

The Vaults of Santa Maria Novella and the Creation of Florentine Gothic

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Figure 1. Santa Maria Novella, Florence (1279-1355)

Links between constructional practice and design were not uncommon in medieval architecture. In 12th c. France the transition from Romanesque to

Gothic went hand-in-hand with the development of the rib vault, a new form effective both for increased ease of construction and also for increased clarity in conception of the design. This connection is famously represented by the choir of Saint-Denis, whose architect took advantage of the linear character of the rib to re-imagine the relation between each bay of the choir and ambulatory, resulting in the open view so neatly described by Abbot Suger.¹ Such a relation can also be found at the beginning of the Gothic era in Central Italy, where the nave of the Dominican church of Santa Maria Novella in Florence (1279-1355) provides a vivid example of the link between constructional practice and design.² (Fig. 1)

Historians of Gothic architecture, among them Louis Grodecki, have noted that Santa Maria Novella is one of the most beautiful examples of Italian Gothic without attempting to specify just what it is that sets Santa Maria Novella apart.³ The significance of Santa Maria Novella was perhaps most clearly set forth by Jean Bony, in his classic book, *French Gothic architecture of the 12th and 13th centuries*. In the introduction, Bony explains that he has limited his book to France, because he sees Gothic architecture as consisting of two periods, the first of which, between c. 1130 and the late 13th century, took place almost entirely in France, while the second, from the late 13th through the

¹ Much has been written on the choir of Saint-Denis. An excellent and succinct analysis of the brilliance of its design is in Bony 1983, 90-93.

² To date, useful publications on the church of Santa Maria Novella include Wood Brown 1902, Paatz 1937, Orlandi 1955, Hall 1974, Arthur 1983, Lunardi 1983 and 2001, Piccinini 2000, Rocchi 2004, Bellosi 2004, Schwartz 2009. The only monograph on the church is by Wood Brown; others focus on particular features, such as architectural sculpture, the tombs, or a particular chapel. Paatz suggests possible sources for the design, while Rocchi focuses on the transept and on the foundations of the "old church".

³ Grodecki 1977, 323.

15th c., took place on a wide international front. Singling out Santa Maria Novella as important in the development of Italian Gothic. Bony notes how it adopts Cistercian models available in Central Italy in the mid 13th c. and transforms them by opening up the interior space and thinning out the walls. For Bony, “The substance of walls and piers is so reduced in that large airy nave of Santa Maria Novella that they seem to have lost all weight and to serve simply to define and enclose space”.⁴ The nave of Santa Maria Novella was equally admired in the 15th c. by the Dominican Giovanni Caroli, who described the effect produced by the interior in the following way: “*if you were standing in the first door of the church and you were looking at it, since it is vaulted, with one glance you would see all the vaults made with excellent art, and with another glance you would see clearly in another direction with no obstacle.*”⁵ Caroli’s description, focusing on the wonderful vaults, goes on to explain that “*they stand without tie rods or other such visible supports, but by their very selves.*”⁶

(Fig. 2)

⁴ Bony 1983, 456.

⁵ Caroli c. 1470-1480, pp. 22v-23. Caroli’s text reads, “*Nam si ad primam eius ecclesie portam, consistas intusque illam spectes, cum testudinata sit, omnes illas testudines egregia arte confectas, uno simul oculi ictu perspicias, una alterius aspectum nulla ratione impediante.*”

⁶ Ibid. “*Neque vero cathenis aut aliis huiusmodi apparentibus firmamentis consistit, sed in semetipsam...*” Caroli’s reference to the absence of tie-rods at Santa Maria Novella is worth noting, as the majority of vaulted churches in Central and Northern Italy at this time were provided with either wooden or iron tie rods as reinforcement.



Figure 2. Santa Maria Novella, nave and aisles

This effect of openness and airiness in the nave of Santa Maria Novella is most apparent in the four bays closest to the main façade.⁷ These bays differ from the two bays next to the transept in that they are square rather than rectangular. In these bays, with the piers of the arcade placed more widely apart than in the two rectangular bays, there is an interpenetration of space between nave and aisles that was unusual in completely vaulted structures at that time. Bony recognized that this openness in the Santa Maria Novella nave, almost equal to that of hall churches, would characterize Italian Gothic in the 14th c. What neither Bony nor any other historians have done, however, is to

⁷ Santa Maria Novella is “oriented” with the choir at the north and the main façade facing south. The east flank of the church thus faces towards the city center while the west is enveloped within the convent walls.

analyze the elements that created this new spaciousness and to attempt to explain its genesis. How and why the builders of Santa Maria Novella introduced this new spaciousness is the question explored in this paper.⁸

The fact that the first two bays of the nave are rectangular in plan while the other four are square, or nearly so, has been noted by scholars. (Fig. 3) Because the change in bay size occurs just below the choir screen that once ran across the width of the nave, it has been linked to the possibility that the nave below the screen was not at first meant to be vaulted.⁹ However, while the Dominicans of Santa Maria Novella may not originally have meant to vault the bays below the choir screen, it does not necessarily follow that this would involve a change in the size of the bays. Other scholars have attributed the change in the dimensions of the nave bays to a desire on the part of the builders to enhance the perspective of the nave as seen by a viewer entering through the doors of the main façade.¹⁰ The notion of creating a visual perspectival effect within the nave is surely an overly precocious and unlikely concept to have been applied in the 13th or early 14th c. Close examination of available evidence

⁸ TMy research into the process of design and construction at Santa Maria Novella, has been generously supported by grants from The Kress Foundation, The World Monuments Fund, The Graham Foundation and The Pennsylvania State University. I have also benefitted from the collaboration of Tom Boothby, Professor of Architectural Engineering, Penn State, and a team from the Milan Polytechnic under the direction of Professor Luigia Binda. The results of this research have appeared thus far in the following: Smith 2006a, 2006b, 2010, and Erdogmus, Boothby and Smith 2007.

⁹ The Dominican Constitution of 1228/35 stipulated that there be vaulting only over the choir and the sacristy. By 1300, the ban on vaulting below the screen was removed, having already been violated numerous times. On this, see Sundt 1987, 402-403. The notion that the difference in bay size may derive from the division of the church into a space for the Friars and a space for the lay people is best summarized in Hall 1973, 163-164.

¹⁰ For example, White 1066, 8, , considers this possibility, linking it to the birth of three-dimensional reality in painting at that time. S. Romano ("Domenicani," *Enclopedia dell'Arte Medievale*, 1994) continues to apply the notion of "optical illusionism" to the varying bay sizes in the nave of Santa Maria Novella.

suggests instead that it was the type of vaults used to cover the nave that served as the driving force behind the unusual sequence of bays, and that furthermore the wonderful airiness of the interior space results from a change in design precipitated by the masons responsible for erecting those vaults. While this design change could not have taken place without conflict and sacrifice, the result would prove fruitful for the development of Italian Gothic, serving as a model for the nave of Florence Cathedral and other important Gothic structures in Italy.¹¹

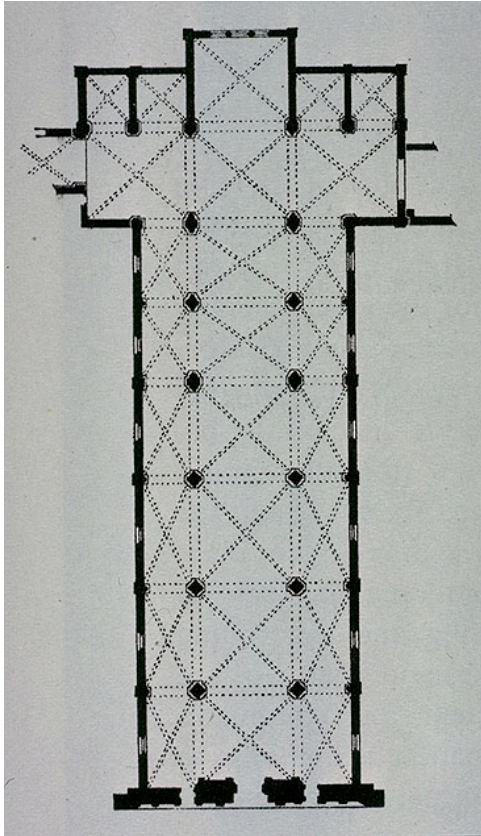


Figure 3 Santa Maria Novella, Florence, plan (Paatz)

As with the majority of even the greatest medieval buildings, little written evidence relating to the design and construction of Santa Maria Novella

¹¹ For example, outside of Florence, the Dominican church of SS Giovanni e Paolo, Venice (begun c. 1333), S Maria Gloriosa dei Frari, Venice (begun 1330s), and San Petronio, Bologna (begun 1390), also reflect the nave design of Santa Maria Novella.

has survived to the present day.¹² While the rare archival references are invaluable, evidence provided by the building itself is also revelatory, suggesting that it was the vaults and their builders who were critical factors in creating the much-admired airiness that made Santa Maria Novella a trendsetter. More specifically, it is possible to identify the site of interaction between constructional practice and design high above the nave, in the vaults of the first two nave bays, and to reconstruct a probable sequence of events as well as plausible rationales behind them. Analysis of these and the other nave vaults provides a key to understanding the major design change in both plan and elevation for the rest of the nave. This paper will focus on the vaults and the masons who built them, arguing that the final product, the airy vaulted nave we see today, was neither planned nor foreseen by anyone at the outset.

When the Dominicans of Santa Maria Novella decided to build a new church large enough to accommodate their rapidly expanding community, they turned, like many of their colleagues, to the Cistercians for models for both the ground plan and for certain aspects of the elevation. Although there were no good examples of Cistercian architecture in the immediate vicinity of Florence, there was an outstanding one under construction set in the hills of western Tuscany: the abbey church of San Galgano (1217-1289?).¹³ (Fig. 4) San Galgano today is a roofless shell, but it is still possible to see the resemblance between

¹² Most of the original records of the convent of Santa Maria Novella were destroyed during the Suppression of Monasteries, first under Napoleon and again after the unification of Italy. Important evidence survives in the early 18th c. transcription of original texts in the convent archives by Father Vincenzo Bporghsigiani, O.P. These are now held in the Archive of Santa Maria Novella. See Lunardi 2001, 160-178 for a useful review of available archival evidence.

¹³ On San Galgano, see the classic monograph by Canestrelli 1896 and more recently Gabbrielli 1998.

its plan and that of Santa Maria Novella, especially in the transept, choir and first two nave bays. (Fig. 5) The French-inspired elevation of San Galgano also bears comparison with Santa Maria Novella, most especially in the first two nave bays of both structures.¹⁴ (Fig. 6)



Figure 4. Abbey Church of San Galgano (1218-1300). Nave looking east.

¹⁴ The alternation of supports in the first two bays of Santa Maria Novella, where a slender pier in the nave arcade divides the first two bays, suggests a possible original intent to use sexpartite instead of quadripartite vaults over the nave. In this case, there is another candidate as the model for Santa Maria Novella: San Martino al Monte Cimino, a French-derived Cistercian abbey church, south of Orvieto. With an alternating plan suggesting an original intent to cover both transept and nave with sexpartite vaulting, San Martino was eventually completed over an extended period, with sexpartite vaults only in the transept and quadripartite vaults over the nave. See Enlart, 1894, 57-64; Wagner-Rieger 195, II, 232-237, Fraccaro de Longhi 1957, 264.

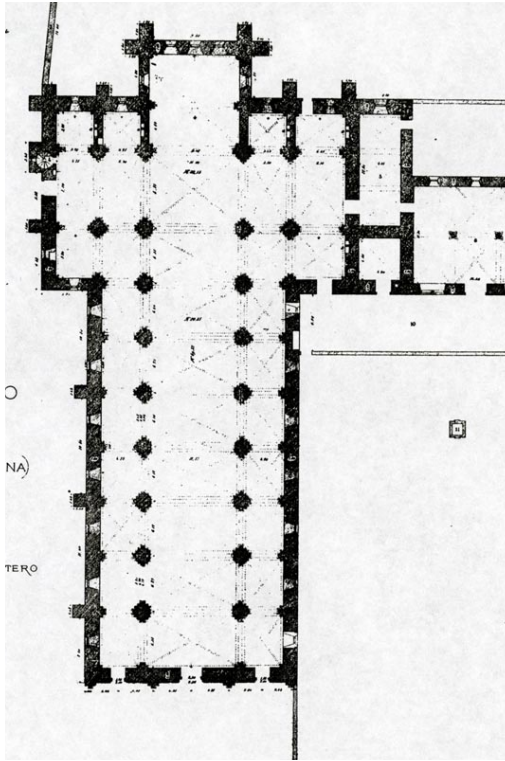


Figure 5. Abbey Church of San Galgano, plan ((Canestrelli).

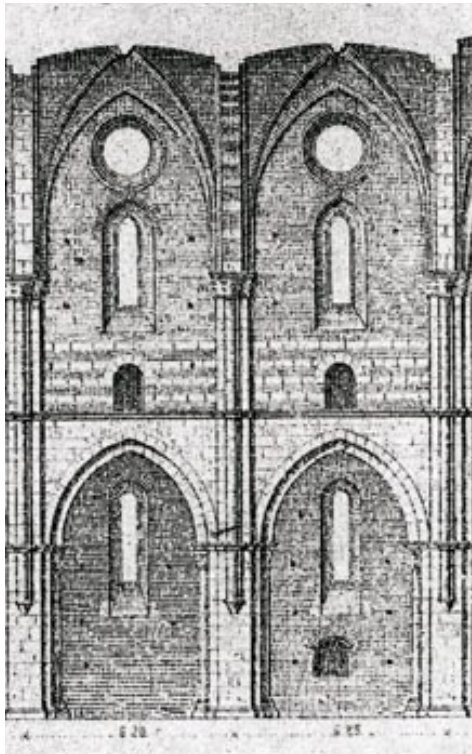
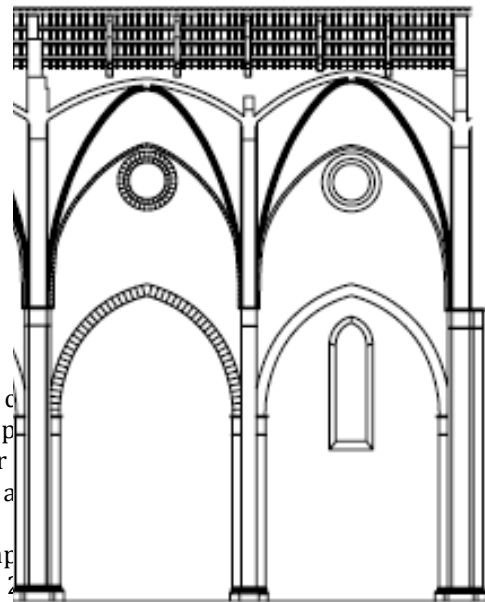


Figure 6. Elevation of first two nave bays, San Galgano (left) (Canestrelli) and Santa Maria Novella (right)

In 1279, armed with a great deal of money and a *modellum* (a plan and probably a proposed elevation), provided by Aldobrandino Cavalcanti, former Prior of Santa Maria Novella, the Dominicans began construction on their new church, sited to the north of the small church of Santa Maria delle Vigne given to the Dominicans when they arrived in Florence in 1221.¹⁵ The first stone of the new church was ceremonially laid by Cardinal Latino in one of the transept chapels,¹⁶ (Fig. 7) The perimeter of the entire church seems to have been laid out and the foundations dug right away, in order to



¹⁵ Cavalcanti died in 1279 just before the laying of the cornerstone of Santa Maria Novella. The Novella Necrology records that he was a member of a prominent family. "Santa Maria Novella, Bishop of Orvieto and papal vicar in the city of Rome. When he was old he returned to the convent with much money and a plan for our church." Orlandi 1955, I, 10, n. 124.2

¹⁶ The foundation date of 1279 is attested to by contemporary records of the convent of Santa Maria Novella, Orlandi, 1955, I, 239.

demarcate the space where it would rise.¹⁷ Already in 1287 the City of Florence traced the precise outline of a large piazza to be opened up in front of the façade of the new church.¹⁸

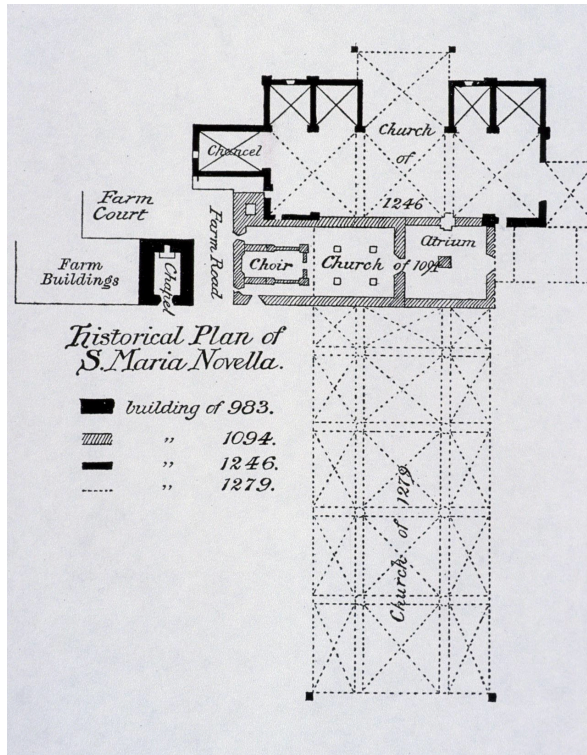


Figure 7 Santa Maria Novella. Cross-hatching indicates the church of 1004 given to the Dominicans in 1221 (Wood Brown)

Meanwhile, keeping the old church of Santa Maria delle Vigne open and functioning, the Dominicans constructed an enormous new transept contiguous to it on the north, with its first use documented in 1295.¹⁹ Immediately afterwards, the old church must have been demolished and work begun on the

¹⁷ Borghigiani, *Cronica minuta*, I, 210 [ASMN I A.26. The perimeter walls to the east and south would have been important in marking off church space from adjacent property, while the west wall, inside the convent, was less so and could be left until later.

¹⁸ Although the original official document no longer survives, a contemporary copy was published in Pampaloni 1973,, no. 43, 67-69.

¹⁹ Borghigiani, *Cronica minuta*, vol. I, pp. 233-235 (N.B.: There is not and has never been a p. 234. Apparently, Borghigiani made an error in his numbering.) [ASMN I. A. 26]. Orlandi 1955, p. xxii, n. 17, suggests that although the transept was in use by 1295, with its lateral chapels vaulted and decorated, the high vaults of the transept were probably not erected until much later, an opinion supported by physical evidence in the structure.

first two nave bays of the new church, set in part crossways on the foundations of the old church. In addition to the similarities in the overall plan, it is the decidedly Gothic elevation of these two bays that most recalls San Galgano. United with the transept and open for use in 1300, the two completed nave bays of Santa Maria Novella were closed off from the active construction site by a wall.²⁰ Construction on the rest of the nave would continue at least through the 1330s, and perhaps beyond, with the final dedication of Santa Maria Novella not taking place until 1355.

A comparison of the nave vaults of Santa Maria Novella with the vaults typical in French Gothic construction reveals striking differences in design, construction and visual effect. Usually raised over rectangular bays, French Gothic vaults are even-level crowned, with the keystones of both transverse arches and vaults rising to the same height, tracing a visual line that links one

²⁰ Borghigiani, i, vol. I, p. 247 [ASMN I. A. 26].

bay to the next down the length of the nave. (Fig. 8)



Figure 8. Chartres Cathedral (1194-1226) nave interior.

The vaults of Santa Maria Novella, however, are domed, the keystones of each vault rising higher than the apex of the transverse arches between them. Rather than visually linking the bays, the vaults of Santa Maria Novella instead provide each bay with its own canopy, visually separating one from another. This type of vault is commonly known as Lombard, because of its early and wide-ranging use in the Lombard region of northern Italy. (Figs. 9 and 10)

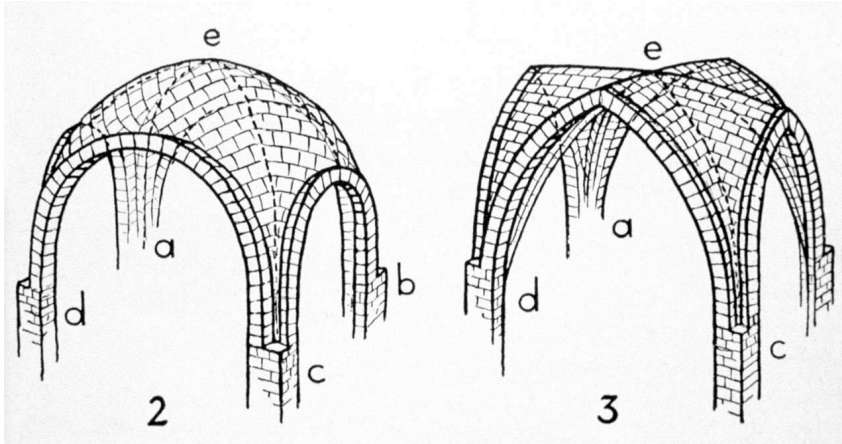


Figure 9. Comparison of Lombard vault (left) with French even-level crown vault (right).



Figure 10. Santa Maria Novella, nave vaults over square bays

Beginning in the early 12th c, Lombard masons erected ribbed groin vaults over the naves of many churches in the region.²¹ (Fig. 11) Given the prevalence of brick over stone in building construction throughout the Lombard region, Lombard masons almost invariably constructed their

²¹ Porter 1917, 109-126, outlines the basic characteristics of the Lombard ribbed groin vault.

churches with both walls and vaults of brick. They raised these vaults over square bays, providing lateral buttressing above the aisles, sometimes hidden and sometimes visible on the exterior. The interior effect in Lombard churches is of a series of discreet, square bays, separated by round-headed transverse arches, and covered by a domelike canopy. In Lombard churches, as a rule, each nave bay corresponded to two small bays in the aisles, separated from the nave by a low arcade resting on short, heavy supports. The fact that the plan and elevation of the first two nave bays of Santa Maria Novella appear derived from a French Gothic model transposed to Tuscany by the Cistercians, raises the question of why the Dominicans of Santa Maria Novella elected to cover them with domical Lombard vaults instead of with the even-level-crown vaults common to French Gothic architecture.



Figure 11. Chiaravalle della Columba, Cistercian Abbey Church (1150-1200), nave.

The Dominicans' unusual choice of vault masons may have been dictated in part by the lack of a local Florentine tradition of large-scale vaulted structures and the concomitant lack of masons familiar with the procedures required in order to raise a series of vaults on a succession of point supports .²² To solve the problem of finding vault masons, the Friars of Santa Maria Novella needed only to look within the Dominican network, to the church of San Domenico, Bologna, where a team of masons had, not long before, erected a series of Lombard vaults over the transept and first two nave bays of the church that housed the tomb of St. Dominic, founder of the Order.²³ Fig. 12) Given the lapse of at least two decades between the adoption of the Cistercian-inspired model for Santa Maria novella and the erection of the vaults over the first two nave bays, it may be that the Dominicans were not aware that they were recruiting a group of masons who, if not the wrong choice, were at least an unusual choice of masons for the job at hand.²⁴

²² The vault of the Florence Baptistery, not securely dated, seems to have been constructed sometime in the mid-12th c. See, for example, Toker 1976, and Paolucci 2004. The Baptistery's eight-sided dome-like vault, abutted by walls around its entire periphery, seems to have been an anomaly in medieval Florence and did not serve as either a structural or constructional model for the vaults of Santa Maria Novella. In fact, there does not seem to have been a tradition either in Florence or in Tuscany as a whole for erecting vaults on point supports over the naves of churches. On Romanesque Tuscany, see, for example, Salmi 1961,; on Florence see Horn 1943, or more recently Rinaldi, Favini and Naldi 2005.

²³ One of the original Lombard domical ribbed vaults survives at San Domenico, in the left arm of the transept, sandwiched between the roof and the Baroque ceiling below, hidden from view but accessible. On San Domenico, see Alce 1973, esp. 16-163; on the Dominican practice of sending lay brother artists and artisans from one convent to another, see Meerssemann 1946, esp. 175 ff.

²⁴ The Lombard masons had probably already constructed the vaults over the four lateral chapels off the transept of Santa Maria Novella also covered with domical vaults. Since these chapels are small, square in plan and bound by walls on three sides, the masons would not have encountered any constructional problems.

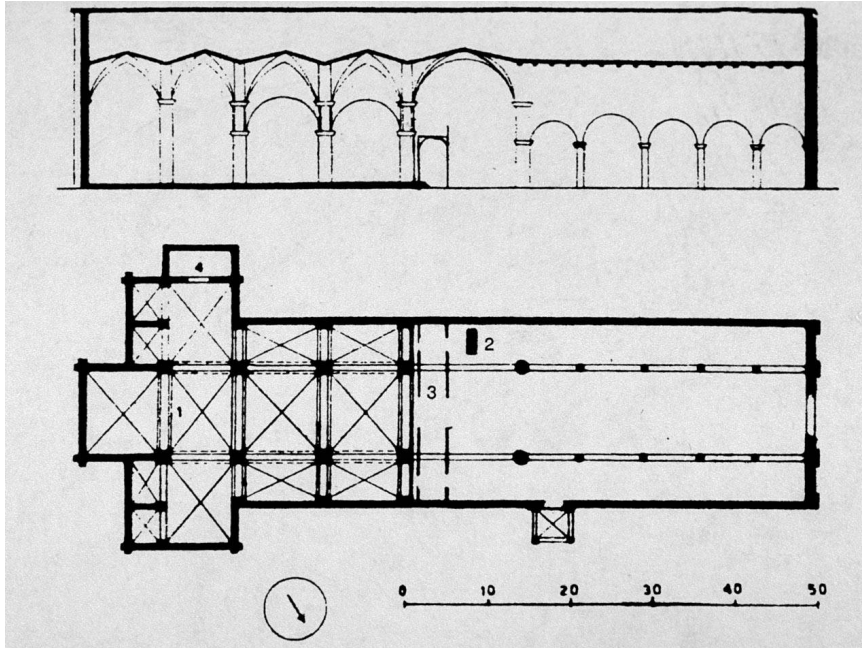


Figure 12. San Domenico, Bologna. Consecrated 1251, elevation and plan (Alce).

If this was indeed the case, then it is possible to reconstruct the following plausible scenario: between 1295 and 1300, a group of Lombard-trained masons, possibly imported from Bologna, proceeded to build Lombard vaults over the first two bays of the nave of Santa Maria Novella. Given their training in the Lombard tradition, where vaults were always raised over square bays, they must have found it a difficult task to erect their vaults over rectangular bays. However, given that the walls and arcades of these bays were already complete, the Lombard masons constructed their vaults as best they could. Although the walls of Santa Maria Novella were built using the local Florentine sandstone known as *pietra forte*, with decorative elements outlined in the finer *pietra serena*, the vault masons, following Lombard tradition, constructed the nave vaults of Santa Maria novella entirely out of brick.²⁵ Also

²⁵ Frati 2006 provides a full background on the building materials in 13th and 14th c. Florence.

following Lombard tradition, they provided lateral support for the nave vaults with transverse walls over the aisle vaults, hidden under the aisle roof.²⁶

A closer look at the vaults of Santa Maria Novella suggests a likely rationale behind the insistence by the masons on building over a square base. (Fig. 13) From above, the domed vaults present an even more striking difference from the typical vault used in French Gothic architecture than from below. Between each of the square bays is a transverse wall, raised with and keyed into the exterior walls of the clerestory, suggesting a different mode of construction from that of the ribbed vaults of northern France.



Figure 13. Santa Maria Novella. Above nave vaults, showing transverse wall between bays.

Although there is no surviving contemporary account of the constructional process for either the French or the Lombard system of vaulting, the French

²⁶ Diagonally placed wooden tie beams are visible just above the surcharge in most of the nave bays of SMN, where they serve to strengthen the connection of the transverse walls to the clerestory walls. These, too, may have served during vault construction.

method has been convincingly reconstructed by John Fitchen, and brilliantly conveyed to a wide audience by the artful draftsmanship of David Macaulay's *Cathedral*.²⁷ To construct the French Gothic vault, the masons would first erect the clerestory walls, then the carpenters would raise a roof over the nave, and at the level of the top of the clerestory walls they would construct a wooden platform to serve for lifting heavy stones and as a work space protected from the elements for the construction of the vaults.

Such a method seems not to have been used in building Lombard vaults.²⁸ In many cases the original roof either rested directly on, or not far above, the tops of the vaults, suggesting that it was customary to build the roof after rather than before completion of the vaults. (Fig. 14) The presence of transverse walls between each bay further suggests that instead of making use of the roof beams as a platform, Lombard masons made a sort of square masonry box to serve as a basis for the scaffolding required for construction of their square vaults.

²⁷ See Fitchen 1961, Macaulay 1973.

²⁸ To my knowledge, no scholarly publication has yet outlined the Lombard method of vault construction. The method proposed here is based on inspection of a number of Lombard vaults from above,



Figure 14. Viboldone, abbey church (completed 1348). Nave vault from above. Although the roof is a replacement, the main cross beams are original, almost touching the tops of the vaults.

The clerestory walls of the first two nave bays of Santa Mariai Novella, no doubt erected by local masons following the French model, are not connected by a transverse wall between each bay. Rather, the two vaults, domical yet rectangular, form a unit, abutted on one side by the transept and on the other by the wall closing off the first two bays from the rest of the nave. The vault masons may also have relied on the presence of transverse walls as a means of reducing horizontal forces between bays. Although this factor would not have been as important in rectangular as in square bays, the vault masons may nevertheless have been suspicious of the lack of a wall. In any case, the lack of both a square base and transverse walls apparently made the task of the vault masons significantly more difficult, with the result that they must afterwards have lobbied hard for a change to square bays in the rest of the nave. (Fig. 15)

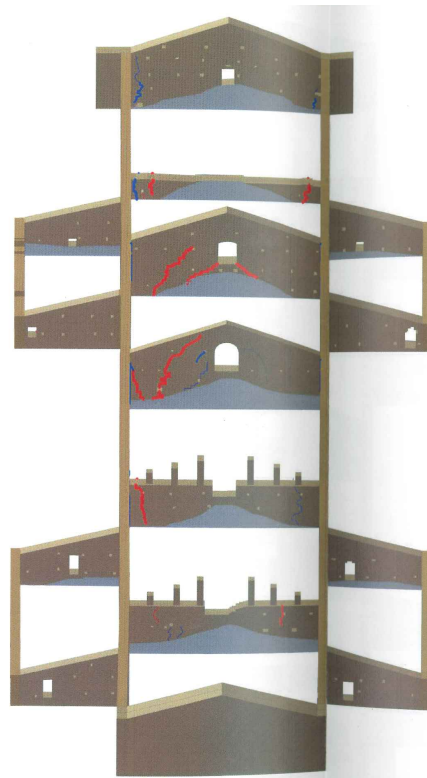


Figure 15.1

ove the vaults (Politecnico di Milano).

Although the vault masons of Santa Maria Novella were probably not envisioning it at the time, their insistence on building their vaults in the traditional way, over a square base, would have far-reaching consequences. In return for the change to a square bay, they abandoned the traditional Lombard double-bay system with its heavy supports and low arcades, instead daring to raise their vaults on the slender supports and high arcades inherited from the original French Gothic model.²⁹ The nave elevation of Santa Maria Novella clearly illustrates the change in the bay size. In order to maintain the same height for the keystones of the nave arcade, the arches in the square bays abandon the pointed profile of the first two bays and become almost

²⁹ See Erdogmus, Boothby, Smith 2007, for an analysis of structural differences between the French system and the Lombard system as used at Santa Maria Novella, in which vault behavior in both the rectangular and square bays is examined.

semicircular.³⁰ (Fig. 16) With the piers in the square bays more widely placed than those in the first two bays, the space is thus allowed to flow freely between the nave and aisles, in a way not seen before in either the Lombard churches nor in French Gothic.

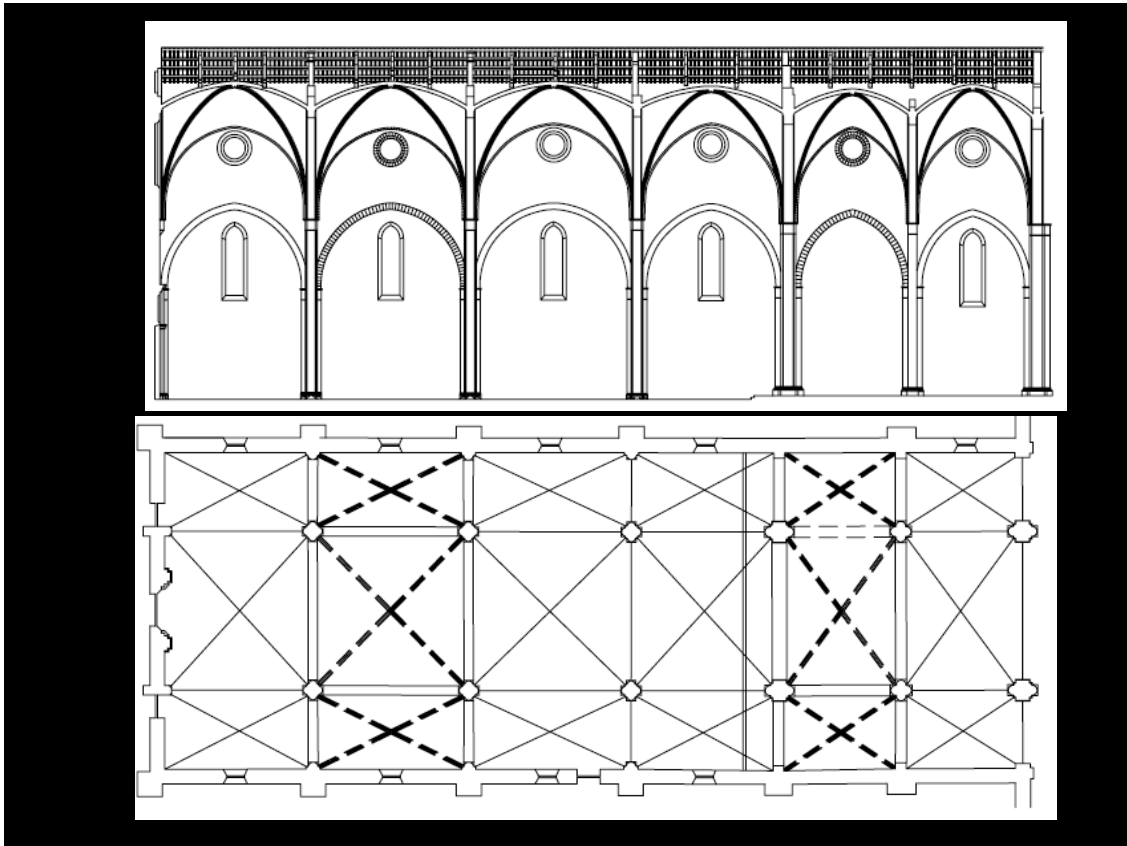


Figure 16. Santa Maria Novella. Nave elevation and plan.

Documentation related to the construction of the nave is sparse and not always useful in establishing a chronology. A reference to funds donated to found a chapel in 1303 but reallocated in 1325 to be used instead for the beginning of construction on the façade wall, might be taken to indicate that the nave vaults were not yet complete at that date.³¹ Alternatively, a reference

³⁰ The transverse arches in these bays, however, retain the pointed profile of the first two bays, so that the difference is not apparent to the casual viewer looking down the length of the nave.

³¹ Orlandi 1955, I, 335. Addition of the marble veneer on the façade would not begin until 1350.

to the founding in 1305 of an altar and related frescoes dedicated to St. Maurice in the east aisle of the nave, has been interpreted as an indication of the completion of construction in the nave.³² This lack of reliable archival references for the sequence of construction in the nave is particularly unfortunate, as it is precisely in these last four bays that the elevation imparts that sense of airiness and weightlessness praised by Bony. Nevertheless, evidence gleaned from the building itself suggests that the new openness of the nave resulted from the vault masons successfully convincing the Dominicans to alter the original plan of the nave to allow for vault construction according to the procedure traditional to Lombard vaulting.

Despite the disappointing lack of documentation on the construction of Santa Maria Novella, there is one particular feature and an archival reference to that same feature that together support the reconstructed sequence of events proposed here to explain the genesis of the new and trendsetting design for the nave of Santa Maria Novella. This feature is a monumental door, documented as first opened in the east aisle of the nave in 1302, soon after the first two nave bays were complete and in use. (Fig. 17)

³² Borghigiani, *Cronica minuta*, I, 264-266. These frescoes, recently uncovered and restored, remain unpublished. Money for the altar and fresco may have been given in anticipation of their execution, as was the case with the 1303 donation. Alternatively, both altar and fresco could have been in place and in use while the church was still under construction, common practice in the Middle Ages.



Figure 17. Santa Maria Novella in the late 19th c. The 1302 door is clearly visible on the right flank of the nave. (Alinari)

The original significance of the 1302 door is apparent on a plan of the church with its adjoining cloister, the Chiostro Verde. As in most conventual establishments, the cloister of Santa Maria Novella was the hub of the everyday life, with the monastic quarters, including the Chapter House and Refectory, situated around its periphery. The plan of the church within its monastic context shows the 1302 door precisely in the center of the east aisle of the nave, halfway between the transept and the façade. From this door it is possible to trace a line directly across the nave, through a second, now closed door on the opposite wall, directly to the fountain in the center of the cloister. From its prominent place on the plan, It seems clear that the 1302 door was originally conceived as an integral feature in the overall design of both church and

convent.³³ (Fig. 18) Facing east, towards the city center, the 1302 door was also conceived as an important entrance for the Florentine public.³⁴ Although there would eventually be a triple portal on the main façade, it would face south toward the new piazza. Moreover, from the time it was built until 1470, when Alberti's new design for the façade replaced the original portal with a much larger one, the 1302 door was the largest entrance into Santa Maria Novella.³⁵

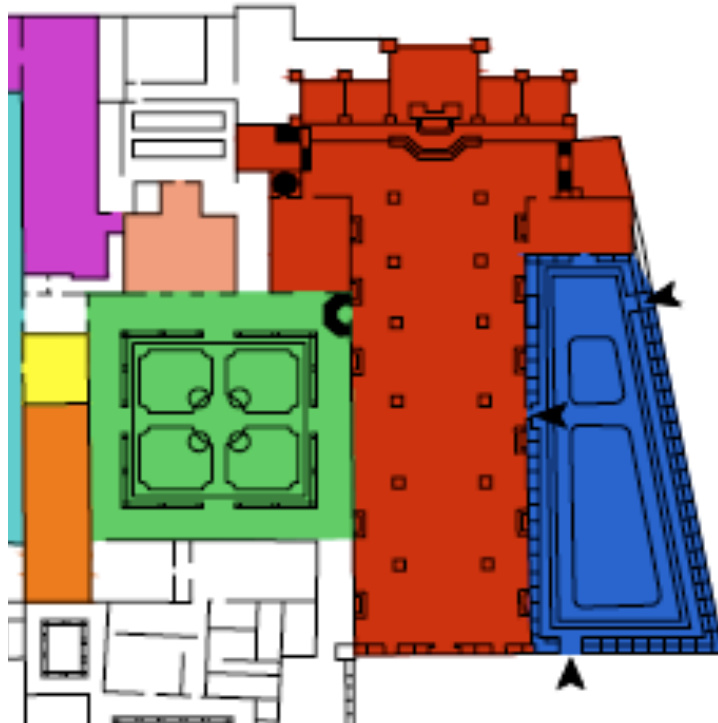


Figure 18. Santa Maria Novella, plan of church and adjoining cloister. (Bartoli)

³³ The existence of the cloister door is confirmed by a 16th c. description of Santa Maria Novella, as having been situated, prior to that time directly opposite the 1302 door: "...da prima della fabbrica della chiesa, dov'è l'Altare [della Trinita di Masaccio] vi fosse, per poco tempo la porta che, mettesse nel Chiostro primo, di contro all'altra che stava di là di levante, che corrispondeva al Cimitero degli Aveli." Borghigiani, *Cronaca Analistica*, III, 330-340, published in Orlandi 1955, II, 397-404, cf. esp. 402; Bartoli 2009, makes the same observation but draws different conclusions from it.

³⁴ It continued to be so at least through the first part of the 15th c., when Masaccio painted his Trinity on the west aisle wall, facing all those who entered the church through the 1302 door.

³⁵ See Lunardi, 2001, 169, who also outlines later alterations to the 1302 door, first by Vasari, who closed it off completely, and later by restorers in the 19th c. Interestingly, this door now serves as the only public entrance into Santa Maria Novella, the triple portal of the main façade having been closed in recent years.



Figure 19. Santa Maria Novella, 1302 door from inside and outside.

Today the 1302 door appears relatively insignificant. From the outside, it is squashed up against a buttress, while from inside it appears even more awkwardly placed. (Fig. 19) Indeed, the plan shows that although the door is situated precisely halfway down the nave, it is strangely placed at one end of a bay.

A closer look at the plan, however, suggests that it was not always so. Using the peripheral dimensions of the completed church, it is possible to re-envision what may have been the original plan for the nave: instead of two rectangular bays and four square bays, the nave can be divided into seven equal rectangular bays with the same dimensions as the two bays next to the

transept. In this version of the plan, the 1302 door would then open into the precise center of the fourth bay, the central bay of the nave.³⁶ (Fig. 20)

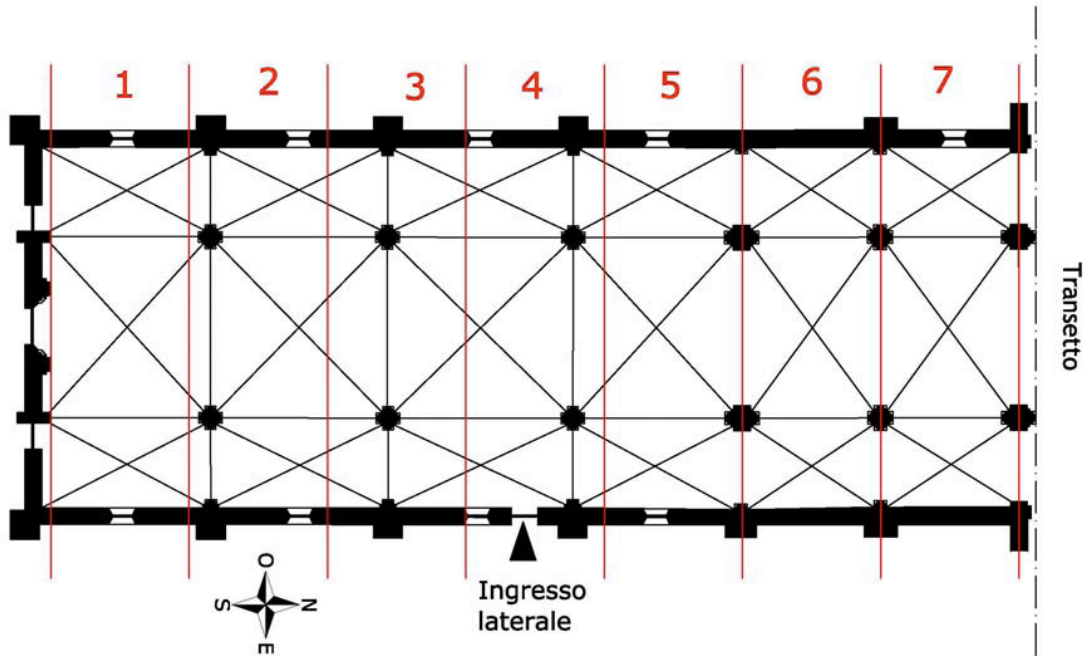


Figure 20. Santa Maria Novella. Nave plan with proposed original design of seven rectangular bays. (Biffi)

The posited existence of an original design for a nave composed of seven rectangular bays allows for the reconstruction of a plausible sequence of events leading to a design change that would result not only in the present awkward position of the 1302 door but also, more importantly, in the airy spaciousness of the nave. This design change must have taken place after completion of the door in 1302, thus after that part of the east aisle wall had been erected.³⁷ The impetus behind this significant change in bay size—a change that upset the

³⁶ See Biffi 2007 and Bartoli 2009 for reconstructions of this arrangement.

³⁷ Physical inspection of the aisle walls above the springing of the aisle vaults reveals that they are not interlocked with the crypto-buttresses of the nave vaulting hidden above the aisle vaults, so that they do not transfer forces but only add weight and thus increase stability. The lack of interlocking reinforces the argument made in this paper that much of the east aisle wall went up before the decision to change the bay size.

original symmetry of the plan and obscured its concordance with the adjoining cloister—can be traced to the masons in charge of vault construction. These masons must have viewed this change as necessary, and they must in turn have successfully convinced the Dominican fathers to accept this major alteration to their original design.

How might this sequence of events unfolded? After the completion and closing off of the first two nave bays in 1300, construction would have continued on the peripheral walls of the rest of the nave, with the opening of the door into the east aisle in 1302.³⁸ It seems therefore that in 1302 there was as yet no plan to change the size of the nave bays, and that it was only after the erection of at least a portion of the eastern aisle walls that the decision was made to change the bay size from rectangular to square.³⁹ On the basis of the available evidence, lacking any other plausible rationale behind the change in bay size, it seems reasonable to conclude that it was due to the insistence of the vault masons that this change took place.

By 1305, civic unrest in Florence had made finances so tight that construction slowed down considerably for several years, sometimes even

³⁸ Both the available documentation and the base profiles of the engaged piers along the east aisle wall suggest an earlier date for this wall than for the west aisle wall. Schwartz 2009 supports this view.

³⁹ Schwartz 2009 provides a history of the tombs (*avelli*) lining the exterior walls of SMN along the east aisle wall and the façade. A major source of funding, these tombs were actively solicited by the Dominicans from local families from the beginning of construction. Schwartz (104, 266) dates those along the east aisle between 1279 and 1315 and those at the base of the façade also before 1315. The presence of these tombs, together with the extensive changes to the fenestration of the east aisle wall by Vasari in the 16th c. and restorers in the 19th c., make it difficult to assess the masonry in this area in order to determine how high these walls may have been erected before the decision to change the bay size.

grinding to a halt.⁴⁰ It may have been at this point, during the slowdown, that the imported vault masons worked with the Dominicans to rethink the nave design to suit their needs, arguing that the original layout was not ideal for the kind of vaults they were trained to build. It would have been at this juncture that the masons and Dominicans together ideated a new plan for the rest of the nave, changing the shape of the bays from rectangular to square, making vault construction significantly easier and increasing vault stability, at least in their eyes⁴¹ In the process, they created the much-admired interior we see today.⁴² Although neither the masons nor the Dominicans are likely to have realized it at the time, the Friars, in giving up the coherence of their original plan, received in return a nave whose much vaunted airiness was so admired that it started a trend towards interior spaciousness that would characterize the finest creations of Italian Gothic architecture for the next hundred years.

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⁴⁰ cf. Borghigiani, *Cronica minuta*, I, 264-266 [ASMN I.A.26]

⁴¹ Erdogmus, Boothby, Smith 2007, 16, summarize the structural behavior of the domical vaults of SMN over both rectangular and square bays, concluding that the square bay is better suited to that vault form.

⁴² Construction of the nave vaults of Santa Maria Novella would continue slowly over the next several decades. Evidence in support of a significant time-lag between completion of the first two nave bays and completion of the rest of the nave is provided by the frescoes decorating the transverse arches, whitewashed by Vasari and only uncovered in the 1960s. Those over the first two bays can be dated stylistically to the beginning of the 14th c., while those over the rest of the nave date c. 1350. See Boskovits 1984, 188.

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