

Cambridge University Press

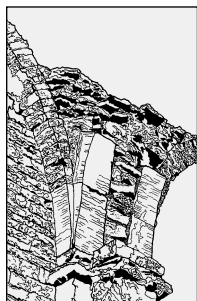
978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

## Introduction

**I**

This book is about a specific architectural feature, the pointed arch. The subject can be elusive, however, because early Romanesque vaults often are irregular and their shapes hard to define. When I use the term *pointed web*, I usually describe something loosely characterized as the extension at the peak of a web

where it rises over an arcade, wall arch, or transverse arch on the side of a vault. This extension may be broken, but often it resembles the tip of a catenary cord, as opposed to the intersection of equal curves or the regular outline of an ellipse.<sup>1</sup> More broadly speaking, however, this book is about the creative context of vault construction in Romanesque architecture in southern Europe.

In the first part of the twentieth century, Romanesque architecture was a topic of interest in America. Two successive Harvard professors, Arthur Kingsley Porter and his student Kenneth Conant, pioneered the field with groundbreaking studies on Lombard and Cluniac architecture; at Columbia, Meyer Schapiro reframed the major questions of Romanesque monumental art; and at the Metropolitan Museum, James Rorimer with the help of John D. Rockefeller Jr. created one of the outstanding collections of Romanesque architectural sculpture.

In the second part of the century, Americans turned a cold shoulder to this subject. The major museums in New York, Philadelphia, Boston,

## 2 Design and Construction in Romanesque Architecture

and Cambridge that had previously competed for the best Romanesque pieces almost stopped acquiring them. After Conant wrote his survey in 1959, no major book was written in English on Romanesque architecture.<sup>2</sup> The lack of interest to a certain extent existed worldwide. After Josep Puig i Cadafalch in 1935 completed *La Géographie et les origines du premier art roman*, no one in any language studied together the hundreds of early eleventh-century churches in the southern littoral of Europe;<sup>3</sup> and for three-quarters of a century, virtually nothing was written about the building and structure of Romanesque vaults.<sup>4</sup>

I would like to contribute to these three little-studied areas of research: early medieval vault construction and structure, international First Romanesque architecture, and the transition to later medieval forms of building. Specifically, I use the pointed arch and the principles of arch and vault construction to study First Romanesque architecture and its impact on High Romanesque architecture. Within a building, I ask: Why did masons use the point, where did they use it, and how did they use it? The answers to these questions will tell us something about the creativity of the artists, the tradition from which they worked, and the relation of structure to other aspects of building – like construction and aesthetics.

Throughout southern Europe at the beginning of the eleventh century, the pointed arch was used as an important part of groin-vault construction in architecture built with bricks and stones the shape of brick. This discovery leads me to a number of conclusions about First and High Romanesque architecture. Masons who built the earliest brick-based churches did not focus only on thick walls with superficial, banded decoration. They also explored the point of support at the base of groin vaults, especially in combination with sophisticated pointed webs and relieving arches. In Burgundy at the beginning of the eleventh century, masons expanded this system by combining the point support of groin vaults with the continuous support of barrel vaults used extensively inside and between walls. They created complicated and innovative designs, including a type of elevation that allows an unusual combination of light, space, and proportions. In the largest sense, then, I use the pointed arch to investigate not only the creative process but also the shared heritage and diversity of approaches within the tradition of brick-based construction.

## II

It frequently has been suggested that Romanesque architecture is a massive style of building with small openings and round-headed arches.<sup>5</sup> According to this theory, only at the turn of the twelfth century did masons find the means to avoid the limitations imposed by static walls and continuous lateral pressure inherent in the barrel vault. They then built high, light, and airy structures that depend on the point support of groin webs and pointed arches.

This rags-to-riches story of medieval architecture often culminates in the Paris basin with masons who were predisposed to thin walls. They invented the Gothic style by combining the pointed arch from Burgundy with the rib vault from Normandy. Whether true or not, this theory about the sources of Gothic architecture does not explain why and where Burgundian masons in the eleventh century first used the pointed arch and vault.

If, as I claim, Burgundian masons used the point well before the twelfth century, did they use it in isolation or as part of a long-standing building tradition? Moreover, to what degree did they use international sources, regional tradition, and their own creativity to exploit the pointed arch in buildings as important as Cluny III? The answers to these questions are the focus of this book.

## III

Creative “firsts” often are used to explain important steps in the history of art. In the history of medieval architecture, the pointed arch along with the statue column and flying buttress have received this kind of landmark status. Writers often consider these innovations as restrictive typological devices; discuss them separately from the broad context of labor, construction, and articulation; and locate the first appearance of these devices in large and prestigious French buildings. The first flying buttress, for example, is said to debut in the cathedral of Notre Dame, Paris, and the statue column in the royal abbey at Saint-Denis.<sup>6</sup>

As the largest church in Christendom, Cluny III has garnered its share of firsts. The style of the ambulatory capitals and the soaring

Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

## 4 Design and Construction in Romanesque Architecture

proportions of the interior often are described as breakaway achievements. Similarly, it is claimed the pointed arch appeared in northern Europe for the first time after 1088 in the arcades, transverse arches, and central vault at the mother church (Fig. 1).<sup>7</sup> At dispute is the exact journey the pointed arch took before it reached southern Europe from areas of Arab domination. Generally it is believed that the device first appeared after 1050 at Italian sites like Amalfi and Monte Cassino.<sup>8</sup>

To explain the first appearance of the pointed arch in northern Europe, scholars often cite as a cause the search for efficient support at the end of the eleventh and beginning of the twelfth centuries.<sup>9</sup> As masons sought to make the barrel vault stronger and lighter, they introduced devices like the pointed arch to channel weight efficiently. This notion, that builders continuously solved problems, and as a result introduced structural improvements, complements the view of the history of medieval architecture as a series of typological firsts that occurred at important and increasingly more sophisticated churches.

A method that explains the evolution of medieval structure in terms of the logical introduction of new devices is convenient and handy because very few historical texts explain changes in medieval architecture. There is a downside to this approach, however, since if used by itself, it may be taken to imply that problems of structural change can be isolated and understood apart from other considerations.

Because the creative process of early Romanesque architecture is essentially undocumented, I have developed a methodology to begin to answer causal questions by examining the remaining physical evidence.<sup>10</sup> I use this method to analyze the pointed arch in the broad context of building. A thorough examination of a building requires more than making an archaeological inventory or establishing typological groupings, as is often the custom in France. What is needed is an approach that couples a precise and complex analysis of material, shape, size, and finish with an understanding of construction, structure, and the relationship of parts. To fill the void left by a lack of written evidence, I concentrate on masonry – its consistencies and inconsistencies – to appreciate the hand of the mason on the stone. I do this in an attempt to re-create the design and building process and to document

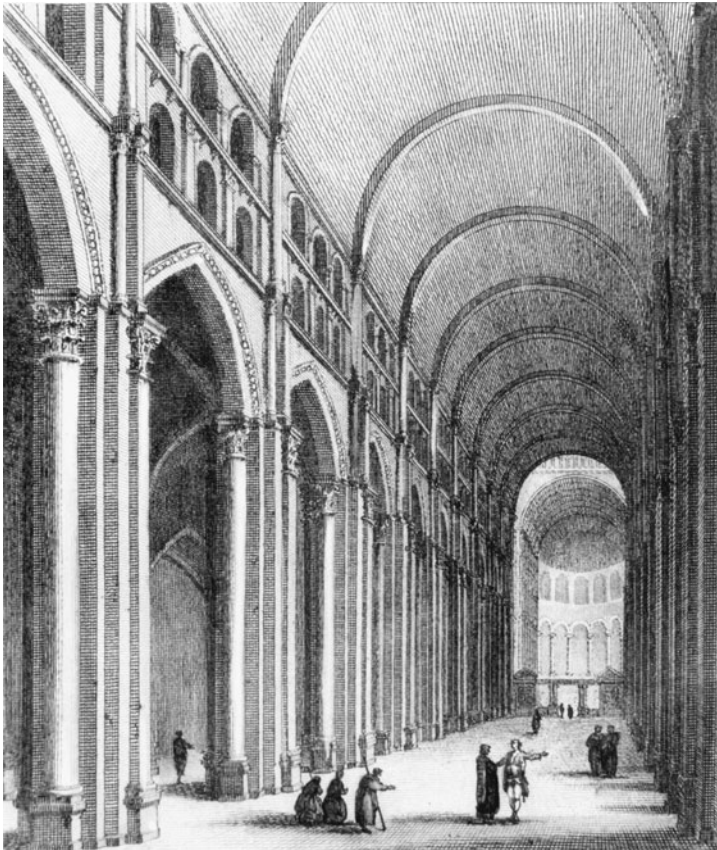
Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)



1. Cluny III, interior, nave, J.-B. Lallemand, 1773.

the decisions that masons made in the context of a specific tradition of labor. In my own work I make an effort to put a face on creation – that is, to associate individuals, workshops, and building traditions with a comprehensive physical understanding of works of art. I have never understood the common practice of isolating issues of form, authorship, and meaning from a collective consideration of material, construction, and structure, or the widespread Anglo-American approach of discussing Romanesque stone sculpture apart from architectural issues.

Based on an approach that considers structure together with material, construction, articulation, and decoration, I draw new conclusions about when, where, and under what circumstances masons introduced changes in medieval vaulting. The use of the point appeared widely in

Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

## 6 Design and Construction in Romanesque Architecture

the context of the earliest Romanesque architecture in the Mediterranean basin – and not, as previously thought, at the turn of the twelfth century in the context of Burgundian High Romanesque architecture. In these early eleventh-century buildings, masons used the pointed arch predominantly in groin vaults, not in barrel vaults as is so often claimed. With the help of pointed webs, they could make groin vaults light and thin, and incorporate the vault into a sophisticated system of structure, construction, and aesthetics.

In both northern Italy and Burgundy, masons in the eleventh century used a brick technique to build pointed vaults. In each region, however, very different lessons were taken from these experiments. In the side aisles of northern Italian churches, masons often pointed groin webs but kept the arches – the arcades, transverse arches, and *formerets* – semicircular. In the center of the nave, these round-headed arches are often coupled with a wooden ceiling or a round-headed rib vault. In Burgundy, in contrast, masons often vaulted the nave and expanded the use of pointed arches throughout the building. Not only are groin webs pointed, but likewise frequently the arcades, *formerets*, transverse arches, and even the barrel vaults in the center of the nave.

**IV**

The discovery that masons had used the pointed arch with an active system of arch support throughout the littoral of Europe from the beginning of the eleventh century prompts a question: How does one frame the broader issue of change in medieval architecture?

Southern First Romanesque architecture has frequently been regarded as a primitive and folkloric stop on the road to high medieval architecture. Since the writings of Porter and Puig i Cadafalch, this early eleventh-century architecture has continued to be labeled as structurally unadventurous and aesthetically limited.<sup>11</sup> Puig i Cadafalch maintained that First Romanesque builders followed a “blind and unconscious routine . . . because of the lack of any rational mechanical system of calculating stability and resistance . . . and because of the self-complacency of those who believed themselves subject to an unchanging discipline.” As a result, forms that before the First Romanesque period were “originally architectonic gradually tended to become dec-

Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

orative. . . [T]hey had no longer the constructive logic of their form, and became bulk and mass, playthings of the decorator, pure line, undefined space, baroque." This structural and aesthetic crisis was resolved only when "the more far-seeing and more intelligent architects of the twelfth century" superseded with "great compositions" the "popular, modest, poverty-stricken elements of the first Romanesque style."<sup>12</sup>

Pierre Truchis, Charles Oursel, and Jean Virey, the leading specialists of early Romanesque architecture in Burgundy, described the earliest brick-based buildings there as massive and inactive, and Oursel and Virey further suggested that folkloric artisans overbuilt these churches because they feared the vaults might collapse.<sup>13</sup> According to this theory, masons anxious about vaulting created rigid and bulky walls, lined with superficial ornament, instead of lighter envelopes that resisted vault pressure through point support and vaults inside the wall. Dreading the effect of vault weight, early Burgundian masons engaged, in Oursel's words, in a "vicious circle" that produced piled-up material rather than a complicated interrelation of vault, wall, space, and light: "Our architects of the eleventh century essentially demanded stability and containment of material." Being disposed to support the weight of vaults with mass, the earliest Burgundian masons preferred to make "walls . . . enormous, pillars bulky, arches thick and crude, doors small, . . . openings reduced. . . . The whole is heavy and weighty, and if one wishes to make it bigger, one risks also to make it heavier and weightier, to augment the pressures, and thus also the mass which must contain them. It is a vicious circle."<sup>14</sup>

To overcome this self-defeating circle in which fearful builders produced architecture "imprisoned in mass," Burgundian masons, Oursel and Virey agreed, needed help from the outside, specifically from internationally trained architects who designed Cluny III: "It is, in one word, a primitive or primary art, that hardly knew by its own means how to exit from itself. But, at the end of the eleventh century, owing to Cluny, Burgundian architecture succeeded in escaping from itself."<sup>15</sup>

This negative picture of the structure of brick-based buildings has become common in scholarship devoted to the broad range of early eleventh-century architecture.<sup>16</sup> New information about systems of support may help to change the image of these churches from static, massive, and superficially ornamented buildings – gawky and unpro-

Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

---

## 8 Design and Construction in Romanesque Architecture

gressive foils to the revolutionary genius at Cluny III – to creative, complicated, and interactive structures.

In particular, the new evidence showing an early date and context of the pointed arch makes it difficult to teach students that medieval architecture evolved from thick walls and round-headed vaults to light, pointed skeletal construction. The notion of twelfth-century architecture as a breakthrough to a delicate, spacious, point-support system has tended to overshadow the sophisticated system of pointed groin vaults that preceded it by one hundred years in Lombardy, Catalonia, and Burgundy. Moreover, the discovery that this early tradition of southern European vault construction continued with renewed life throughout the eleventh century in Burgundy supports the argument for the existence of a progressive and structurally sophisticated High Romanesque architecture in this region. In the vicinity of Cluny, by the end of the eleventh century masons had created their own delicate, lighted, and spacious form of building.



Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

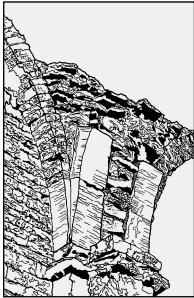
## CHAPTER

## 1

History, Geography, and  
Construction

The Franco-Provençal [transalpine] domain . . . is not a land, it is not a nation; it is a route, it is a town.

– Pierre Gardette



At the beginning of the twentieth century, the art historians Raffaele Cattaneo, Ferdinand Daltein, Arthur Kingsley Porter, Josep Puig i Cadafalch, and Giovanni Rivoira argued that Lombard masons, aided by transplanted Italian abbots like William of Volpiano, influenced the appearance of northern French High Romanesque architecture.<sup>1</sup> The thesis of a Lombard–northern French axis has been criticized, modified,

and amplified; but no one has succeeded in disproving the idea that Italian masons, by themselves or through intermediaries, transmitted the techniques of Lombard structure, construction, and ornamentation to early eleventh-century architecture in Burgundy.<sup>2</sup>

Specific cultural and geographic reasons explain how Lombard masons and their ideas could easily penetrate the Alps and descend through the region of the Jura to the edge of the Mâconnais, in southern Burgundy (Fig. 2). For centuries following the collapse of the Roman Empire, this transalpine area east of the Saône River and west of the Aosta pass was politically united. Burgundian settlers, who originally came from Scandinavia and then moved westward through Poland and southern Germany, controlled, by the middle of the fifth century, the land between Lake Geneva, the Jura, the northern Dauphiné, and the Franche-Comté.<sup>3</sup>

During the fifth century, the Merovingian Franks annexed this area, but during the next three centuries they preserved Burgundy as a separate and intact kingdom.<sup>4</sup> Even after the empire had absorbed

Cambridge University Press

978-0-521-83033-1 - Design and Construction in Romanesque Architecture: First Romanesque Architecture and the Pointed Arch in Burgundy and Northern Italy

C. Edson Armi

Excerpt

[More information](#)

## 10 Design and Construction in Romanesque Architecture

the transalpine area following Charlemagne's death, political and cultural links continued in the region. In the tenth century, the counts of Mâcon on the local feudal level ruled the territory from the Saône River to the Jura Mountains, and maintained tight connections within this domain.<sup>5</sup> The people of the Kingdom of Burgundy also preserved their independence through a separate language.<sup>6</sup> From the tenth century, in a region extending from the Alps beyond the Saône River, inhabitants universally spoke a transalpine dialect that was different from the *oïl* in northern France and the *oc* in southern France.<sup>7</sup> Even as recently as three generations ago, over three million people continued to use this vernacular.<sup>8</sup>

The transalpine geography between Italy and France allows for open exchange among people. The territory has no natural frontiers, and roads and river highways unite it.<sup>9</sup> Geological formations create a climate conducive to travel. In particular, high peaks partially shield the Valley of Aosta from exterior influences, and they provide a dry strip wider than in any other interior region of the Alps.<sup>10</sup> This unique topography acts as both a protective cell and an intersection.

This double function of the valley is reinforced by the major routes running through it.<sup>11</sup> The western borders overlap the Rhône–Saône basin, a vast and natural transportation route that directly connects Geneva and the Alpine passes with Lyons and the Mediterranean Sea. In the eleventh century, major roads surviving from the Roman period linked the Valley of Aosta with the Jura and ensured communication between both sides of the mountains in the region.<sup>12</sup> The Franco-Provençal linguistic expert Pierre Gardette explained that the two most important Roman roads from Lyons (the capital of Gaul) to Rome paralleled the arms of a triangle that inscribed this Franco-Provençal-speaking region (see Fig. 2): “The route created a unity, dispersing legends, songs, no doubt words, and perhaps a language in the process of formation. In any case it created a social unity which must have persisted when Rome no longer was Rome.”<sup>13</sup> As speakers of the Franco-Provençal patois easily moved along these highways from the Rhône basin to the Po basin, they came to dominate the clergy and upper classes on both sides of Mont Blanc.<sup>14</sup>

In addition to the bonds of language, culture, and geography that united both sides of the Alps, changes in social structure and the econ-