at their highest points by the camber in the arches of the nave, the showing up of the arches in the aisles and the reinforcement of their lower halves thanks to the side chapels, is also aided at its lowest level by the thickness of a pavement which in turn contributes by distributing thrust over a sandy terrain.

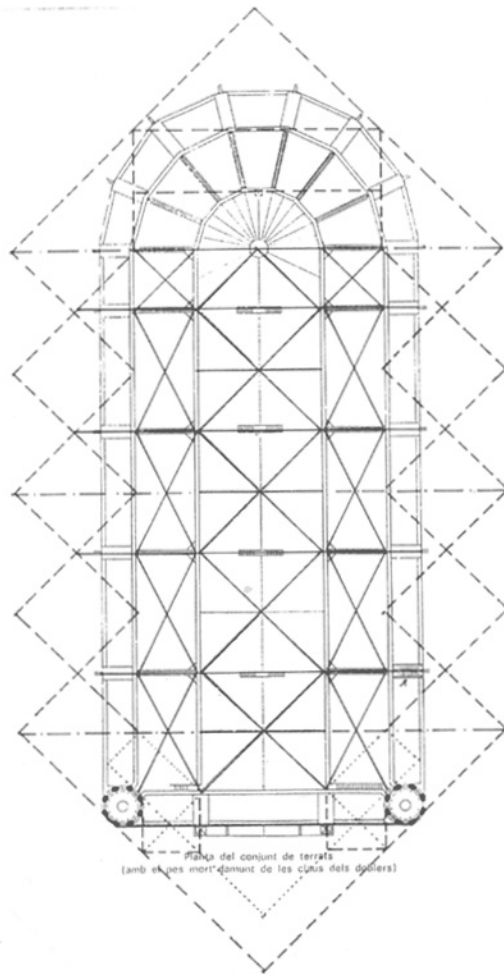


Fig.9

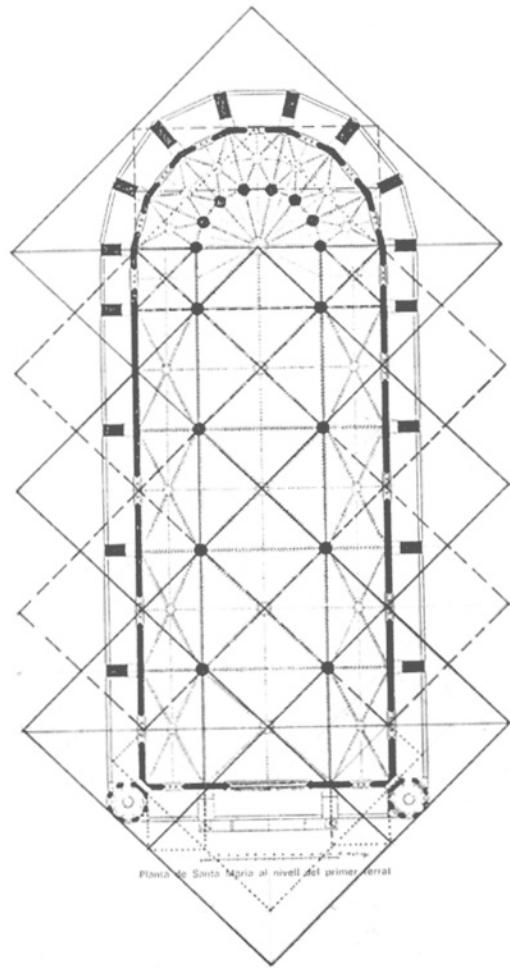


Fig.10

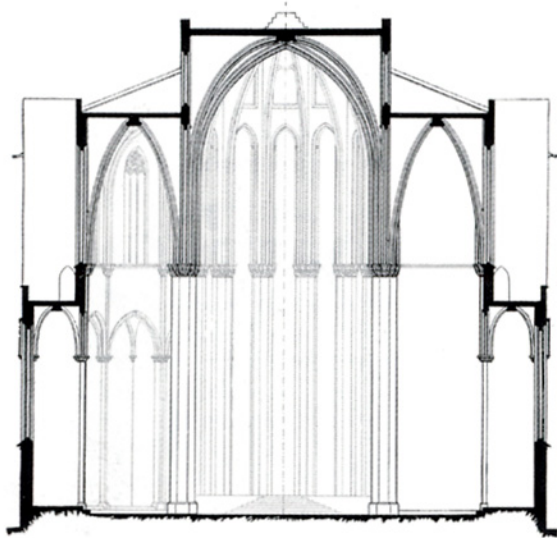


Fig.8

The area located at the apse of the church rotates about the boss of the apsidal vaulting, defined by a series of eight pillars 1 destre apart, measured between correlating edges, as has already been shown to occur in the nave (Fig. 11).

The distancing effect between the two large octagonal pillars adjacent to the altar is also worthy of mention, as the gap between their exterior faces diminishes to 9C. Similarly, the depth between consecutive pillars, which had been 5D in the central area of the church, decreases progressively to 5 canas and to 1 destre.

All these together, then, produce an imposing apse, demonstrating the surprising intellectuality of the city considering Barcelona's small population at that time, which heightens the significance of this work. It is for this and other reasons that this stage in the city's cultural development has been described as pre-Humanist.

Montagut's authorship of the church, initially hypothesised by Bassegoda i Amigó, was confirmed by F. Martorell i Trabal's discovery of several of the church's construction contracts in the Notarial Archive of Barcelona²⁶. It is important to recall that Montagut, also the architect of Manresa Cathedral, had included in his layout for Santa Maria del Mar certain features of Santa Caterina (or the Cathedral of Narbonne, or that of Prague), as a characteristic of these is a pier poised against the pillars, which permits the small side chapels to fit between them and economically distributes the thrust of the buttresses.

This feature did not pass unnoticed by an observer as attentive as Domènech i Montaner, whose restaurant built for the 1888 Exposition can be compared with this and a long series of examples.

The rationality of the Catalan Gothic has inspired modern architecture during several of its greatest moments (Le Corbusier, Sert and Kahn, among others). In short, we find ourselves before the unity of the interior space and the solution of exterior volume in a single authentically modern gesture.

Layout of plan and geometric properties

To focus on the comparison made by Bassegoda i Amigó¹, comparing the crypt plan of Sainte Chapelle (built by Jean de Chelles and Pierre de Montreuil for King Louis IX of France between 1245 and 1248) and Santa Maria del Mar (built between 1318 and 1383 by Berenguer de Montagut) we find series of vesicae, four intercolumnations up to the "ronde point" of the apse, and provocative similarities in the geometric configuration of the apse.

One could imagine this entire series of vibrations as reminiscent of the concentric circles that spread outwards when a stone falls in water. They extend and slow, reaching an extreme stillness, and then suddenly begin to expand and contract again, returning to their

point of origin. It is as though a ring formed in the water from which emerged ancient music, becoming higher or lower in pitch, giving rise to unexpected metrics and proportions whose eloquence increases with each increase in simplicity.

The geometry of Santa Maria del Mar truly possesses a flawless exactitude:

- the height of the side chapels (5CD) finds its counterpart in the total height of the buttresses (10CD). The height of the central columns (6CD, from the floor to their capitals, is reflected in the total height of the church—12CD from the floor of the nave to the highest point of the vault, or 21C to the exterior roof). The terminology, applied to Italian Renaissance architecture, of musical analogy is quite pertinent in this case as well.

Nonetheless, something has been overlooked in the previous comparison: the interior space. The transparency of the Parisian chapel has little to do with the *mesura* of Barcelona: in the former transparency is taken to extreme, leaving only the skeletal and linear outline of structure. In contrast, the space inside Santa Maria del Mar is understood as an articulated unit, and as having an equilibrium in which predominance is given to surfaces. The openings are limited to simple oculi, or narrow windows etched into the walls between buttresses.

One nuance appears to have escaped the previous comparison: that while at Sainte Chapelle we are dealing with two differentiated and quite distinct parts (one single nave in the chapel and three in the crypt), in Santa Maria del Mar it is difficult to separate the nave from the aisles, which in turn extend between the buttresses into the chapels, shoring up the structure where it is most necessary, at its base.

And as if this were not enough, the distance between pillars, measured as was done in the Middle Ages, that is, between the arris adjacent to the interior face of the nave and the corresponding exterior face, measuring towards the aisle is exactly nine canas or five destres.

²⁶ Discussed in Duran I Sanpere: "Per la història de l'art a Barcelona. Gloses a documents dispersos". Institut d'Estudis Catalans, Barcelona, 1960.

²⁷ Bassegoda I Amigó, Bonaventura et al.: "Santa Maria de la Mar". Monografia històrico-artística del temple. Editores Tècnics Associados, Universitat Politècnica de Barcelona, 1976.

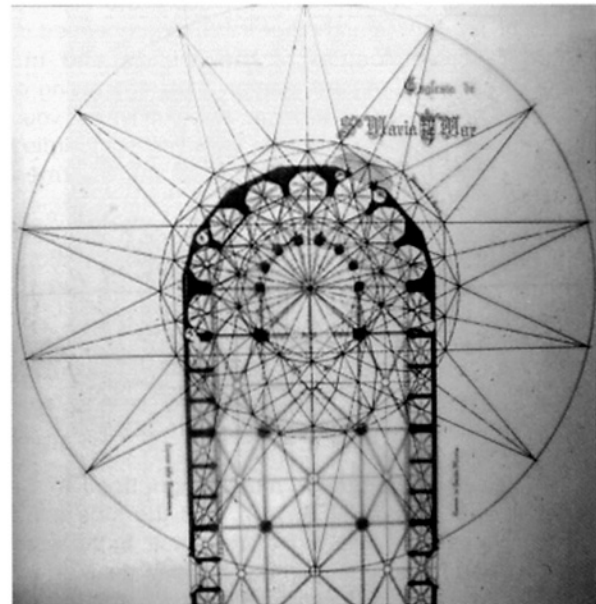


Fig.11

With the aid of a Geodimeter 460 laser distance meter we were able to take readings²⁸ from a distance of up to 60-70m with a precision of ± 10 mm, yielding the following conclusions:

- Two- and three-destre modules were used to determine the heights of pillars, bases of arches and bosses of vaults (the span of the central transverse arch is 11.53m... 4CD are 11.2m; the base of the arch is 22.42, that is, 8CD; The span of the central diagonal arch is 16.94m, 6CD are 16.8m, etc.)
- As Roland Bechmann stated, the principle of economy rules every moment of the process of creation.
- Four of the five arches—all of them except for the transverse arch of the aisle— possess the same curvature. This implies that the same centring was used to apply the prior assembly or layout on the floor or the walls of the church, thus reducing the number of squares and other instruments needed in the construction of the arches and in the measurement, demarcation and laying off of angles. Furthermore, only one type of voussoir was used, with the resulting standardisation of the cross-section and the treatment of seams.

The principles of mediaeval construction are evident in this building: the need that these professionals felt to determine some characterisation to rationalise their trade ("*ars sine scientia nihil est*"), and how this conferred sense and neatness (propriety) to their work ("*scientia reddit opus pulchrum*").

The buttresses go almost unnoticed in Santa Maria del Mar (Fig. 12), and the side chapels, aisles and nave form a single unit. In the words of Joan Rubió i Bellver, Santa Maria del Mar "*is one of the buildings with a simplest constructive nature in all of Gothic art; fewer complications and fewer*

materials have resulted in the creation of the most spacious and self-confident halls of all Christendom, and one cannot be certain if what we usually call the nave actually exists, as it makes a single entity, a unique space, and not a sum of spaces."

A maximum of space with a minimum of material structure—or at least apparently so, because the conceptual structure is in fact extremely profound in its rigorous simplicity.

²⁸ Carrasco Hortal J.; Millán Gómez A.: "*Sobre la medida y el lugar de la estructura gótica en Santa María del Mar, Barcelona*". *Revista EGA. Asociación de los Departamentos Universitarios de Expresión Gráfica Arquitectónica*, nº 4, 1996, págs. 102-107.

