

*The Notre-Dame
Translation Project*

III. Structure

Edited by Lindsay S. Cook and Kathleen Hart

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The Flying Buttresses of Notre-Dame

Written by Olivier de Châlus ([source](#))

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The original configuration of the Notre-Dame flying buttresses remains the most nagging historiographical question about the cathedral. At least five theories have been proposed since Viollet-le-Duc for the cathedral's original buttressing system. They hinge on two questions: were the flying buttresses planned at Notre-Dame of Paris from the 12th century et, if so, what kind were they before being replaced in the 13th century by flying buttresses whose form corresponds to that which we see today.

The question seems to have been settled by Andrew Tallon through the analysis of deformations, leading him to conclude that flying buttresses were installed when the cathedral was vaulted. Two questions remain open, however: why do the flying buttresses have the distinctive feature of spanning the two side aisles in a single reach, and, among them, how to explain the singularity of the

intermediary upright of the flying buttress of the Magi, situated on the northwest side of the choir.

In reality, single-span flyers seem to have been the rule among churches featuring double aisles—as at Saint-Rémi of Reims—before intermediary uprights appeared on the building sites of Chartres and Bourges Cathedrals in the mid-1190s. Until that date, the columns separating the side aisles were too weak to support such a device. It was only from the very end of the 12th century that the columns were thickened, enabling the implementation of double-span flyers, which then became the rule. To my knowledge, the only exception to this chronology is the case of Saint-Denis, where the 13th-century flying buttresses project above the 12th-century side aisles.

As for the flying buttress of the Magi, it rests on an intermediary support thicker and later in date than in the other cases. It corresponds, therefore, contrary to what some authors have proposed, to a later intervention and not to the original configuration of the buttressing of the cathedral; but why? Approaching the history of the structure from a technical standpoint, therefore, raises additional questions and lays the groundwork for the study of ancient structures.

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The Lengthening of the Transept Arms

Written by Yves Gallet and Markus Schlicht ([source](#))

Translated by Lily Feinberg-Eddy | Edited by Kathleen Hart

By the mid-13th century, the appearance of Notre-Dame as it had been conceived in the 1160s had changed significantly. The body of the cathedral was completed, but from the 1220s, retrofits had been undertaken in the nave: the improvement of the lighting of the central vessel by lengthening the clerestory windows, the reworking the tribunes and the buttressing system, and the addition of lateral chapels between the buttresses of the side aisles. The creation of the latter, which enlarged the nave at ground level, threatened to make the north and south façades of the transept appear set back from the alignment of the wall of the side aisles: this is the reason historians of Notre-Dame have pointed to explain the decision to add a bay, and thus a new façade, to both arms of the transept. Other factors cannot be excluded: a desire for prestige on the part of the clergy (the canons entered the cathedral through the portal on the north arm, the bishop through the portal on the south arm), competition with the Sainte-Chapelle in the cityscape, rivalry with the abbey church of Saint-Denis, where the transept façades had been constructed shortly before. With their tripartite composition—portal, openwork triforium, and large Rayonnant rose window—the Notre-Dame transept façades, indeed, emulated those of Saint-Denis. We can assume that the cathedral’s architect had been given instructions to surpass the façades of the great royal abbey, the cathedral’s old rival. Undoubtedly for the first time in Gothic architecture, he designed a facade, which, instead of simply superposing the levels, linked them together in a single composition. The brilliant composition that he designed—unthinkable without the widespread use of the new medium of architectural drawing—soon constituted an inescapable point of reference for Gothic architecture throughout Europe.

The work, carried out in the 1250s and 1260s, corresponds to the documented period of activity of Jean de Chelles and then Pierre de Montreuil. The first Notre-Dame spire was also added during this period, perhaps also designed by one of the two architects.

Both transept façades are based on the same tripartite schema: a portal, visually linked to the whole from the lower part by a series of slender gables; at the intermediary level, a glazed triforium, characteristic of the Rayonnant Gothic style; a large rose window that fills the entire width of the bay. The

façade terminates in a triangular gable, embellished with trefoils and quatrefoils redone by Viollet-le-Duc in a style that is busier than the original, and an openwork rosette intended to ventilate the attic. [The gables of the transept façades] were the two most directly affected by the fire of April 15, 2019.

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Structure and Vaulting: Architectural Invention in the 1160s

Written by Claude Andrault-Schmitt ([source](#))
Translated by Teddy David | Edited by Kathleen Hart



One of the claims to fame of the cathedral of Paris is the placement, at a great height, of rib vaults that spring from an elevation consisting of stories that are arranged pyramidally.

If this audacious choice determined the ultimate appearance of the building—as if moored near the Seine thanks to its flying buttresses—it must be said that the definition of the project of the 1160s is not obvious. The “peeling away” of the historical layers of a centuries-old building that specialists do—that is, removing, in the mind’s eye, the belt of chapels, the restored flying buttresses, the transept arms, etc.—is necessary, but difficult to convey to the public—and even to students of art history. [Notre-Dame’s 19th-century restoration architect] Eugène Emmanuel Viollet-le-Duc understood this didactic pitfall—in putting up around the crossing of the transept (at precisely the place worst affected by the fire) is a four-story elevation corresponding to his hypothesis

about the original appearance of the cathedral, further complicating its interpretation.

Put more simply, we should recognize the particularity of the vaulting as an essential vector of architectural inventiveness and put it into the context of its own time. It was a period during which the choices available to builders were extremely varied and builders experimented a great deal, even though certain architectural solutions (like those of Paris) tend to overshadow certain others, less forward-looking. While the rib vaults at Notre-Dame are distributed into different levels, this is not the case everywhere. If they have a “flattened” profile, convenient for making the thin walls tall, this is not the case everywhere either.

In the absence of being able to investigate the full range of places where the “French Gothic” style predominated, it will suffice to cite one contemporary example, utterly opposed to that of Paris. At the cathedral Saint-Pierre-Saint-Paul of Poitiers, an architect conceived a grouping of three aisles, equal in height, emphasizing the juxtaposition of rib vaults that are thin but rounded (of the “Angevin” type), simply supported by piers: no slender walls, no differentiated stories in the elevation, no flying buttresses . . . no precedent for and no legacy of this inventive spatial arrangement, distinctive for its brightness. It was a project envisioned around 1155, for which the first vaults were built before 1167.

This case, as unusual as it is, should draw our attention to the necessity of studying, dating, understanding, and explaining the various vaulting systems, on a case-by-case basis and with a critical eye on existing paradigms: static, aesthetic, construction techniques, proportions of the necessary formwork, temporary scaffolding, building materials, order of installation between roof and vault (not a given), etc. For example, note that in the “Angevin type” of vaulting evolved at the end of the 12th century, the ribs cross the vaults; they do not “support” them. That proves right Viollet-le-Duc’s opponents regarding the understanding of vault ribs.