Boundaries that Delineate Periods in Art History between 1090 and 1180

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In the twelfth century, three events formed boundaries that define periods of sculpture and architecture. They are changes in climate, some unknown impulse that transformed carving style during the 1170s, and two major wars. These events emerge as potent forces that diverted the linear process of history and appear to have changed the collective psyche. Such historic moments direct a spotlight on turning points in artistic views and attitudes.

This analysis is based on earlier studies without which the boundaries would not have come into focus: in particular, the Survey of all the churches in the Paris Basin before 1250 (James 1984),² studies on funding, and the identification of individual sculptors in the *Master Carvers Series* (MCS is used in citations to refer to James 2010-13).

The latter are among "Presentations by Members" on the International Centre of Medieval Art web site. Following a stimulating entry on phases of carving of northern French capitals by Danielle Johnson, I received permission to submit these draft studies on individual sculptors. They are based on material collected in *The Ark of God*, which is a thesaurus of nearly all the capitals remaining in the Paris Basin between 1050 and 1250. The studies will become volumes 6 and 7 of that series. Though only in draft, I have placed them on the web so colleagues may assess the validity of my approach and have the opportunity to comment prior to publication, which is expected in 2016. As of March 2013, thirty draft chapters have been submitted to the ICMA site.³

While working on the sculptors in the Series, I became aware of the impact of these three historic developments of climate, style, and war. They delineate decisive moments of historic change and form boundaries in time that had consequences for architecture and sculpture.

It is not that these have gone unnoticed; the effect of the crusades on the design, for example, of arches and vaults, has been well-considered. My interest is not so particular but lies in the relationship between these events and the boom-andbust cycles in church construction, and the possible impact on style. For that, we need to estimate what these churches cost and when and over what time period they were built.

Scholars seem agreed, within the range of a decade or two, on the dates of many of the major buildings (Crossley in Frankl 2000). Though most of the dates have been accepted in this analysis, many are still being influenced by the assumptions and memes that have directed most art-historical analysis for over a century. For this analysis, more precision is needed (James 1989, ch. 1; James 2003; Cantor 1991; Damico 2000; Rudolf 2006).

For campaigns built after c.1170, I have made adjustments to the dates of individual churches from the decadic analysis in volume 1 of The Ark. For the period before, we have more-or-less firm dates for parts of only thirteen churches, and far-from-generally agreed scholarly estimates for fewer than seventy. Together the dates indicate the prevailing views or feelings of the profession, with the caveat that many highly significant buildings remain in question, such as Orbais-l'Abbaye, Etampes-Notre-Dame, Provins-Saint-Ayoul, Essômes-sur-Marne, Châteaudun, and a silo full of other works whose place or significance in the history of art has not been determined. On the other hand, modern tools of digital photography, computerized databases, and scientific analysis such as dendrochronology⁴ and petrography (Olsen 2011) have not made significant changes to our overall understanding of chronology (James 2007a).

Over the past forty years, I have followed the principle that new lines of discovery would be opened by studying the whole *œuvre* rather than by concentrating on the parts, no matter how important.⁵ I therefore beg my reader's indulgence in dealing with so many of the smaller buildings and for presenting conclusions in charts, for that offers the simplest foundation for comprehending this large mass of information.

To bring the three boundaries of climate, style, and war into focus requires a complex process of investigation involving three stages of analysis. In the first, I find a way to calculate how much was being built in each period and region by decade before 1250 through some method of costing.

In the second, inseparable from the first, I define each of the construction campaigns for individual buildings. In only some cases will the natural order of work determine a building's chronology through being able to date an upper stage after the one underneath. For example, if the nave of Chartres cathedral was built and vaulted between 1194 and 1217 (Deremble 1988), we could represent the approximate stages in Figure 1. Using an even rate of construction, this would date the nave aisle capitals to c.1201 and those in the clerestory to c.1211. However, in most cases the chronologies are more complex than this.

Thirdly, I examine to what extent we may establish lateral links between undated campaigns and those that can be placed in time. As most of the buildings in this study are without documents and have received little attention from scholars, we need to find a method for anchoring them. These three issues form the foundation for considering what impact the boundary events had on architecture and sculpture.



Figure 1. Chartres cathedral nave with dates of each level noted. All illustrations by author.

Issue 1: Relative cash flow by decade

In 1972, an experienced quantity surveyor, Ken Green, and I examined the cost of building the cathedral at Chartres based on the construction rates of that time, including sculpture and glass (James 1972). These figures were updated a few years ago (James 2007c). Subsequently, the data obtained from the Survey (James 1984) was used to cost the 670 more important churches in the Paris Basin before 1250 (James 1997, 41–82; updated in James 2007d).

To summarize that research, an arbitrary unit of work was adopted based on bulk-billing techniques developed for quantity surveying. By multiplying and stretching, the unit was applied to each campaign in these churches. This data has since been updated from the *Master Carvers Series* to produce a chart that shows three phases of growth, each larger than the previous, separated by distinct periods of decline (fig. 2).

Over the past thirty years, the three booms have remained no matter how the figures have been adjusted and refined. It



Figure 2. Cash-flow graph for the churches of the Paris Basin 1050-1240s



Figure 4. Cash-flow units spent on the fifty larger buildings compared to the more than 600 smaller churches shown dashed.

shows growth in construction during the 1080s and 1090s, another burst in the twenty years after 1125, and an enormous surge during the 1180s and 1190s. Between the building booms, there were discernable slumps, while at the end there was a sharp and universal decline. During a century, the amount spent was so enormous we can only call it an overarching passion for construction, an obsession even, which would have affected the whole community.

To minimize distortion in the figures from the enormous variety of sizes and designs, I created an Excel program to calculate the number of units under most circumstances (fig. 3). It took account of changes in height and plan, of plainness or decoration, and of mass and lightness. Only local variations in cartage, quarrying, etc. were excluded.

The next chart compares the smaller buildings with some fifty major ones (fig. 4). The quantity achieved in the minor churches and abbeys was almost the same as the total spent on the major. Where funding for the major works declined gradually during the thirteenth century, funding in small villages and abbeys fell catastrophically. The most complete col-



Figure 3. Spreadsheet used in the calculation of cash-flow units

lapse of spending after 1200 was among the minor buildings. Projects without the backing implied in great establishments languished, especially in the northeast.⁶ In the southwest and along the Seine, there was less decline in the first two decades of the century, possibly from funds acquired from royal conquests in Normandy and elsewhere that may not have been available in the northeast.

Construction among the major churches also peaked around 1200 and then declined over the next forty years, though more gradually than among the smaller works. We may ask why there was a decline when so many great cathedrals were being constructed at this time. The question arises from thinking of Chartres, say, as being "after 1194" when construction took six or more decades. Spreading the costs in real time on a decade-by-decade basis shows that total expenditure on the cathedrals of the Paris Basin had also peaked in the 1190s, in line with the general trend, and gradually diminished afterwards.

Figures 5 and 6 show the amounts being spent on the eleven Paris Basin cathedrals by decade. The buildings most responsible for the peaks are noted on the graph and marked



Figure 5. Graph of cash-flow units spent on eleven cathedrals in the Paris Basin.

in bold on the chart. When large expenditures are spread in this way, the figures show a definite decline in funding that was relieved only by the rebuilding of Reims after the fire. By the 1230s, "the efflorescence of enthusiasm that had funded a great enterprise and in the process created a new artistic idiom was over" (James 2007d, 556).

It may be indicative of the general financial situation that, during the decades of decline, there were major public revolts at Chartres in 1210, Soissons in 1211 and 1225, Saint-Quentin in 1213, and Reims in 1233 (James 1978; Barnes 1967; Shortel 1997; Abu-el-Haj 1988).

Issue 2: Campaigns and timetables

From my training and experience as an architect, I have come to rely on the building itself as the ultimate document in reading its history. It is the least susceptible to forgery or miscopying. Working with existing above-ground structures is not the same as below-ground archaeology, and other arthistorical methods offer few comparable alternatives. I use the term toichology for the archaeolithic procedures required to separate campaigns in standing stone structures.⁷ A campaign is a stage of work executed in one operation to a common set of templates. The method for determining campaigns is set out in The Template-makers and is referred to in everything I have written (James 1989).

The major published examples of toichology concern Chartres vathedral and its westworks, the Saint-Denis choir, Etampes-Notre-Dame and Saint-Martin-des-Champs, Senlis and Soissons cathedrals, Essômes-sur-Marne, and the little church of Cerseuil.⁸ These studies show that breaks in coursing and changes to profiles (and the geometry that created them) indicate a lack of centralized control between the different building teams, and possibly changes in the mason-

	1130	1140	1150	1160	1170	1180	1190	1200	1210	1220	1230	1240	
Beauvais								317	258	280	154	164	1173
Chalons			22	32				62	126	76	49		367
Chartres	107	438	200	230			677	2028	1776	966	197	102	6721
Laon			200	671	1215	2281	710	440	480				5997
Meaux							94				82	314	490
Noyon				572	942	664	708	310	250	202	180		3828
Paris ND		262	160	242	707	100	373	1025	548	803	226	126	4572
Reims									435	1777	336	210	2758
Senlis			2190	116		55							2361
Sens	471	1270	485	430	258	352	232	324	163	100	20		4105
Soissons					100	351	492	830	256	146	87	170	2432
	578	1970	3257	2293	3222	3803	3286	5336	4292	4350	1331	1086	

Figure 6. Table of cash-flow units spent on eleven cathedrals in the Paris Basin. The figures refer only to work executed during these decades. The items responsible for the peaks in Figure 5 are noted in bold.

architects in charge. My recent study of the Royal Portal at Chartres clearly demonstrates the issues that were inherent in discontinuous contracting where "there was no skilled tradesman nor layman in charge of the carving or construction teams with any overall understanding of or control over the minutiae of design" (MCS, 30:8).

Though there have been disputes on how to interpret the data (Shelby 1981), the data itself has been largely ignored and never questioned. The multitude of campaigns in most buildings implies a contractual system and a design process that is at odds with most academic analysis of the past hundred years that presumes permanent workshops, at least on the major sites (James 1989, ch. 1).

One is easily mesmerized by the broad dating in most histories. Long periods are conflated by simple phrases such as "in the 1130s" or "second quarter of the century." To investigate the three boundaries, we need a greater appreciation of what it means to construct a building over more than a generation. When we read that Chartres was, "begun after 1194," we may gather the impression it was conceived as it is now and that over the more than 30 years it took to build there were no significant changes to either the initial design or the rate of construction. However, every medieval building is a process in time. As styles and masters and context changed, so did the building. It is not meaningful to discuss the Chartres clerestory as a design of the 1190s when it does not reflect the ideas of the 1190s, but of the next generation (fig. 7).

By arranging the building sequence as campaigns or courses per year, timetables like that in Figure 1 provide a more meaningful view of the works. Timetables for a number of major buildings have been published online (MCS, 8).⁹ Within approximations, they give a valid idea of progress over time and thus reassert the perspective of process. They help to resolve major issues of chronology, as in the earlier analysis of Soissons cathedral (James 1989, ch. 7, 128–29, 134–36; Sandron 1998, 65–82).

The Saint-Denis choir

Many historians follow Panofsky and Crossley in believing that Suger completed a three-storey choir in four years (Panofsky 1946; Frankl 2000, 309n3). Both are eminent historians, but have they had direct experience of the complexities of a building site? How many historians have lifted heavy stones or carried mortar across gangways elevated high above the ground? Among men who build and carve and supervise architecture, and the masons I have spoken to in detail on this subject over the last forty years, all agree that in four years Suger could not have built higher than the aisle vaults (James 1998). There is general agreement in the trade that, in churches with aisles, only on rare occasions would as many as eight or ten courses be laid in a year, especially in a tightly constricted, multi-level space like this.



Figure 7. Chartres cathedral nave showing breadth and height of clerestory windows compared to those of the aisles.

There is nothing in the stonework above the vaults to show anything was laid over them in the 1140s. When Stephen Gardner and I examined the area above the vaults with the greatest care in 1985, we found no excrescences or leftover mortar or parts of buttresses to indicate twelfthcentury work above the ambulatory vaults. Every surface was finished off, clean, and neat. Crosby himself acknowledged "Even my own enthusiasm for Suger's abilities questions the possibility of his erecting such a complex structure, especially one so novel, in such a short time" (Crosby 1953, 217–18).

To create a scenario that may allow us to go beyond the clerestory-and-high-vaults proposal, I suggest that the storm described by Suger refers to the ambulatory vaults, not the high vaults. After the storm, the cells were laid over the ribs fairly quickly and a roof provided for the grand consecration in June 1144. Suger's words have been discussed by many, especially Crosby and Panofsky (Crosby 1953, 216–20; Panofsky 1946, 238–40). These were "from the crypt below to the summit of the vaults above, elaborated with the variety of so many arches and columns, including even the consummation of the roof."

"So many arches and columns" describes the ambulatory with words that could not have been used to describe the simpler arrangement of ribs and walls of a main vault, and if he were referring to the main roof this "even" is curious, as roofs were usually erected before the high vaults to keep out the rain and carry the lifting gear (Fitchen 1961). But there are precedents for building a temporary roof at the level of the aisle vaults to allow ritual to continue while the upper parts were being completed. The choir of Chartres would have been in use by the 1220s under a temporary roof, and the vault not built until over thirty years later (James 1979–78, 107–08; Lautier 2011; Pastoureau 2011). I have argued for similar situations in Paris, Noyon, and Sens (see below).

So let us add a gloss so Suger's words read, "from the crypt below to the summit of the *ambulatory* vaults, elaborated with the variety of so many arches and *drum* columns, including even the consummation of the *temporary* roof *over the aisles.*"

Because Suger tells us when work began and when it ended, every course in the choir has a place in time. From this I prepared a month-by-month and course-by-course construction timetable (MCS, 8:10–12; Gardner 1984). The courses are numbered in the third column of Figure 8. When Suger laid the foundation stone for the choir in July 1140 "the excavations [had been] made ready for the foundations." This would have been through soft loam and, along with the demolition of the earlier choir, may have been initiated the year before (Panofsky 1949, 99, 241).

Courses could not be laid continuously layer-by-layer since delays were inevitable while erecting arches and vaults so the mortar could harden. It is estimated that average settling time for a medieval arch was three to six months. Though a few blocks could be laid alongside the lower voussoirs of an arch while the mortar was setting, they could not lay more because once the formwork was struck the arch would settle and a gap would open between it and any supported ashlar (James 1989, 63-82; James 1978-79, 12-13; Ashurst 1983; Harvey 1950; Fitchen 1961, 129, 262-65; Heyman 1969). The timetable has been adjusted for these necessary pauses around ribs and arches. The pauses coincide with breaks between the building campaigns indicated by the toichological evidence (James 1993). One affirmation for this timetable comes with the miracle of the storm that occurred when expected, noted with the red dot in Figure 8 under January 1144 (Crosby 1953, 218; Panofsky 1946, 242-).

Between the first stone laid in July 1140 and the con-secration four years later, we can estimate a reasonable construction schedule. Allowing for pauses for setting the mortar, we obtain approximately one course per month, which amounts to no more than eight or nine courses per year. This rate of erection is similar to comparable buildings where we can assess the span of time (MCS, 8).



Figure 8. Construction timetable for the choir of Saint-Denis. The year and months are listed in the left column, the courses are numbered in the centre. Additional time has been allowed for formwork and mortar setting under arches and vaults, noted bold. The date of the storm described by Suger is by the red dot.

The Saint-Denis narthex

I have applied this rate of construction to the narthex with its exceptionally well-preserved capitals. I assumed that money became available and erection continued at much the same rate (fig. 9). The unrestored capitals of the interior and in the portals can be separated into seven distinct groups by location and design (Crosby 1953, 372; Blum 1992). Few in the portals are like those in the aisles or those under the upper vaults or in the towers. Most in each group are unique; one only has to skim through *The Ark* to see this (James 2002–08, 5:1173–1240).

There are seven layers of capitals, and over them rests a tangle of arches and ribs. As mentioned above, the time needed for arches to settle creates necessary and unavoidable delays in the construction before the arches can be loaded or the centering struck. This is long enough to stop all work for a significant period if there was nothing else for the men to do. Each group of capitals is separated by these settlement pauses.

It may be thought there was only one contractor because Suger does not mention any builders (only skilled individuals) and because he gives the impression it was a sustained building operation. However, the variety of capitals, changes to profiles between levels, and changes to torus molds and pier plans show distinct stages to the detailing that imply anything but one campaign or a single master mason, though there could have been a full-time capo-master (Shelby 1981).

By working backwards from the known date for the consecration of the chapel of Saint Romanus in 1140, we can estimate the order in which the capitals may have been placed



Figure 9. Section through the Saint-Denis narthex from rock footings to roof, with ghost outline of the western portals, the approximate number of courses and suggested dates.

(Panofsky 1946; Kidson 1987). The timetable in Figure 9 is based on the same erection rate of eight to nine courses each year as found in the choir, with pauses for arches and vaults. In the *Master Carver Series* (MCS, 8:9–10), I followed Crosby in suggesting that the westworks were designed around 1130 (Crosby 1981, 123–24). This would have been a minimal construction period, yet some scholars tend to shorten the building work to a couple of years (Grant 1998; Bony 1983, 90). This shows little understanding of the medieval construction process.

I have more recently veered closer to Panofsky (1946, 150) in suggesting that work began a little earlier. The documentary support for a date shortly after 1125 makes political and ideological sense (Grant 1998, 241–42). Considering the complexity of erecting a large sculptural program with builders who had not yet acquired experience in such matters, fourteen years to build the narthex at 8 courses per year may not be too long. The demands on the abbey finances were high at that time with wide-ranging projects on conventual buildings, and Suger himself suggests that the work began slowly.

Once we have a timetable, approximate dates may be allocated to each layer of capitals. Working backwards, a reasonable chronology would be:

- In 1138, the capitals under the ribs of the chapel and the surrounding openings, leaving time to build the ribs, strip the centering, erect the cells, and place a roof over the chapel
- 1135–36, the capitals over the "window" openings between the central vessel and the towers, followed by setting time for the central vault ribs and cells
- 1132–33, upper capitals of the central vessel and completion of the aisle vaults
- 1131–32, capitals for aisle ribs and arches, and the adjacent windows followed by the arcade and wall arches framing the aisle vaults
- 1127-31 for the portal capitals. The "ghost" of the portals in Figure 9 shows that the sculpture had to be completed and the archivolts erected before the aisles could be vaulted. It is likely that the sculpture would have been commissioned early in the work and carved and placed during the three years required to erect the enfolding masonry. I have suggested that the whole sculptural program required three distinct campaigns (MCS, 29:23-25). The Italianate jambs may have been included because the carver I have called Grégoire had been working in Lombardy, and the Saintogne style of the archivolt figures may have been influenced by other carvers who had worked in that region, Jérôme and Félix (MCS, 4, 10). The carvers of the capitals also participated in sculpting the tympanum and the archivolts.
- 1126-28, set out the piers and walls and place the now hidden faceted bases
- 1125–27, dig and prepare fairly deep footings through silt to a firm foundation.

This timeline provides more meaningful, and possibly more accurate, dates than a general "some time before 1140." Such an approach highlights the revolution in church design that occurred between the massive narthex and the lighter design for the ambulatory. The enormous stylistic change makes little sense over a shorter period, but a timetable covering more than a decade opens new possibilities.

Long delays between campaigns

We cannot presume that construction always proceeded in an orderly manner, even in large buildings. Indeed, it has recently been shown in one of the largest, the cathedral of Chartres, that the choir vaults were not completed until the 1250s, forty years after those praised by Guillaume le Breton in the nave (Pastoureau 2011; Deremble 1988; Branner 1969, 96–97) while a document tells us that the choir stalls were occupied in 1221 (Branner 1969, 97–98). To explain such complexity, I surmised that a temporary roof was erected above the choir to shed the rain over the sills of the clerestory windows (fig. 10). The rooms behind the triforium and the details in the clerestory sills show that the choir was only a year or two behind the nave. This was the level where an effective temporary roof could have been erected (James 1978–79, 21–32).

In the clerestory, the connections between the flyers of the eastern wall of the transepts and the adjacent walls of the choir show they were constructed together. Scholarly dating of the south rose glazing varies between 1212 and 1229, at the latest. Most convincingly, Frankl argued for 1224 to 1229 (Frankl 1966; Morganstern 2011). This provides an *ante quem*



Figure 10. Section through Chartres cathedral showing probable location of temporary roof above the triforium around 1210.

date for the stonework around the south rose, and therefore for the completion of these walls (James 1978–79, ch. 20; Williams 1993, 15–17). Were this so, the great timber roof over the choir could have been finished shortly afterwards.

However, the vaults were left incomplete for a further thirty years. What would be the advantage of such a delay? Why would a rich diocese not seek instant gratification and complete the job they had begun? As the choir glazing was installed during the 1220s,¹⁰ why not continue? One explanation could be that the omission coincided with the general decline in construction during these decades. I have suggested that this same process happened at Notre-Dame in Paris (James 2002–08, 1:81). Leaving work incomplete was far from uncommon, as in the many Add-a-Chapel and similar schemes (James 1989, ch. 3, esp. 50-54). There are more complex situations exampled in the choir of Noyon (MCS, 8:19), at Soissons (MCS, 8:12-14) and the Saint-Leu-d'Esserent triforium (James 2002–08, 1:473–74).

Variations in expenditure of this magnitude make a significant impact on any financial cash flow and highlights the importance of separating campaigns and creating timelines.

Issue 3: Links between campaigns in different buildings

The above procedures are more readily followed in the major buildings, but dating is not so easy for the mass of minor churches that make up more than half the total, especially for the first half of the period.

Capitals are seen as a valid way to consort dates, and scholars have often sought to connect the capitals in undated buildings with those with a firmer chronology (Vergnolle 2000; Baylé 1993; Schmitt 1981). Mair (1982) linked capitals at Canterbury with those in Champeaux and Saint-Remi; Severens (1970) compared Sens with Til-Châtel and Charlieu, and Bony (1983, 489) used designs in Canterbury to date the Paris nave. In *The Ark*, I have followed these links,¹¹ except in cases such as the latter where there are clear errors of comparison (James 2002–08, 1:688–89).

In most cases, there would have been only small gaps of time between carving a capital and placing it. My personal opinion is that they were almost always created as they were needed. They could not have been carved before the columns had been designed unless the builder wished to risk a misfit. In Saint-Martin-des-Champs, nearly every second pier was created from a different template, and it would be a foolhardy mason who carved any capitals before their shapes were well defined (MCS, 9:4-7). In Notre-Dame in Paris, more than half of the aisle-wall capitals are like those at Saint-Denis from the 1140s, while the rest were in the design mode of the 1160s (MCS, 8:16, 9:12-13; Clark and Ludden 1986). As they are mixed together, I presume the earlier were stored while work stopped during the Second Crusade. However, even here I believe the footings would have been laid, the bases completed, and some of the walls erected before the carving got underway (MCS, 20:2, 5–7). Therefore, the plan for the choir was prepared before the crusade, paused for many years in 1145, and—from hearsay—not continued until 1163 eighteen years later.

The studies of individuals in the Master Carvers Series are still in draft with many discrepancies and assumptions not yet resolved.¹² Nevertheless, the more solid attributions have helped to bring greater precision to many undocumented churches. Studies of the way a carver's designs may change over time show how their capitals could be chronologically ordered. For example, it can be argued that the designs of GrippleSon in the Gournay-en-Bray choir clerestory and nearby Trie-Château narthex are more skilfully rendered than those he carved in the aisles of Senlis, and are therefore later (MCS, 6:3-9). Two campaigns without dates may thus be placed after one that is fairly firmly dated. When such comparisons are extended over many carvers and a few hundred buildings, relative chronologies become more focused. Reviewers of The Ark have recognized the possibilities in this approach (Crossley 2004 and 2010; Plagnieux 2006; Bruzelius 2009).

Documents and timetables may then provide anchors in time for connected campaigns. For example, we can associate a later campaign in the Saint-Denis narthex with the choir of Aulnay-sous-Bois through four readily recognizable carvers who worked on both sites. The styles of two of them can be sequenced: Félix's Aulnay capital seems to have been carved after he returned from the south, and Victoire's, after his large capitals in the Saint-Denis narthex aisles (MCS, 10, 15). For Cyprian and Nazaire, who first came to my attention on the Laon choir gallery of c.1161 (MCS, 20), two small capitals at Aulnay may have been their first (MCS, 24). Together, this suggests a date for Aulnay in the later 1130s, somewhat more useful than the usual "of the twelfth century."

To control the growing complexity of these inter-relationships, I note every carver against the church and campaign, with dates and comments (fig. 11). This file is continuously updated, for chronologies are like a cats cradle in which the adjustment of one will impact many others. Step by step, the uncertainty is lessened as the works of more carvers are identified, for each additional carver added to the list limits the randomness in the dates of his companions. The combination of personal development of style and the length of a working life,¹³ when combined with links to other carvers on the same job, leaves progressively less room to juggle dates.

Figurative sculptures require more subtle tools to ascertain identity, as they may have been the work of many hands. John White (1959) proposed at Orvieto that distinctive groups of workers proceeded in four stages to carve the facade reliefs. A few of the more skilled blocked out the whole work. Minor craftsmen then smoothed the background and carved the details. The leading masters or their assistants then

0				Applc	Applc+	Comet	Duke	Duchess	Old Duke	Faceter	Fan, G#, Sprout	Felix	Gregoire	Gripple, Son	Heron	Jerome	Long-Leaf	Palmier	Strapper +	SS, son	Willow, Pecker	Wing-up
1130	Saint-Denis	west portal stage 1	30								G	f	G		Η						W	
1131	Saint-Denis	west portal stage 2	30	Α			D								Н	J				SS	5	
1132	Saint-Denis	west portal stage 3	40								G	f	G		Н	J						
1133	Saint-Denis	Apostle relief	2	Α												J				SS	W	'
1134	Saint-Denis	X(a-)	- 90								G	¥								SS	5	
1134	Saint-Denis	X(aw)	20	Α							G	f						Р			W	1
1135	Saint-Denis	X(a)	40	Α								f						Р		SS	5	
1136	Saint-Denis	X(c)									Fa	i i										
1137	Saint-Denis	X(c+)		Α							G	¥						Р				
1137	Saint-Denis	W-w(cw)	18															Р				
1138	Saint-Denis	X(cw)	25	Α												J						
1139	Saint-Denis	chapel	45															Р		SS	5	
1140	Saint-Denis	towers (1), rose		Α				Ds	s													
1140	Saint-Denis	E(u)	- 98					Ds	s								LL		S	SS	5	
1141	Saint-Denis	tower WS	8																			
1142	Saint-Denis	E(a) walls	120	Α			D	D_{2}	s			f				J	LL	Р			W	1
1143	Saint-Denis	E piers	85													J						
1143	Saint-Denis	E(aw)	20	Α								f								SS	5	
1143	Saint-Denis	N-n	14	Α																		
1143	Saint-Denis	cloister	20													J					W	1
1144	Saint-Denis	E(rc)	8													J					W	1
1145	Saint-Denis	tower E1	40																			
1160	Saint-Denis	tower E2	36																			

Figure 11. Sample of the Excel control sheet with the Saint-Denis campaigns. The identified carvers are listed along the top, campaigns to the left and possible presence of each carver in a campaign noted by a letter.

continued the work on the anatomy and drapery. Finally, lesser men rubbed down the striated surfaces and finished the repetitive details.¹⁴ This all but excludes the relevance of connoisseurship in the major figures, a method designed to separate individual hands.

Capitals, on the other hand, are quick to carve, and few are major works demanding forethought and discussion with the client. Though each needed a certain amount of preplanning and care in layout, most would have been finished in a few days (MCS, 19, 20:13–14). The designs reflect the community of ideas being shared in the shed and, as in any collective endeavor, readily responded to the mode of their times. They are therefore perfect vehicles for a comparative study of this period.

The Boundaries

The cost analysis by decade was an essential step, for without it I would not have been aware of any correspondences between construction and climate. The figures allowed me to suggest that wealth for church construction was affected by cycles in temperature and precipitation, and through that to suggest that these climatic events had major impacts on art and architecture. It was similar with the crusades. Together they provide boundaries that may be used by historians in analyzing changes in the creative arts, just as the Black Death did for a later century.

Boundary 1. The relationship between climate and construction

This data was first presented in the *AVISTA Forum Journal*, and the following recasts that article for its relevance to cultural change (James 2010). Neither my dates nor the climate models are yet so accurate that a more precise relationship can be determined, yet they pose the strong possibility that the connection I had tentatively raised in the 1970s does exist (James 1978–79, 554–55n53).

Working mainly from contemporary descriptions of weather, Hubert Lamb showed almost fifty years ago that a history of temperature and rainfall was possible (Lamb 1965,



Figure 12. Temperature gradients for the north European plain. Adapted by the author from Glasser 2009.

1977, and 1982). He suggested that both increased from the mid-eleventh century through to the 1190s, and was followed by a prolonged drought (Lopez 1971, 163; Alexandre 1987, 67–127). Research on the Medieval Warm Period has become extremely sophisticated, largely stimulated by the anthropogenic changes currently being inflicted on the planet, and has amplified Lamb's work (Fagan 2008; Brazdil *et al.* 2005). The variations in temperature (fig. 12) were compiled for the northern European region from historical and instrumental data and through analysis of tree rings, pollen counts, marine sediment, and cores through glaciers (Glaser 2009; Mann and Jones 2003).

Temperature affects agriculture, and when temperature and rainfall combine to produce an ample surplus, people have funds that can be directed into other projects. Campbell stated "Shifts in environmental conditions exercised a powerful influence upon available resources via their effects upon the reproduction, health and life expectancy of humans, crops, and livestock" (Campbell 2009, 6; Curschmann 1970).

Viticulture was a most important cash crop. Merchants would often invest their spare funds in vineyards (Dion 1977; Doehaerd 1950; Dupaquier 1969; Guyotjeannin *et al.* 2002). The region produced good quality wines when the temperatures were high, rain sufficient, and frosts few (Dion 1977, 83–92). Figure 13 shows the coincidence between viticulture and church construction. The gray area marks where a combination of sources indicates wine was grown while the solid dots locate the better-quality churches (Dion 1977; Brunel *et al.* 1997; Arnould 1968; Doehaerd 1950; Petit Dutaillis 1970). The profits from this trade could have provided major financial support for church construction, as hinted in the number of capitals covered with vine leaves (James 1984, 32–33).

When we juxtapose the money spent on building with the swings in temperature, there is a reasonable correlation. The



Figure 13. Major location of vineyards in the Paris Basin marked in gray, coinciding with the more important churches marked as black dots.



Figure 14. Correlation between climate in gray and construction in black before 1240.

greater sophistication in climatology and updated cash-flows provides a truer assessment than the simple models proposed over thirty years ago (James 1978–79, 554n53; James 1982, 32). The passion for building waxed and waned more or less in time with the changes in temperature. Each hotter period gave a boost to building. Each peak in expenditure more or less corresponded to a climatic event (fig. 14).

The earliest projects were small, and their locations along the riverine valleys of the Oise and Aisne and their tributaries suggest that money came from ordinary people as much as from the nobility. Of those that remain, a wing, a small crossing, or an apse was all that could be encompassed in one project. Work on larger buildings would have been swept away in the massive rebuilding of later times: Beauvais Saint-Etienne choir, Châlons cathedral, Saint-Leu-d'Esserent nave, Saint-Denis nave, Saint-Remi choir, and Senlis, to mention only a few of those we know. Though it may have seemed at the time that much was being directed toward construction, it was insignificant compared to what was to come (James 1984, fig. 4).

Between the end of the 1090s and the mid-1120s, the average temperature dropped 0.7°C or more, creating difficult years for farmers. In the summer of 1100, for example, chroniclers wrote of a "hard winter," "severe hunger," and "great mortality" (Curschmann 1970, 128–29). These years coincide with a massive reduction in construction.

The moment the temperature began to improve, the simmering passion to construct took off again and accelerated through the 1130s and 1140s. The presumed larger income from wheat and wine may have generated a surge in gifts. The passion for building wonderful churches that had been ignited in the previous generation came together with a growing infatuation for perfection in carving to create the inspired work we see today (James 2002–08, 3:17–24).

While Saint-Denis and Chartres were under scaffolding, workers were also engaged on over 300 lesser-known buildings. Construction was marked by noticeable pauses between one donation and the next so that parish churches and priories would take more than a century to build. Each step in construction depended on individual grants—possibly locally sourced—with considerable time-gaps between. For example, at Champeaux and Fontenay-en-Parisis the opposite arcade piers in the naves were erected fifteen or more years apart; Cerseuil took over a hundred years and ten campaigns to build; and at Gallardon the triforium was built forty years after the aisles vaults (fig. 15; James 1989, 208–30). Even in larger buildings, construction was an "untidy and opportunistic process" (Givens 1991).

From the mid-1140s the boom coincided with a mild drop in temperature that was unchanged for most of a generation. Though major famines are reported in contemporary texts in the early years of the 1150s, 1160s, and 1170s, fairly even growing conditions seem to have prevailed that were neither too frosty nor too torrid (Curschmann 1970, 144–53). Construction did not pick up significantly until the later 1150s when a dozen major projects were begun, including the cathedrals of Senlis and Laon. From 1160 the average level of construction was as high as it had been in the previous maximum around 1140.

The 1180s and 1190s were the peak of the best growing season, with little frost and long, well-watered summers (Lamb 1965). By the 1190s the temperature had risen to a level not seen either before or after in living memory (fig. 14).



Figure 15. Gallardon from the northeast.

It was also when more money than ever was being channeled into the passionate pursuit of increasingly splendid churches.

In Figure 14, the right side of the gray line shows how quickly the average temperature dropped at the end of the century. It fell by more than a degree over thirteen years. Written evidence from that era tells us that precipitation fell too, bringing drought and hard frosts (Dr. Justin Schove in James 2010, 47, Table 1). Poor growing conditions are confirmed from all climatic studies (Parry 1978). During the same period, construction dropped to a small proportion of what had once been (compare James 2002–08, 1:520 and 2:1012).

The next twenty years were the coldest of the Medieval Warm Period, even colder than the 1120s a hundred years earlier. Such a climate would have been unfavorable for all agriculture, including viticulture (Lamb 1977). Indeed, during the coldest period between 1220 and 1225, a major famine seems to have affected much of northern Europe (Curschmann 1970, 166–71).

When we separate parish construction in the western regions that were ruled directly by the king from construction in the bishoprics of the Soissonaise and Reimois, the costing shows that in the latter it collapsed almost at the same time as the temperature, while in the west money continued to flow for a while. The expansion of the royal demesne at this time and support for local trade cushioned the impact of the declining harvest (James 2007d, 546–48; Baldwin 1970, 347; Fawtier 1960).

Throughout this 150 years, it would seem that the total funding for the smaller projects was about the same as for the great cathedrals and abbeys, albeit in small, individual amounts (James 2007d, 549–50). Though Suger mentions that gifts from the pilgrims paid for the windows, there is little documentary information on gifts from the lower classes. Can we say that parochial building was to a large extent paid for by the local populace? When times were good, there was a surplus that could, from time to time, be invested in the construction of parish churches and priories. These gifts would be sustained or extinguished by the extent that weather affected agriculture (Panofsky 1946; Grant 1999; Kraus 1979).

It is these buildings, intimately supported by the produce



Figure 16. Graphs comparing temperature (dashed) with funds spent on smaller churches before 1240.

of the earth, that show the closest relationship between climate and construction (fig. 16). This makes sense in a cash society where those paying were primarily the richer farmers, vintners, and traders whose income was most dependent on the weather, assisted no doubt by the local clergy and nobility whose income came from the same sources.

By the time temperatures rose again towards the mid-1240s, funding of parochial construction had diminished compared to fifty or so years earlier. It was a time when independent towns were finding it difficult to pay for their royal charters, and the great fairs had moved from the Champagne to Flanders. The vineyards were being so damaged by drought and frost that the Paris Basin lost its preeminent role in the production of good wines, which thereafter came from Burgundy and Bordeaux (Dion 1977, 63–). One should also consider the pressure on resources that came from the rapidly growing population (Fourquin 1964; James 1984, 22–24).

Though there were only small reductions in the number of buildings under scaffolding (James 2002–08, 1:520), considerably less was being constructed at each one (fig. 4; James 2007d, 531). From here on, the bulk of new spending was on prestige projects such as Reims, Royaumont, Saint-Germerde-Fly, Dammery-les-Lys, and the magnificent royal chapels, all with enormous areas of stained glass.

Stained glass was considerably cheaper than masonry walling. The acre of glass in the Chartres windows was estimated to cost only one-tenth of the total expenditure (James 1972, 52). It may be significant that great windows came into fashion just as the temperature was declining and funds were being reduced, for then one could construct more with less. The tall clerestory at Soissons had been intended by 1200 or just before, and the design of the Chartres clerestory changed to reflect the scheme at Soissons around 1210 (James 1978–79, 438–42; MCS, 8:13).¹⁵ Reims and many smaller buildings followed suit during the next decade.

In the Royal Domain, the smaller parochial works responded to reduced funding in the opposite way by lowering the vault springing into the triforium and replacing the great, glazed clerestory lancets being used in the northeast with small oculi (James 1989, 112–16).

Boundary 2. The revolution of the 1170s

There was a permanent, revolutionary transformation in the design of capitals during the 1170s (James 2002–08, 1: ch. 5). During this decade—and including a couple of years on either side—all capital sculpture was redesigned from a formally stylized manner to a more natural one. These were simple, austere arrangements in which foliage gradually became more realistic (fig. 17). Lightness was as important in the new manner of carving as it was in the new architecture. This happened throughout the Paris Basin but hardly at all in the more distant regions in the south of France, in Germany, Italy, England, and Spain where formal designs continued for some decades (James 2007b).



Figure 17. Changed design modes between 1170 and 1180: Top row: Chars nave, Laon transept aisle, Saint-Denis choir crypt. Bottom row: Chartres north porch, Paris Notre-Dame nave, Soissons south transept.

The chronology for the period after 1180 has been the simplest to determine as the dated works show a clear evolution in the morphology of foliage that can most fittingly be described as seasons: from winter hibernation through the freshness of spring to the dramatic vitality of summer (Jalabert 1965; Viollet-le-Duc 1868, 5:286). From the dated works, I arrived at a definition for the style current in each decade and applied it to every campaign with capitals (James 2002–08, 1:ch. 4, 2:1603–1607). This procedure cannot be applied to the stylized carving before c.1170. One capital in the south arm of Angicourt has a single central leaf and a document that may date it to 1168 (fig. 18).¹⁶

For historians, such an event is of inestimable value. It forms a boundary that indicates with reasonable certitude that any campaign with only formal designs would have been carved before 1170 and that any with only natural designs would have been after 1180. It provides a method for clearly separating what was built before from what was built afterwards.

In those buildings where there is a mixture of formal and natural designs, the proportion gives an estimated date close to the year. This can be demonstrated in the many layers of capitals in the Canterbury choir where documentary dating is fairly precise, and in the Laon transepts where the order of construction confirms the changes in the proportions (James 2002–08, 1:39–59, 151–). Among the more interesting conclusions, at Chars the proportions suggest that the ambulatory and the nave clerestory should both be dated to the 1170s.¹⁷ In the Noyon choir gallery, all the wall capitals are formal while those in the piers fit the later 1170s, a discrepancy that led to the complex construction schedule presented in the *Master Carvers Series* (MCS, 8:19; Seymour 1939; Héliot 1980, 3–11).

As a demonstration, in the little church of Voulton we can distinguish some ten or so campaigns (James 2002–08, 2:282–93, 5:1745–53). All the capitals in the east are formal, and would therefore have been carved before the transformation of the 1170s (fig. 19).¹⁸ The first touch of naturals occurs in the next campaign in the eastern aisles of the nave where 20% of the designs are natural. This proportion suggests a date just after 1170. In the clerestory under the giant, eightpart vault, the range is ten formal to four natural designs, suggesting a date between 1171 and 1173.



Figure 18. Angicourt south transept, earliest natural c.1168.

After a smaller campaign that included the sixth pier, the next was a larger program in the aisles and clerestory where more than 90% are natural, indicating a date between 1177 and 1179. The capitals in aisle bays nine and ten and those in the clerestory west from bay six have the same range as the western door: all natural with most of them in the manner of the 1180s, suggesting one large campaign that completed the church just before 1190. The progressive development of foliage on these capitals is shown in Figure 20.

The varying proportions of formal to natural styles confirmed a reasonable order of construction from east to west. At no time did a later phase of work contain a mix that would have contradicted this steady progress. Salet's dating was correct only for the western bays and for nothing else. As the building was constructed over thirty years, his single blanket date for the church does not help create a cash flow nor to separate the campaigns (Salet 1944, 113).

The same procedure may be applied to all the buildings with campaigns that contain both formal and natural capitals, such as those parts of Laon built during the 1170s, the Paris clerestory, of Braine, Soissons, Saint-Remi, Mantes-le-Jolie, and indeed every church with a part that dates from this transitional period.

Possible causes of change from formal to natural

What could have prompted this extraordinary trans-formation? Could there have been contact with Cistercians or Premonstratensians, whose buildings show their preference for simplicity? The speed with which the change occurred suggests a directive. Such speed would have been remarkable today, but within a society without today's journals or social networks for exchanging ideas, it was little short of miraculous. The fact that, without exception, every carver in the midst of their professional lives changed their manner of working within the short space of ten years does suggest some level of coercion. The way in which they produced the 'required' look by simply placing a crude leaf in front of paired crockets suggests that some carvers were responding to an injunction rather than evolving a new manner out of the old (fig. 20).

In the last years of the 1160s, some leading prelates may have argued that the carving at Paris and Saint-Remi, at



Figure 19. Voulton apse from the south side.

Nouvion and Glennes, was too diverting and stole men's attention from the contemplation of simpler and purer things. They may have preached of the purifying benefits of the simple crocket, enlivened perhaps by a single frond or leaf. But then, surely we would expect to find some evidence in the records of such a strong opinion, as we do for Bernard of Clairvaux forty years earlier. One of Bernard's followers, Pierre le Chantre, former cantor in Paris, often preached against elaboration. His sermons were collected and printed, possibly before 1180. Perhaps he was not the only one (Baldwin 1970; Prache 1978, 40; Bruzelius 1979, 29, 41).



Figure 20. Capitals from the choir of Voulton in the mid-1160s N1(a), under the vault from 1171/3, from around 1177/79 in N8(a) and from the later 1180s in the west door.

Boundary 3. The financial impact of the Second Crusade

The Second Crusade began when King Louis decided to visit the Holy Land in December 1145, followed by Bernard of Clairvaux's exuberant call-to-arms four months later. We can presume that, during the next year, every magnate, knight, and foot soldier who had sworn to join would have been saving money and preparing. This may be one reason why departure was delayed for a further year. One would expect these ongoing military costs to have had some impact on construction during the later 1140s (MCS, 6:9–14).

Two years later, the defeated and demoralized army returned home in small contingents. How was this disaster paid for? How were the taxes raised? Were precious possessions sold or pawned? The initial cost of the venture, the continuing expense of maintaining the troops, the ongoing payment of ransoms, and so on may have bled France dry for some years afterwards (Riley-Smith 1998, 129–35). The evidence from each study in the *Master Carvers Series* suggests that almost nothing was being spent on religious architecture for many years after the crusade was announced.¹⁹

Between the completion of the Saint-Denis choir and the start of Senlis only a few small works can be inserted, listed in the adjacent box. There is very little else to choose from. It was an empty time (MCS, 6). Also, there was a major famine in 1145 just as the crusade started that would have increased their financial difficulties and may have been responsible for the year's delay before setting out (Bouquet 1869–1904, 12:275–88).

Historians have noted the financial impact on building construction in a general way, though not in detail as the story of architecture has been written through the uncertain dates of the major buildings in which a six- or seven-year hiatus does not register very clearly. Not enough is known about the costs of a crusade, nor of its economic impact. Research has, on the whole, concentrated on the political, military, and dynastic aspects. However, extracting cash from the community meant little would have been left over for construction, for "Louis levied a substantial and deeply unpopular tax, all the more unpopular in view of the wide-spread famine of 1145-46" (Grant 1998, 157).

Construction usually had to be paid for at the time, in cash (Kraus 1979; Grant 1999). The crusaders needed enormous sums for the high cost of war and ransom, and when that is combined with famine it is no wonder that the quantity of architecture and sculpture was affected.

There is one documented example in which Count Galeran promised, before he left for Jerusalem, that he would build seventeen towers. It is significant that, though he returned home early, he put off complying until after 1156, a delay of more than ten years. This may have been typical for many who went east (James and Gardner 1996–97; James 2002–08, 5:1758–60).

It is hard to imagine a major war without some social consequences. Wars in modern times have left not only scars but have changed attitudes and left an impact on art. Though rigorous proof is not possible, it seems that, for a period that cannot be closely defined, there was less work after 1146 than in adjoining decades. The crusade seems to have stopped the boom of the 1140s in its tracks and ended a period of prodigious construction. We only have to think of Saint-Denis, Saint-Martin-des-Champs, Saint-Germain-des-Prés, Chartres, Sens, and fifty other great buildings to bring focus onto this period. As the army tramped east the workshops fell silent.

It seems significant that Senlis, begun shortly after the crusaders returned home, was the smallest cathedral of the period (James 1987; Erlande-Brandenburg 2006). When started in 1153, it was not conceived as a great monument in either size or grandeur. Its modesty exactly reflected a time of

Major campaigns with capitals begun in the seventeen years after 1146 (dates mostly indicative, only initial campaigns included). These 26 were selected from 380 campaigns in the ten years after 1153.

- <1153 May-en-Multien apse
- <1153 Laon Saint-Martin north door
- <1153 Bazoches single north bay
- 1153 Senlis cathedral begun
- 1153 Oulchy-le-Chateau crossing
- 1154 Corbeil, Saint-Spire nave
- 1154 Vernouillet apse
- 1155 Antony choir
- 1155 Berzy-le-Sec apse
- 1155 Champagne-sur-Oise east
- 1155 Jouy-le-Comte apse
- 1155 Laon cathedral choir dado
- 1155 Lierval apse, crossing
- 1155 Melun east
- 1155 Orbais-l'Abbaye choir dado
- 1155 Provins, Saint-Quirace choir
- 1155 Sens cathedral choir walls
- 1156 Chartres cathedral continues south tower
- 1156 Montmartre central nave
- 1156 Saint-Germer-de-Fly choir gallery
- 1156 Val-Crétien east
- 1159 Fleurines east
- 1159 Nouvion apse
- 1161 Laon cathedral choir gallery
- 1162 Guignicourt chapels
- 1162 Noyon cathedral choir dado
- 1163 Paris, Notre-Dame choir aisles
- 1163 Saint-Remi west façade
- 1163 Voulton apse

scarcity when funds were only starting to return to what they had been before the crusade. When I compiled the list on the previous page of major works under construction after the crusade there was little until Senlis (MCS, 6:9–14).

The major source for the proposed recession after the crusade lies in *The Ark* and the studies on individual carvers derived from that collection. It was through the following that I recognized its baleful impact in the carvings of Cyprian, GrippleSon, the Nazaire group, Palmier, Strapper, and the Victoire team (MCS, 24, 6, 26, 7, 27, 15). The chronologies for each person show there was a dearth of capitals after 1146, perhaps for as long as seven years. In the *Master Carvers Series* my use of precise dates has developed into an exceedingly useful tool in this research. The dates do not pretend to be either accurate or final, yet they are actively becoming harder to shift around as more carvers are included and I come to know more about the companions with whom they worked.

The evidence (including subtle changes to the design and execution of capitals) suggests that the following seven buildings were among many that were started before the crusade and then stalled and left incomplete for long after.

- The ambulatory walls of Notre-Dame in Paris were begun in the 1140s (MCS, 9). Some wall capitals were carved at that time and some belong to the 1160s: compare one that is typical of the 1140s with a nearby foliate that is closer in manner to the drum piers of twenty years later (figs. 21 and 22). It looks like tools were downed in the midst of the carving program, possibly just as all available funds were being drawn off for the crusade. Can we therefore date the earlier capitals to a precise time in April 1146?
- Construction of the Saint-Denis choir stopped in 1144 and was not resumed for over a century (James 1998; Bruzelius 1985). The crusade may have prevented its completion, and Suger's death five years later ended his political dreams for the Abbey's role.

- The aisles of the Chars nave would have been carved around 1140, but its clerestory had to wait another thirty years before it could be completed (James 2002–08, 4:274–, 288–).
- The Châlons-en-Champagne, Notre-Dame, nave advanced no further than the floor of the gallery in the 1140s, and the rest had to wait until the 1170s. The nave capitals are replaced and ostentatious interpretations of designs by masters from the 40s (James 2002–08, 4:211–, 252). The south portal is often dated to the 1150s, but the work by Grégoire, Félix, and Jérôme on the capitals and imposts bring their *œuvre* firmly into the 1140s (MCS, 4, 10, 29, 30). Funds may still have been short in 1157 when people may have had to haul the carts themselves to get the work started.
- In the ambulatory of Saint-Leu-d'Esserent, the circlet of chapels have the same sills and curiously oriented plinths as the Saint-Denis ambulatory, from which it could be dated to about the same time, c.1142 (James 1993, 64–67). But none of the capitals were carved by any of the men who worked at Saint-Denis or elsewhere in the 1140s. They are similar to work in the Senlis gallery that we can date to just before 1160. The fact that the ambulatory piers had to wait until the 80s suggests that funds continued to be short for some time to come (James 2002–08, 1:468).
- The lower storey of Saint-Germain-des-Prés is the work of the 1140s, but the clerestory and its flying buttresses had to wait until the later 1150s and were not completed until the 1160s, as shown by the design on the bosses of the high vault. The consecration of 1163 may have marked a tardy completion.
- In the choir of Sens, the capitals in the dado are similar to others from the 1130s and 1140s, as are those in the northern baptismal chapel (James 2002–08, 5:1543–1605).²⁰ The capitals under the ambulatory vaults and in the gallery are closer to the choir aisles



Figure 21. Paris, Notre-Dame ambulatory capital in the manner of the 1140s.



Figure 22. Paris, Notre-Dame ambulatory capital in the manner of the 1160s.



Figure 23. Sens cathedral, dado capital in north chapel *c*.1132.

of Senlis and Laon cathedrals, all from the later 1150s, (figs. 23 and 24). This suggests that the choir was built to some level above the sills of the aisle windows in the 1130s and early 1140s, and that the rest was not completed for more than a decade. To allow services to continue, a roof would have been erected above the aisle windowsills. This provided a usable part of the building where the stalls were placed and Bishop Henry interred in 1144. Large buildings like Soissons and Chartres were erected at a rate of four to six courses per year (MCS, 8:5-7). If this were the case at Sens, some seven to eight years would have been required to raise the walls to somewhere below the capitals, plus a couple of years for the roof and stalls. If completed by 1140, the foundations would have been begun in the early 1130s. After the crusade, construction would have resumed with capitals of the later 1150s. Work continued slowly, with the middle gallery of the nave delayed until near 1170, probably by William of Sens (James 2002-08, 1:263-67; Salet 1955; Henriet 1982; Severens 1970).

Elsewhere, the story seems to be the same. Wherever we look, buildings were stalled about the time the Second Crusade was called and did not start up again for years, if not



Figure 24. Sens cathedral choir aisle capital c.1155.

decades. For a long time, France would have been awash with temporary roofs over unfinished works, decaying scaffolding and cranes, and workshops grown silent with waiting. One of the consequences was that "Paris and its region lost their exclusive leadership in the development of the new style, which was more and more attracted toward the north and northeast margins of the Royal Domain" (Bony 1983, 119).

What happened to the great men who had created the rich carving of Chartres and Saint-Denis? Some would have accompanied the crusaders, especially as there was little available work at home. One who went to Jerusalem may have been working at Etampes from about 1134 on the south portal sculpture (Jacoby 1986; MCS, 7:5–7). But the rest would have had little choice but to pack up their tools and tend their gardens.

To take account of the crusade-based recessions, the cashflow was modified to show the loss of funds for many years (fig. 25). The rupture affected not only funding, but also the number of churches Figure 26 shows the number of both large and small projects with anything from the period. At the peak of the 1140s ("2" in fig. 26) Chartres and Saint-Denis are represented as only two units. Similarly in the 1190s, the four great cathedrals of Chartres, Laon, Paris, and Soissons



Figure 25. Cash flow modified for the loss of production during the crusades.



Figure 26. Number of churches under construction in each decade between 1070 and 1240.

are represented by only one unit each ("5"). Comparing the two charts shows the impact of the first two crusades quite clearly ("1" and "3"). Also, after 1200 the amount being donated for each place was declining though the number of sites under scaffolding was still considerable.

The commencement of work on the cathedral of Senlis may mark the moment when most of the crusader's debts had been paid. In a sense, the cathedral may have given a kick-start to the construction industry after so many years of inactivity. It was followed in the next decade by a rash of major projects.

Aesthetic consequences

There were subtle changes to carving and portal design. As most of the sculpture came from a new crop of carvers, the differences illustrate rather than prove. Nevertheless, after looking over thousands of capitals, I sense a transition over these years. The examples in Figure 27 were chosen because they have similar layouts and detailing. The upper row is from around 1140, and the lower row from around 1160: they have the same layouts but the handling is different with a delicate divergence in approach.

The foliage in the later capitals is more realistic and less fantastical; the straps are wider. The designs are more refined and elegant, stronger, often more flamboyant, and the elements tend to disengage from the cone as if applied later rather than being part of the structural form.

More compelling evidence lies among the portals. There was a dramatic change in attitude between the styles of

Chartres and Senlis. Where earlier work is more austere— exampled by Christ in regal Majesty enthroned as a frontal and awesome deity—later work is intimate and even emotional in a different way. At Senlis, there is a psychological interaction between the figures on the tympanum. They are more concerned with their personal relationship in a heavenly space than with the observer, and the gestural language is more informative.

In the northern pre-crusade archivolts, whether the individual voussoirs are of adoring angels and elders as at Chartres, Provins, and Etampes or narrative scenes as at Saint-Loup and Le Mans, each was designed as separate cartoons within a broader Christological or saintly narrative or eschatological vision (Williamson 1995, 27–28).

In post-crusade archivolts, the clear linear-organic framing at Senlis, Mantes, and Braine departs radically from earlier voussoirs. The device of the Tree of Jesse, which connects every element with the central theme, links figures that had earlier been isolated by their baldachins and clouds.

Notable responses to powerful events are not uncommon. Jethro Lyne suggested that we compare the confidence of the Fauvist subject matter before 1914, with its delight in the expressive potential of color, with the work of the German and Austrian Expressionists after the war, many of whom had directly experienced the horror of the trenches and the breakdown of civil order. And, flanking the sack of Rome in 1527, compare the natural confidence of Bramante and Raphael to the Mannerism of the elder Michelangelo and the younger Bronzino.



Figure 27. Changed design modes between the 1140s and 1160±: Top row Saint-Martin-des-Champs, Saint-Denis narthex, Bourges south portal. Bottom row: Gournay choir, Senlis nave, Laon north transept (author).

Impact on continuity

The crusade interrupted the continuity of training between master and pupil and led inevitably to the subtle changes we find in the sculpture. I find that almost none of the capitals at Senlis were carved by masters from the 1130s or 1140s. When the working lives of each of the carvers being studied for the *Master Carvers Series* is graphed, it is clear there was a rupture after 1145 (fig. 28). Those masters for whom I find no examples after the crusade are marked with an X, being half of those in the study.

With only fourteen years between the Saint-Denis ambulatory and the first capitals in Senlis, there should have been many instances where the same designs were used in both, as there was between Saint-Denis and Châteaudun or Saint-Martin-des-Champs after a similar fourteen-year gap. This is not the case.

Unless men toiled past their sixtieth year, some of the old-timers would have retired by the time Senlis was begun as their eyesight or physical strength failed. All the masters who were most influential in the earlier period seem to have stopped working about the same time, and their pupils did not start until towards the end of the next decade when times had changed in significant ways. The individual pupils involved, like Strapper III and the "sons" of Gripple and the SS Master, illustrate the differences in the next generation



Figure 28. Working lives of carvers identified so far. An 'X' marks those masters who did not continue working after the Second Crusade, being well more than half. Some have already been discussed in the *Master Carvers Series*.

(MCS, 2, 6, 27). The continuity of ideas that came with the medieval manner of training had been interrupted, and some threads were lost.

Boundary 4: The 1095 crusader recession

Moving backwards to the First Crusade, it is noticeable that much of the carving produced afterwards was primitive compared to what had gone before. Earlier capitals in the naves of Morienval and Deuil-le-Barre, and in the Saint-Benôit-sur-Loire narthex, show a markedly different character to most post-crusade work. The earlier ones are larger, heavier, and more confident. Rarely do capitals carved shortly after the crusade match the earlier ones in size, organization, or craftsmanship (compare the two rows in fig. 29, page 36).

The carvers who worked in the Paris Basin before the crusade had packed their bags and traveled to more lucrative climes (if there were any) and did not return when prospects improved. As after the Second Crusade, once funds returned, few of the older men were available, and the new generation of carvers had to start learning the basic skills of their profession without the mentors needed to train them properly. The naves of Bury, Villers-Saint-Paul, and Berneuil-sur-Aisne, and a group of Lilliputian towers at Oulchy, Nouvion, and Retheuil clearly show the post-crusade situation. I concluded that, for at least a decade after 1100, masons in the Paris Basin lacked those qualities of skill and confidence so apparent in the work before 1095. Additional evidence for a decade-long gap in construction comes from the carvers whose *œuvre* can be traced continuously from the naves of Bury, Villers-Saint-Paul, Etampes etc. across thirty or forty years to Chartres, Saint-Denis, Saint-Germain-de-Prés etc. I suggest these men could have completed such a body of work in a reasonable lifetime only if the earliest campaigns were after 1105, and not before the crusade (MCS, 2, 9, 12, 13).²¹

Boundaries 5 and 6: The later crusades of 1189 and 1202

Can we presume similar situations during other crusades? The Saladin Tax of 1189 for the Third Crusade may have had a similar impact on construction as the taxes for the previous two, except that it occurred in the middle of a strong increase in temperature. The other crusades coincided with the start of decreasing cycle in temperature (fig. 12). Good crops and the staggering growth of royal territory under Philippe Auguste may have made it possible to pay the expenses of war without cutting funds for construction.

It looks as if there may have been some reduction among the parish churches, but overall the amount of construction and the continuity of transmission hardly faltered. Again, I speak of northern France and not of any other region.

However, the Fourth Crusade of 1202 is another story. It coincided with the decline in construction initiated by lowered harvests. By then, the drought had had an impact, and temperatures were falling, as were levels of precipita-



Figure 29. Changed design modes between 1090s and after 1100: Top row: Morienval nave, Montlevon nave, Saint-Aubin in Crepy crypt. Bottom row: Etampes nave, Bury nave, Jouy-le-Moutier crossing.



Figure 30. Diagrammatic summary of booms in construction (curved lines with arrows)coinciding with perturbations in temperature (lower graph), and with recessions in the building trade caused by the crusades marked by crosses.

tion. Construction, especially in the northeast—being the Soissonais and Laonnais, and along the Marne—was already in decline and the funds required to support the Fourth Crusade would have done much to hasten that collapse (James 2002–08, 2:1487).

Three of the crusades were initiated at the peak growing seasons when times were good and there was enough money to fund any dream of bravado and knightly derring-do. It was just unfortunate that these adventures were accompanied by declining temperature leading to smaller harvests that made it more difficult to repay debts so impetuously incurred.

Conclusion

The boundaries discussed here effect the chronology of sculpture and architecture. They are the changes in climate, the precisely dated transformation of foliage between 1168 and 1182, and wars that affected the flow of funds between 1095 and c.1105, between 1146 and c.1153, and again after 1202. This has been summarized in a general way in Figure 30. Largely the result of events that were external to most art-historical issues, the boundaries may allow us to modify the dates of buildings and carving and to start searching for some of the more subtle aesthetic consequences.

The events of the crusades, like temperature and possible artistic coercion, would have changed the social psyche and thus the manner of creative expression. It is unlikely that these events would have impacted only sculpture, for architecture, manuscripts, and fashions would also have been influenced by these same forces. Ideally, these boundaries may augment the data we already have to frame distinct periods and so help secure a firmer chronology for the creation of Gothic art and architecture.

Notes

- 1. My deepest gratitude goes to the Australian Research Council which funded much of the Survey and preliminary work in organizing that material into the five-volume thesaurus, *The Creation of Gothic Architecture - an Illustrated Thesaurus: The Ark of God.* I thank many people, and especially Chris Henige, Jethro Lyne, my mentor John Harvey, my loving companion Hilary, and my colleagues in the searching discussions at the All Things Stone Colloquium held at UWM, Whitewater, in May 2011.
- 2. With corrections and additions, the list of churches from the Survey with GPS coordinates may be found online at http://johnjames.com.au/medievaldatabase. shtml.
- 3. The Master Carvers Series may be found on http://medievalart.org/?page_id=214 and at http:// johnjames.com.au/index.
- 4. Prache's publication of the dates for wooden ties in Chartres confirmed the toichological evidence in the masonry from James, 1978–79; Prache, 1997.
- 5. The Survey from visits to some four thousand churches in the Paris Basin where I found parts from this 200 years in about half; this cost analysis; the stone-by-stone study of Chartres cathedral; and more recently the collection of capitals in *The Ark of God.*
- 6. Regions of the northeast and southwest are defined with maps in James (1984). Others have suspected there had been a sharp decline in the 1220s, for example (Branner 1965, 35). Royal conquests and growth of trade along the Seine may have supported construction in the west for quite a while after 1200. My first trials

of this fascinating topic were James 1978–79, 554–556, n53, and James 1984, 32–33.

- 7. From *toichus*, Latin for a standing stone (James 1989; criticized by Russell 1993; defended in James 1994).
- Chartres cathedral in James 1978–78; the westworks in James 2006; Saint-Denis in MCS, 8 and James 1993; Etampes in MCS, 7; Saint-Martin-des-Champs in MCS, 6; Senlis in James 1987; Soissons in James 1989, 119–41; Essômes, *ibid.* 179–90; Cerseuil, *ibid.* appendix 2:209–30. See many small examples of the method in the other chapters of James 1989 and James 2007.
- 9. The buildings in MCS, 8 are the Chartres nave and narthex, the Saint-Denis narthex and choir, Soissons, la Sainte-Chapelle, Reims and Paris choirs, and the choirs of Laon, Sens, and Noyon. In addition, though not in that draft, I have created timetables for a further fortyfive buildings.
- The Corpus Vitrearum Recensement dated clerestory windows in the choir to 1210–25; and the surrounding stonework was completed 1226 or later (James 1978-79, 495-97n17; summarized without coming to conclusions, Williams 1993, 17).
- The dating analysis is spread over all volumes of *The Ark*, especially in vol. 1, ch. 3, "Methods of Dating" and ch. 4, "Decadic Modes." Analysis is summarized on p. 796–97. The completed list of dates appears in vol. 2, p.1603–07. See also vol. 3, ch. 2, "Dates and Documents," for issues of historiography; chapter 3, "Scholarship;" ch. 4, "Unlocking Assumptions;" and vol. 4, ch. 2,

"Concerning Dates."

- 12. To particularize a few: [1] that a mason may be identified from his template, and that he would not share it (already questioned in MCS, 12, 20); [2] that the development of a mason's style is linear, so that he would not revert to an older manner (questioned in MCS, 6); [3] that a mason would not wholeheartedly take over the design of another (questioned in MCS, 25); [4] that men would not have been told to adapt their designs to suit someone in authority (questioned in MCS, 9); [5] that plagiarizing may have been common (questioned in MCS, 4, 26).
- 13. The issue of working age brings into question a few of the dates initially suggested in *The Ark*, vol. 3. The last work of The Duke was in Châlons in 1145; the earliest was in the Etampes nave that I had proposed for 1090. This is far too long an active life for one man. If Gripple's last job was on the Chartres portals in 1138, could he have been working on Courcelles-sur-Viosne before 1095? His working life would then have been some 45 years, making him over 60 on retirement. Similarly, the last work of the SS Master was in the Saint-Denis choir cornice in 1144, but would he still have been alive if he had carved the Berneuil-sur-Aisne nave in 1090?

A sixty- to seventy-year working life was possible for one man but not likely for many, especially when we consider declining eyesight, lost muscle tone, and the average life span at the time. Therefore, the dates in vol. 3 for Courcelles, Etampes, and Berneuil should be brought forward to after the First Crusade.

- 14. A leading Australian architect, Peter Muller, e-mailed me an almost identical description of masons at work in Bali: "In building the Bali Oberoi in 1973 I commissioned a large statue of Buddha. A group of guys arrived and made up a large rectangular block out of smaller evenly cut blocks. When finished an elderly guy arrived dressed in white and probably a *pedanda* [priest]. He proceeded to smash into the large block with a hand axe and hammer and chisels until the rough proportions and outline of the Buddha became apparent. Next a small team of young guys arrived and started to chisel the rough forms and shapes into fine details until the sculpture was finished."
- 15. Toichological evidence indicates that work at Chartres was paused during the Olive campaign in c.1210, and I presumed this was while decisions were being made about the clerestory that was finally swayed towards the Soissons model (James 1978–79, 2:438; James 1989, 138–41, 198–200).
- 16. After 1180, there are a couple of formals in the Laon transept and nave triforiums and clerestories (illustrated in James 2002–08, 5:36, 2:385–99). Rarely, capitals in towers may be in an older manner than the work underneath, possibly because these teams were specialists and more old-fashioned in their manner (for example, Santeuil and Chamery).
- 17. Earlier writers have dated these buildings through procedures that we would now consider too loose. In the case of the Chars choir, Lefèvre-Pontalis (1901) suggested a date twenty years later because the upper stories were like Notre-Dame in Paris from the assumption that Chars would necessarily be later.
- Similar capitals are found in Saint-Quirace in Provins, which is not very far away and has been dated to this period (Timbert 1998; Maillé 1939).
- 19. And, yet to be published, on Son of the SS Master and the later Rinceau carvers.
- 20. As the bases, plinths, and torus molds are the same across most of the cathedral, Bishop Henry seems to be credited with laying out all the pier bases and the external walls as far as the last bay in the west, and in the east with the walls to at least the windowsills. In the north, this campaign continued to the capitals and vault of the chapel, which was designed for groin vaults. Construction was paused here and had to be covered by a roof to protect the stalls and the Bishop's tomb.
- 21. See discussion in note 13.

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