

# THE DATING OF FRENCH TIMBER ROOFS BY HENRI DENEUX

AN ENGLISH SUMMARY

by Cecil A. Hewett

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IN July, 1927, a volume by Henri Deneux entitled *L'Evolution des Charpentes du XI<sup>e</sup> au XVIII<sup>e</sup> Siecle* was published in France. This work should have had an immediate and far-reaching effect upon the study of carpentry-history in several European countries, including England, but only two copies, and those photostatic and without a translation, seem to have found their way into our architectural libraries. At last, in 1960, this publication was mentioned by Mr. J. T. Smith<sup>1</sup> of the Royal Commission on Historical Monuments, and since then an ever-increasing interest in Deneux's work has grown in this country as well as in America and Germany. Consequently it has become necessary that an English version should be widely available, and it is hoped that this article will supply the need.

The great importance of Deneux's work lies in the minute detail with which he examined so many timber structures, a penetrating examination which enabled him when summarising his work to state that "by examining all these examples of framework we have been able to prove, despite their great variety, that each period is characterised by definite assembly-methods (*dispositions*)". He meant that the actual framing joints of the carpenters were different in form and mechanical principles at different points of time; and implied that these differences of jointing technique constituted a new and "long-neglected" set of criteria for the dating of timber-work. It is possible that the change in jointing and assembly-method noted by Deneux have a significance far wider than the area of France which he studied, and interesting parallels may be found in England because, as Fletcher and Spokes<sup>2</sup>

<sup>1</sup> J. T. Smith, "Mediaeval Roofs: a Classification" (*Archaeological Journal*, vol. CXV (1960), p. 112).

<sup>2</sup> J. M. Fletcher and P. S. Spokes, "The Origin and Development of Crown-Post Roofs" (*Mediaeval Archaeology*, vol. 8 (1964), p. 154).

have indicated, there was a clear relationship between roof-framing developments in France and England.

The greatest obstacle to a wide and general appreciation of Deneux's thesis, and one which is magnified by the language barrier, is the need for a large vocabulary of technical terms, and it is hoped that the roof construction illustrated in Figure A, with its key to all named components, will assist in this respect. This example, which is of the roof above the vaulted chancel of Grossenbuseck church in the Hessen area of Germany, has been deliberately chosen because the jointing used for the sole-pieces is the same as Deneux found to be general in France at the same period of time. This identity constitutes one piece of evidence for a possibly wide application of Deneux's principles, and another such parallel is to be found in the tithe-barn at Great Coxwell in Berkshire. These two examples are too few to have much, if any, significance but they serve to show that a re-appraisal is necessary to determine the value of Deneux's results.

The excellent photographs comprising Plates I to VI have been supplied by the Archives Photographiques and are published with the kind consent of the directors. The timber roofs above the vaulting of each of the churches illustrated is mentioned by Deneux. A literal English translation of his text was made by Mr. T. K. Kinsey in 1963, but I have found it best to quote this only at salient points and to paraphrase the rest.

Deneux in summarising his work stated that "each period is characterised by definite assembly-methods (*dispositions*)", and goes on to say that "if we pass from the assembly-methods to the details of construction, we shall establish yet again that certain details belong to certain periods rather than to others". The sequence of construction details which follows is the series shown in Figure B, which illustrates such points in roof-framing as the jointing of collars and ashlar-pieces into either rafters or sole-pieces.

#### CONSTRUCTION DETAILS (Figure B)

Figures B (1) and B (2): "cross-halved (*à mi-bois*), in dovetail form, that we saw used in A.D. 1044 in the primitive framing of Saint-Germain-des-Prés in Paris (Plate I), in 1147 in the church of

Saint-Pierre-de-Montmartre, again in Sens Cathedral (Plate II), and in the church of the Madeleine in Troyes". The following buildings are also listed in support of this point:—the church of Saint-Bris at Yonne, the Old Bishop's Palace at Auxerre, Rouen Cathedral, the choir roof in the church of Saint-Urbain in Troyes, the chapel of Saint-Jean at Angers, the church of Nôtre Dame at Etampes, the "Room of the States" (*la Salle des Etats*) in the château of Blois, the roof of the south transept (*bras sud*) of the church of Saint-Julien in Tours, a house at St.-Julien-du-Sault and the church at Hermonville, Marne. "It is then in the period between c. 1044 and c. 1260 that this construction was used in the area of France which we examined."

"We see this conclusion borne out among some sketches of frameworks in the sketch-book of Villehard de Honnecourt, a 13th century architect. We find it again in several prints by Albrecht Durer at the beginning of the 16th century, and this date is not surprising when we note that this construction-detail survived in Switzerland and in Germany until the beginning of the 19th century." What is surprising, however, is that only the dovetail form is mentioned by Deneux in his opening paragraph, since the details shown in Figures B (1) and B (2) include notched-lap joints, and the dovetails are of the barefaced variety, having only one shoulder. The derivation of the term 'notch' is from Old French, as all the dictionaries indicate; yet here we see the architect using an entirely inadequate terminology, as do many of our English writers upon this subject.

Figure B (3): "in plain joinery with neither tenon nor mortise, but joined by using one or two pegs. This form appears at the end of the 12th century in the framework of the south transept of the church of le Madeleine in Troyes, and in the north transept and the nave of the church at Puiseaux, Loiret." It is also found in the roof above the choir of Auxerre Cathedral (Plate III), in the Old Bishop's Palace also at Auxerre, in the church of Saint-Urbain at Troyes, in the south transept of the church of Saint-Julien at Tours, in the choir of the church at Moret, Seine-et-Marne, and in a house at St.-Julien-du-Sault. Finally, it may be seen in the church at Berru, Marne. "This construction-detail was used, then,

from the end of the 12th century until the middle of the 13th century" or, more explicitly, from *c.* 1190 to *c.* 1250.

Figure B (4): "with tenon and mortise." This is the type which gives us least information about framework dates. In fact we find it used from 1147 up to the present day, though with several variations.

Figure B (5): "A tenon and mortise with" sunken abutments and cheeks (*embrèvement*) "is widely used only at the end of the 13th century. Before this time it was the previous method, B (4), which was predominant."

Figure B (6): "A tenon and mortise with" sunken abutment and housed cheeks "is hardly ever seen before the 17th century."

Figure B (7): "Finally, during the 17th century, because timber was generally used without being squared, nearly all the assembly-methods were effected by spurs (*en réservant la poulaine*)." The meaning of this description is more clearly shown in the drawing. During the 17th century the 'conversion' of tree-trunks into the maximum quantity of squared timbers was the normal process, as is the case today. The most economical use was thus made of cubic quantities of timber, and resulted in numerous pieces with 'waney' edges such as that shown in the drawing. The actual curvature of such corners is the circumferential curve of the tree's layer of wood immediately beneath the bark.

#### ASSEMBLY-METHODS FOR SOLE-PIECES AND WALL-PLATES (Figure C)

"If we now look at the different methods of fitting the sole-pieces (*blochets*) onto the wall-plates, we find that example C (1), with a simple housing on the external arris of each wall-plate, was used for the roof of Sens Cathedral in Puisieux (Plate II), and in Notre Dame at Etampes; that is to say, between 1170 and the beginning of the 13th century." A reasonable period would be from *c.* 1170 to *c.* 1225.

Example C (2): "with a housing on each of the upper arrises, such as is found in the church of Saint-Pierre de Montmartre in Dijon, in the choir of the church at Puisieux, and in the choir of Notre Dame Cathedral in Paris. It also exists in the old refectory of Saint-Martin-des-Champs, and in the chapel of Saint-Jean at

Angers; that is to say, between 1149 and the beginning of the 13th century. We have found it used exceptionally at the beginning of the 16th century on the south transept of Sens Cathedral" (Plate II).

Example C (3): "A barefaced lap-dovetail on each wall-plate was used for the nave roof of the church of La Madeleine in Troyes, in the church of Saint-Bris (Yonne), and for the choir of Tours Cathedral (Plate IV). It is also found in the choir roof of Moret church, and in a house at Saint-Julien-du-Sault; that is to say, between the end of the 12th century and the middle of the 13th century." It is noteworthy that the sole-pieces in the barn at Great Coxwell, Berkshire, are fitted by this method, and that a date close to Deneux's final date has been suggested for this barn.<sup>3</sup>

Example C (4): "We pass over the special examples of Meaux and Mantes, to look at this, the most widely used between 1230 and the end of the 18th century. This example with full lap-dovetails on each wall-plate, like the assembly with mortise and tenon, admits of no accuracy in dating since its use is too wide to allow of this." This last point, of wide and long usage detracting from the method's value as dating evidence, is certainly not true of Essex, where the 'set' or angle of divergence of the 'tail' has varied widely during the centuries. A full study would undoubtedly produce substantial evidence for the more precise dating of lap-dovetails.

Example C (5): "is very special because the sole-piece is omitted, the rafter and the ashlar-piece being jointed directly to the wall-plates. It appeared at Rheims in 1485 and in the choir-roof of Evreux Cathedral (Plate V) during the 16th century, and in the choir-roof of the church of Saint-Julien-du-Sault. It is therefore, a method which belongs to the period between the end of the 15th century and the beginning of the 17th century."

Example C (6): "only the sole-piece in line with each truss (*l'axe*) is fitted by means of lap-dovetails, and the others are fitted by housings on the internal arrises of the wall-plates. This method was used during the late 16th century and the early 17th century in the churches of Saint-Nizier and Saint-Jean at Troyes, in the

<sup>3</sup> W. Horn and E. Born, *The Barns of the Abbey of Beaulieu at its Granges of Great Coxwell and Beaulieu St. Leonards* (University of California Press, 1965), figures 18, 19 A and 19 B.

church of L'Oratoire du Louvre in Paris, and in the chapel at les Invalides."

Example C (7): "with lap-dovetails that have housed-shoulders (*renfort* at the *collet* of the dovetail), this method is peculiar to the 17th century. We find it in the chapel of the Carmelite Convent in the rue de Vaugirard, and in the church of St.-Nicolas-St.-Laumer in Blois, both 17th century buildings."

Example C (8): Deneux appears to state that this method "consists of making the joint by two saw-cuts following the diagonals of the square formed by the crossing of the two timbers to be joined, and chiselling out the two triangles in each of the pieces." The illustration makes this description clear, and shows two variations of the method, one sunken and the other flush with the upper face of the timber. This joint was found by Deneux to be peculiar to the 17th century.

#### ASSEMBLY-METHODS FOR JOINTING COLLAR-PURLINS TO COLLARS (Figure D)

This part of Deneux's book contains a chronological list of methods used for jointing collar-purlins to collars in roofs. "We noted earlier", says Deneux, "that the *sousfaitage* (by which he apparently meant the purlin or the collar-purlin) does not appear until the early years of the 13th century. At this date it is placed under the first collars, and sometimes under the second collars, but always *under* the collars."

Figure D (1): "The collars are placed without jointing on the purlins, and may or may not be pegged together. In the framing of the refectory roof of Auxerre Cathedral (Plate III), as also in the church of Saint-Urbain in Troyes, Meaux Cathedral, and the church of Nôtre Dame in Mante, this method was used, that is to say, from the beginning of the 13th century until c. 1260. After about the mid-13th century the purlin passed *over* the collars and was pegged to them, as in the north transept of the church of la Madeleine at Troyes."

Figures D (2): "Towards the end of the 13th century and during the 14th and 15th centuries, assemblies with cross-laps and two cross-coggings appear. These jointing methods have been recorded in the old Hôtel-Dieu at Tonnerre, in the church of

St.-Leu-St.-Gilles in Paris, in the churches of Saint-Ouen and Saint-Maclou in Rouen, and in the church of Seignelay (Yonne). The same method was used at Saint-Germain-l'Auxerrois in Paris."

Figure D (3) and (4): "Towards the end of the 15th century, but more generally in the 16th century, carpenters doubled the purlins", one passing above and one beneath the collars. "These double purlins are fitted to the collars by housings of various types, a practice reminiscent of earlier times. The churches of Saint-Jean (1468) in Dijon and Saint-Eustache in Paris, and the choirs of Saint-Jean, Saint-Nicolas, and Saint-Nizier in Troyes all incorporate this jointing method. It may also be seen in the transepts of Sens Cathedral (Plate II) and the Jacobin Convent in the same city."

Figure D (5): "Towards the end of the 16th century, but more particularly during the 17th century, the collars are no longer found above, below or between the double purlins but are normally tenoned into the purlin." Examples of this technique are as follows:—Saint-Pierre at Auxerre in Lansecq, the choir of Saint-Medard in Paris, the churches of Saint-Louis-en-l'Île and Saint-Sulpice, also in Paris, the chapel of the Carmelites in the rue de Vaugirard (Paris), Saint-Pantaléon's church in Troyes, the chapel of the château of Versailles, the choir of the church of Saint-Julien-du-Sault, the church of Saint-Pierre at Tonnerre, the transepts of Saint-Florentin (Yonne) and the château of Pimpéan in the department of Maine-et-Loire.

Figure D (6): "Belonging only to the 18th century and found in the roof of the church at Prémaux in the Côte-d'Or, in the cathedral of Saint-Louis at Blois (Plate VI) and in the cathedral of Saint-Croix at Orleans, we see the assembly-method already used for wall-plates."

"These few examples serve to show that differing methods allow us to date with certainty a framework. There remains the manner in which the wood was worked, whether roughly dressed, perfectly squared or having certain surfaces sawn whilst others were merely peeled of their bark. One can still decide, from this evidence, to which period the work belongs. We ask our readers to regard this treatise as only the first outlines of a history of

timber-framing," and we hope that it has "aroused an interest, long neglected, in construction methods.

H. Deneux,  
Architecte du Gouvernement."

At this point this thorough survey of the framing techniques of a whole region, based upon over five hundred examples and covering seven centuries, terminated forty years ago. It is to be hoped that, thanks to the attention of numerous architectural historians and students recently focussed upon this treatise, it may now receive the study it evidently merits. The great difficulty experienced hitherto of obtaining a copy in English will, it is hoped, be overcome by this paper, which may also provoke some speculation as to why English research specialists in this field have for so long maintained a relatively superficial method of examination.

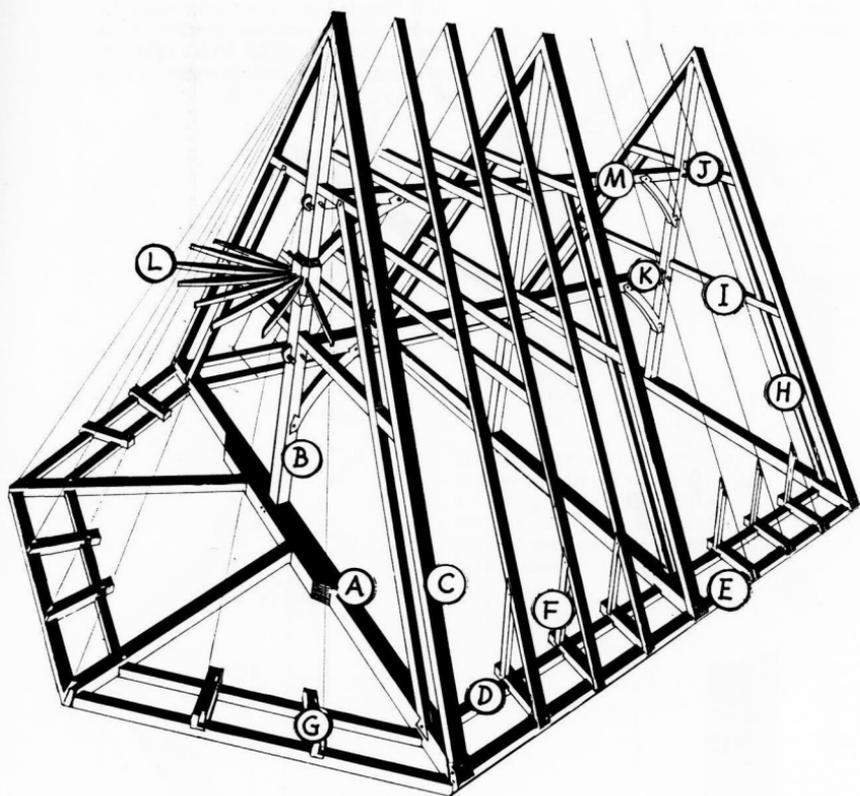


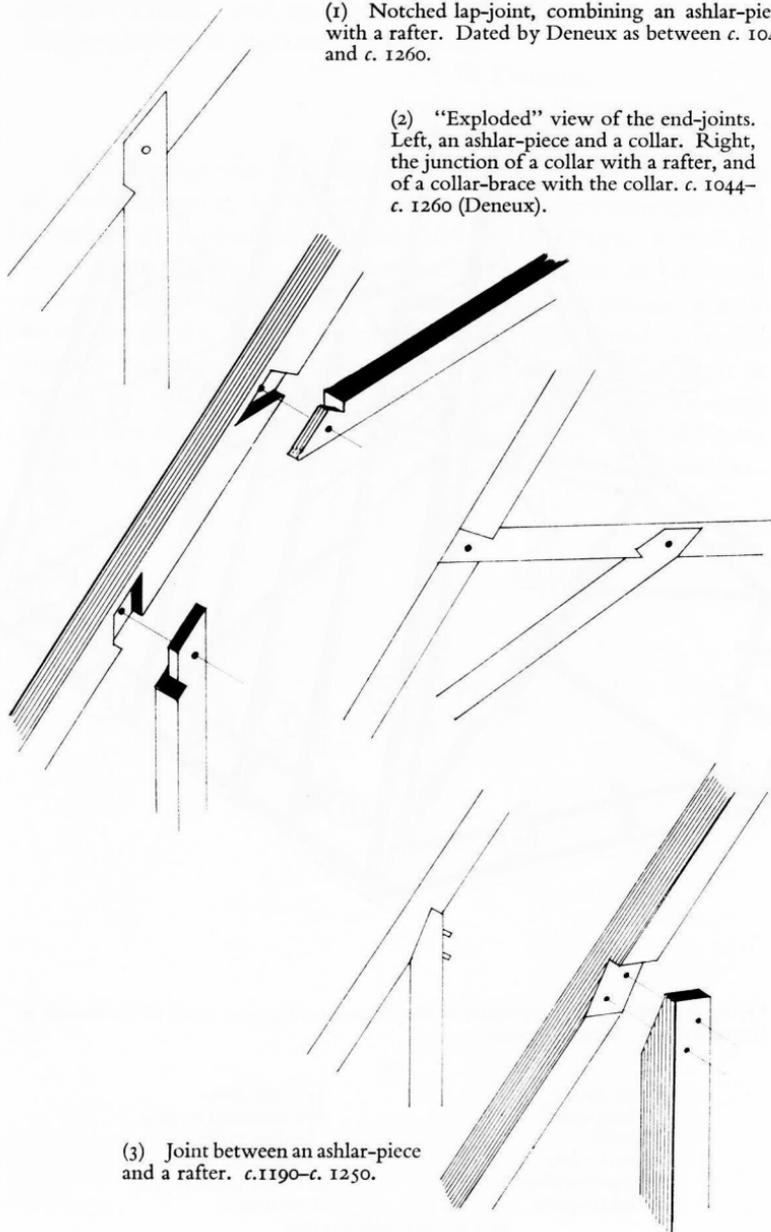
FIGURE A. Non-scale perspective of the chancel roof (c. A.D. 1230) of the church at Grossenbuseck, West Germany.

KEY

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|----------------------|--------------------------|
| A = tie-beam         | G = sole-piece           |
| B = king-post        | H = secondary-rafter     |
| C = rafter           | I = first collar         |
| D = wall-plate       | J = second collar        |
| E = outer wall-plate | K = first collar-purlin  |
| F = ashlar-piece     | L = struts               |
|                      | M = second collar-purlin |

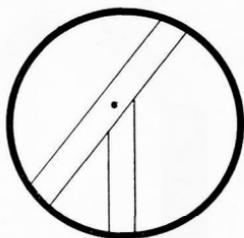
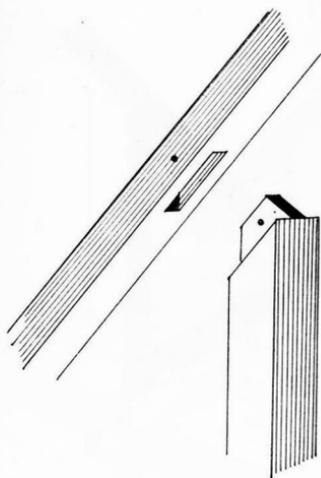
(1) Notched lap-joint, combining an ashlar-piece with a rafter. Dated by Deneux as between c. 1044 and c. 1260.

(2) "Exploded" view of the end-joints. Left, an ashlar-piece and a collar. Right, the junction of a collar with a rafter, and of a collar-brace with the collar. c. 1044-c. 1260 (Deneux).

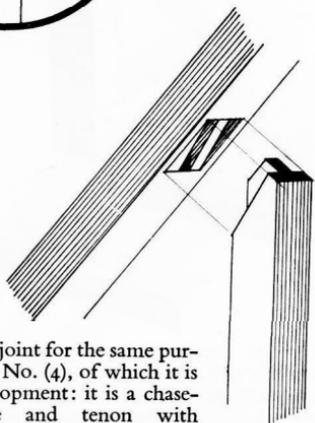


(3) Joint between an ashlar-piece and a rafter. c.1190-c. 1250.

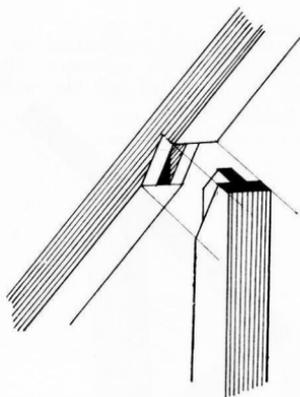
FIGURE B, (1)-(3)



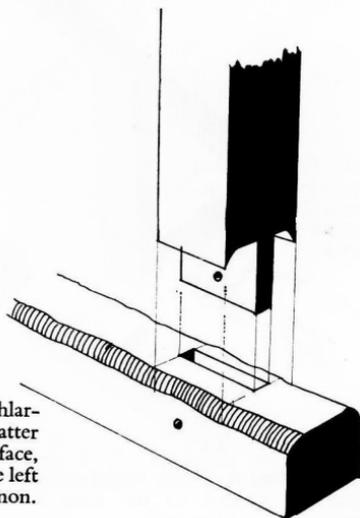
(4) Joint between an ashlar-piece and a rafter, i.e. a chase-mortise and tenon. *c.* 1147 to the present time.



(5) A joint for the same purpose as No. (4), of which it is a development: it is a chase-mortise and tenon with sunken and inclined-cheeks, both housed. *c.* 1275-*c.* 1300.

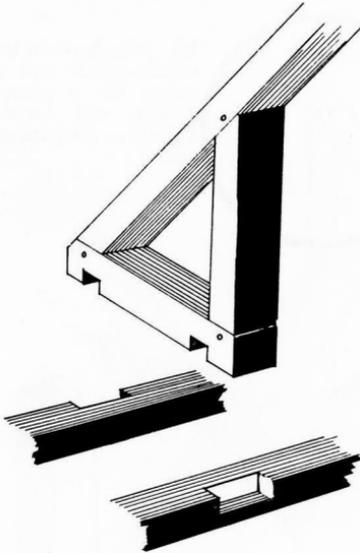


(6) A further example, see Nos. (4) and (5). This is a chase-mortise and tenon with sunken and inclined cheeks. *c.* 1590-*c.* 1800.

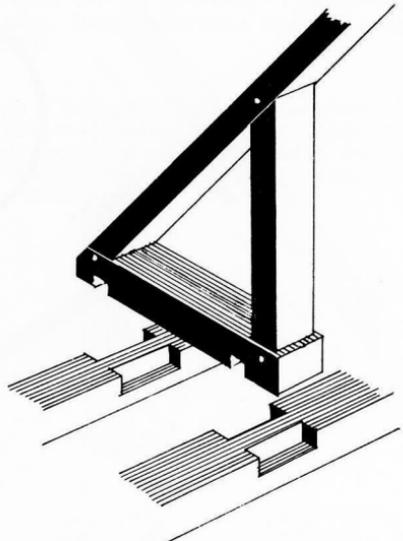


(7) A joint for the foot of an ashlar-piece and its sole-piece. The latter has "wavy"-edges to its upper face, to fit over which two "spurs" are left on the shoulders of the tenon. Peculiar to 17th century.

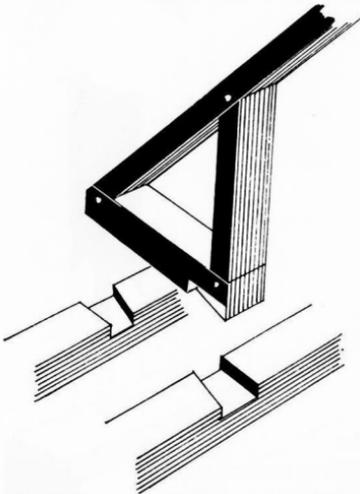
FIGURE B, (4)-(7)



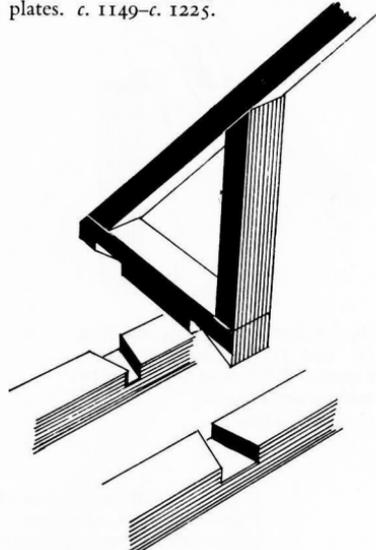
(1) The triangle formed by the ashlar, the rafter and the sole-piece, showing the joints seating it on the wall-plates. The sole is *housed* into the external arrises of the plates. c. 1170-c. 1225.



(2) The same framed base-triangle in a roof showing another technique: the sole-piece is *cross-cogged* into the wall-plates. c. 1149-c. 1225.

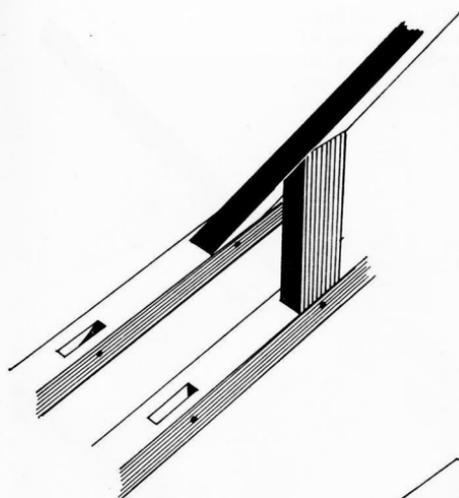


(3) Different joints, bare-faced-lap-dovetails, applied to the same roof problem. c. 1195-c. 1250.

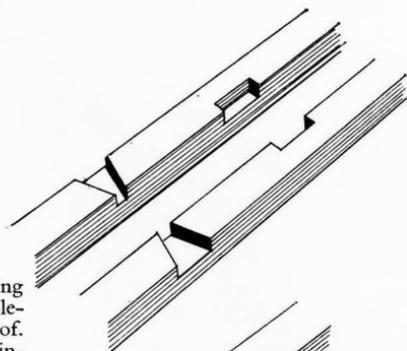


(4) Full lap-dovetails used for the same purpose as the preceding examples. c. 1230-c. 1800.

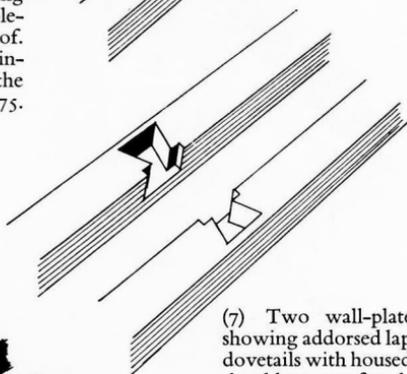
FIGURE C, (1)-(4)



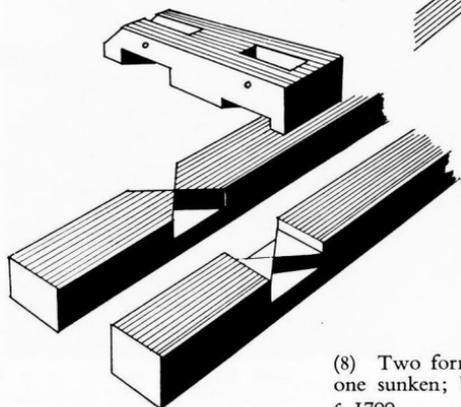
(5) The base-triangle in a roof, formed without a sole-piece: a "squint" and a square mortise and tenon are used instead. c. 1485-c. 1675.



(6) Two wall-plates showing two methods of seating the sole-pieces, both used in the same roof. There are dovetails for the principals, and housing for the common-rafters. c. 1500-c. 1675.



(7) Two wall-plates showing addorsed lap-dovetails with housed-shoulders, cut for the sole-pieces. Peculiar to 17th century.



(8) Two forms of "X" lap-joints, one flush and one sunken; both used for sole-pieces. c. 1600-c. 1700.

FIGURE C, (5)-(8)

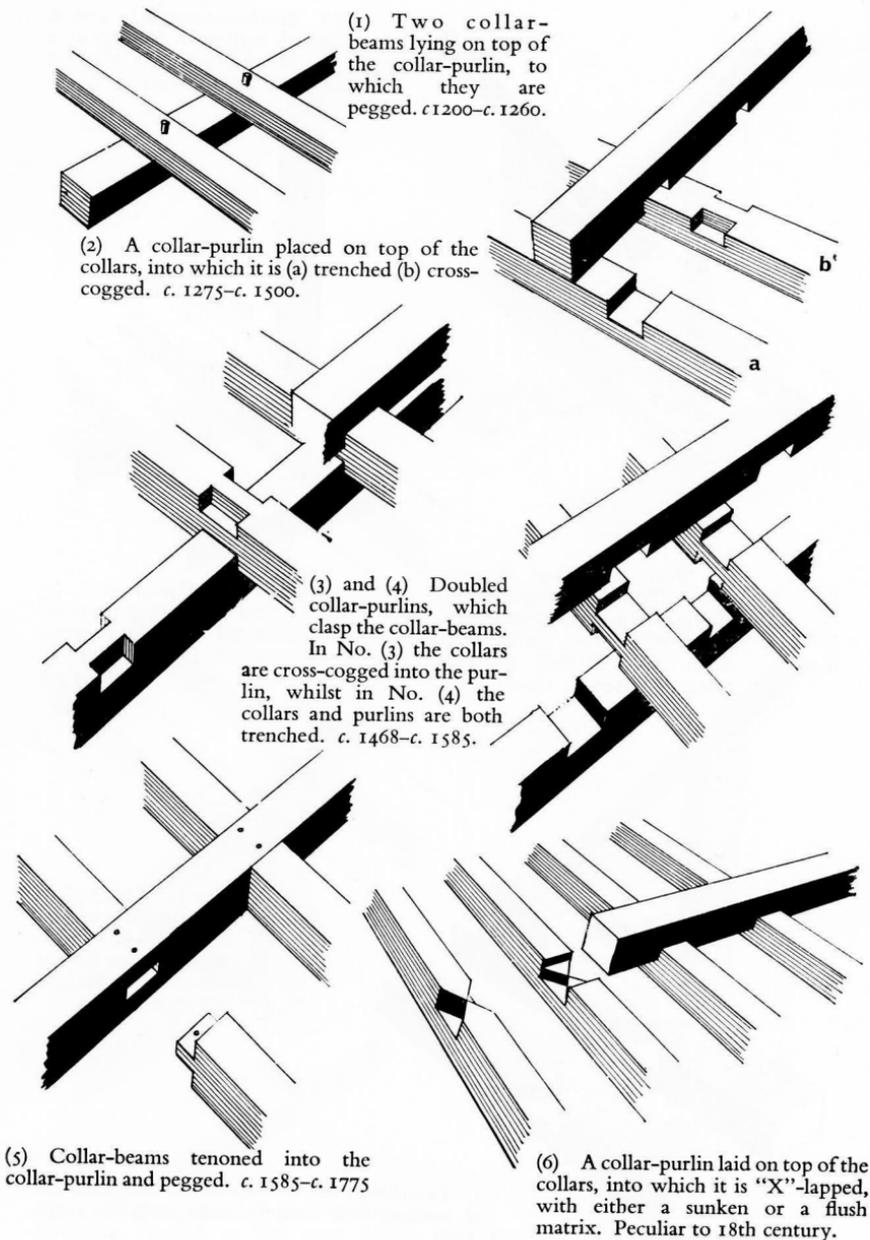


FIGURE D, (1)-(6)

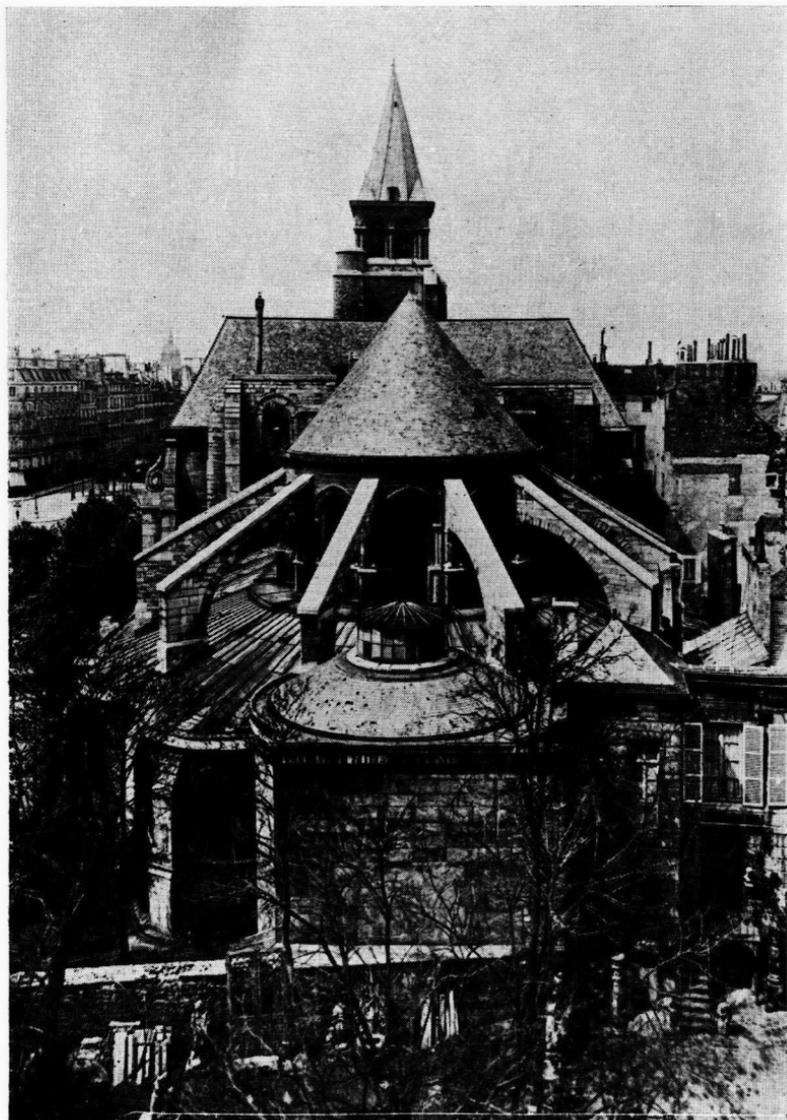


PLATE I. The Church of St. Germain-des-Prés: an exterior view of the east end.  
(Published by kind consent of the Archives Photographiques, Paris, France.)

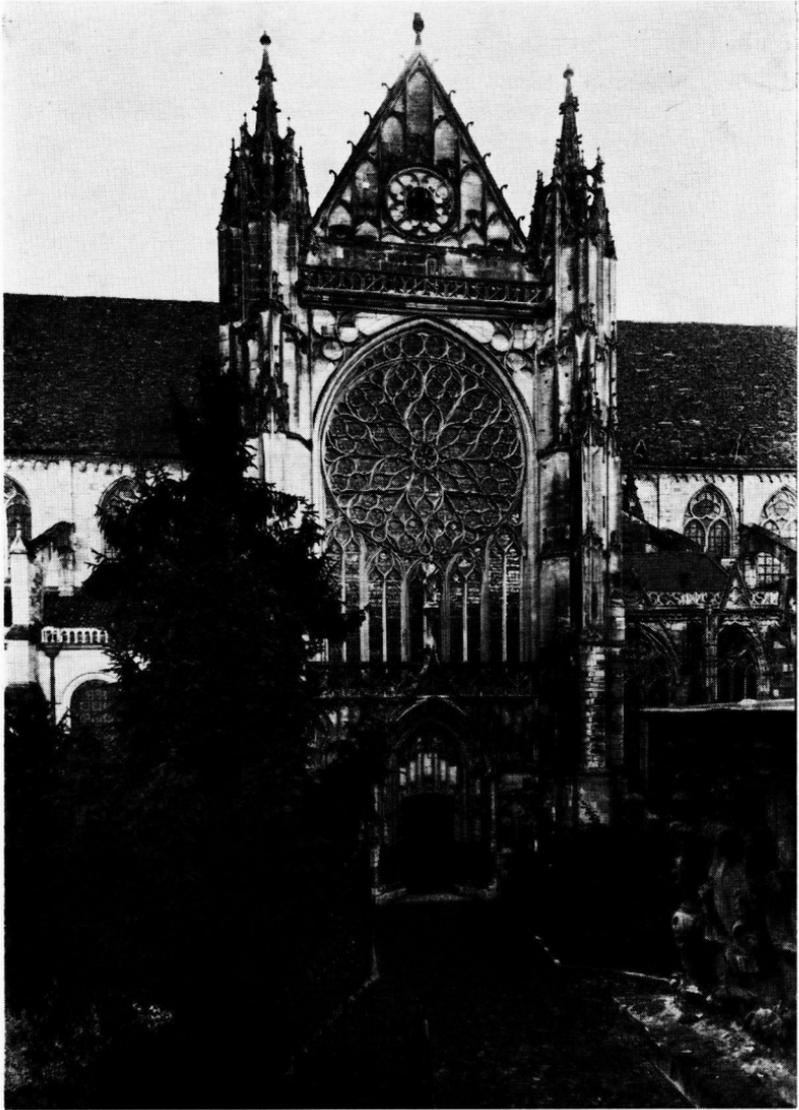


PLATE II. The Cathedral of St. Etienne at Sens: exterior of the south transept.  
(Published by kind consent of the Archives Photographiques, Paris, France.)

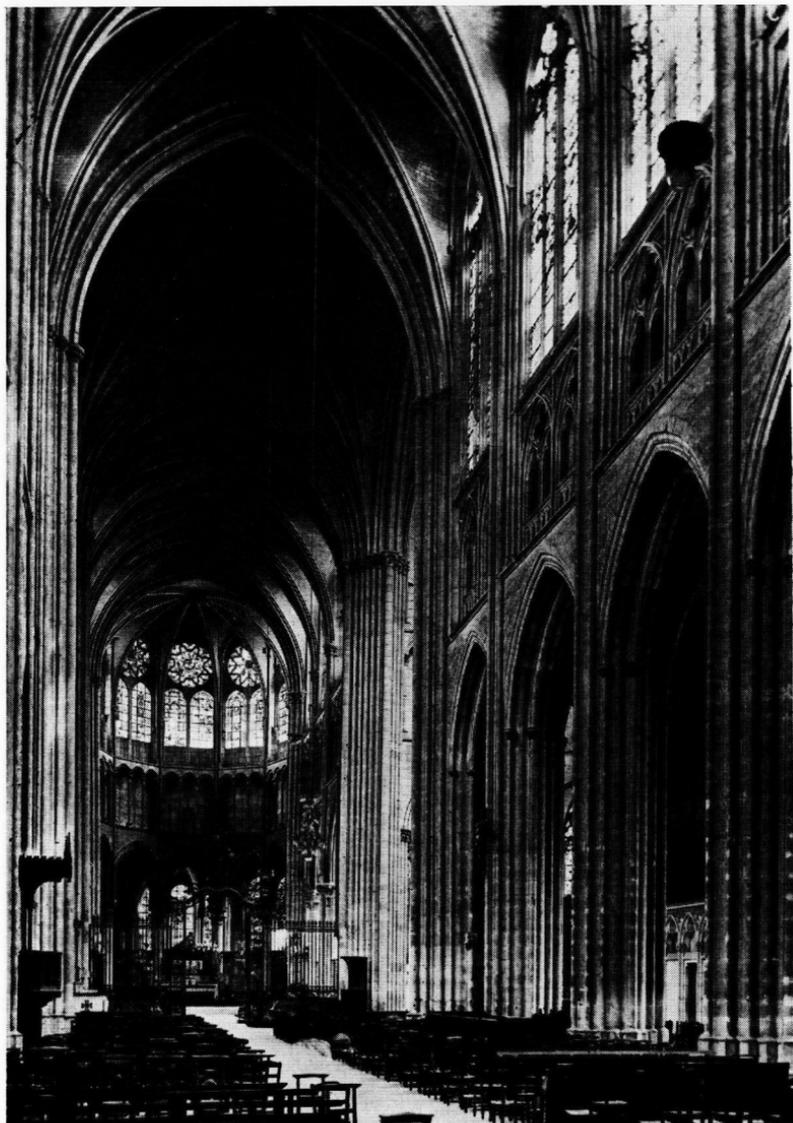


PLATE III. The Cathedral of St. Etienne, Auxerre: interior view of the nave and choir.

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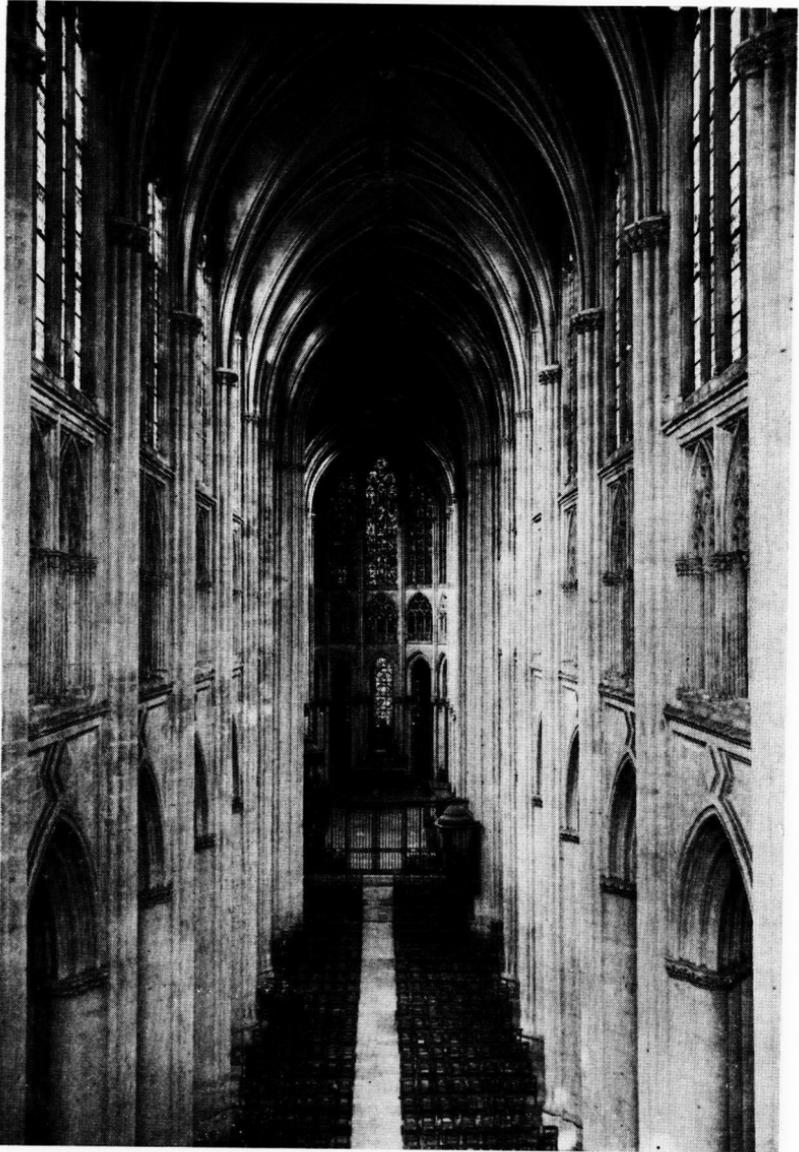


PLATE IV. The Cathedral of St. Gratien at Tours: the nave and choir at triforium height.

(Published by kind consent of the Archives Photographiques, Paris, France.)



PLATE V. Evreux Cathedral: interior of the choir.  
(Published by kind consent of the Archives Photographiques, Paris, France.)



PLATE VI. The Cathedral of St. Louis at Blois: exterior from the west.  
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