Chartres cathedral, Notre-Dame

The narthex

The north tower was constructed to c-7 before work began on the south tower. Most of the sculpture for the portal was carved in c-11, for the archivolts in c-13 and the revised tympani in c-14. For the details of this history see the Portal series in /articles.

Dates have estimated by working backwards from the junction from square to octagon at the top of the south tower. It has been assumed that the transition occurred after work paused for the crusade in 1146. There were 20 campaigns, probably seasonal, with a rate of construction of around ten to twelve courses each. On this basis excavation in the north should be dated to $1127\pm$ and in the south to $1134\pm$. This coincided with the documented fire that did not touch the church but may have damaged the Hotel Dieu which was located on the site of the south tower.

The portal is butted against the north tower, but in the south the embrasures and courses above the archivolts are bonded into the tower in c-13 and c-15. This dates the first sculpture to $1137\pm$ and the completion to $1141\pm$. The rare connections between capitals in the towers and work in the portals suggests that the carvers were independent of the building teams.

The interior of the narthex was demolished during a plan to place the organ across the western windows. From the footings it may have been 3 bays by 2 with a wall built over the earlier porch and a chapel in the upper floor.

The church after the 1194 fire

Chartres is the only church with sufficient depth in its analysis to establish the amount constructed in each campaign. Every one has been illustrated in detailed isometrics in *The Contractors of Chartres*. I understand people avoiding such work as altogether the 32 of these drawings took a full year to prepare. Yet it was the only way to determine the sequence of work across such a complex building. They clearly show which parts could be built at the same time and which parts had to be built before others. It took many trips to the cathedral to get the sequence of construction in right order.

Though scholars have illustrated other buildings such as Laon and Meaux in simple isometrics, such schematics give only a conceptual understanding of work achieved in large blocks of time. None provide the detail that a builder would appreciate.

The timetable for Chartres is derived from the toichological evidence published in *The Contractors*, and not from the style of the capitals. There is a real possibility that the cathedral was completed somewhat earlier than earlier documentary analysis had envisioned. Colette Manhes-Delambre's analysis of the Le Breton poem celebrating the completion of the 'great vaults' of Chartres suggests it was penned between 1214 and 1217. I have checked her conclusions against the process of construction and conclude that it would still have been possible to have substantially completed the nave vaults by 1217, though from the complexity of the program, and its size, an even earlier date would have been extremely unlikely.

There are just over 100 courses of stonework from the lowest exposed footings to the roof cornice. In the nave between 1194 and 1217 this works out at an average of 4½ courses per year. When you consider that this was all round the building involving some 2,800 stones in each course or more than 12,000 per campaign, it was a massive achievement.

The dendrochronological analysis of the wooden tie beams over the nave aisle capitals arrived at a date of 1202, that fits exactly the date suggested in *The Contractors* for this level of the work.

There are some 25 courses from the floor to these ties laid over five years. Above that there are a further 64 courses to the cornice laid over the next fifteen. This is five courses per year in the lower work reducing to four in the upper. This is what we should expect as the upper courses were slower to erect since lifting and scaffolding would have taken longer, while the clerestory level was a maze of criss-crossing arches and their supports.

Though the openness of the design reduced the mass of stonework, a lot more care was required to maintain stability as the work rose. Footings for a major building would seldom take less than a year, more if the foundation material was clay or alluvial. Large trenches had to be dug and the water was kept out, and then back-filled with rubble and mortar, possibly with *spolia* from the older work. Only then would the walls begin to rise out of the ground.

The completion of the vaults

In *The Contractors* each campaign was assumed to be across the entire site. There are few masonry links between the two sections of the cathedral and toichological analysis may not help us here, and I could well entertain the possibility that the nave was pushed ahead while the choir was allowed to lapse a bit under its temporary roof. This would have ample time for Scarlet to build the twin flyer arches in the nave and no more before different masters appeared to complete the nave and at the same time to create their own scheme for the choir.

Recasting the possible history of the clerestory zone, Scarlet-V began and probably continued to work on the flyers and rib vaults of the nave from 1213 through to campaign Y. The intermediate campaigns may not have been in the sequence described in *The Contractors*, but it may have been that Scarlet set out and made substantial progress on the nave flyers before anyone started on the campaigns assigned to the choir. His presence in the western rose makes it likely that this team had control of the bulk of the nave construction over a couple of years for the 12 courses from the clerestory capitals to below the nave roses.

Meantime, the complex roofing over the double aisles of the choir could have been given to other teams to complete under their own direction. The bulk of the funds went to the nave and the choir lagged behind. Then Bronze and Cobalt some years later created the very different choir flyers while completing the windows and vaults in the nave.

The design of the large roses in the clerestory supports this proposal, as they are found in many buildings in the Soissonais nearly always associated with the corbels and other details of the Bronze team: suggesting that Bronze was in charge of that level of the nave after Scarlet.

The slowing down of work in the upper choir fits with the poorer economic outlook after 1200 and as conditions continued to worsen and funding was reduced would help explain why the vaults were not completed until the 1250s.

This possibility that the nave could be pushed ahead while the choir lagged somewhat needs to be fully examined and needs a dedicated on-site re-analysis of my earlier observations to resolve.

However, it must be said that this need not change the detailed stage by stage construction of the upper courses of the nave nor the whole of the choir.