Wells Cathedral: The crossing and the central tower. A new hypothesis on the constructional sequence and dating of the central tower

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ABSTRACT: The focus of the present study is the crossing and the central tower of Wells Cathedral. An analysis of the published research show that this portion of the Cathedral has been inadequately treated, and even the two most recent monographs by Sampson and Rodwell add relatively little about the inception, the heightening of the central tower, and the insertion of the strengthening of the crossing. The present study seeks to advance understanding of the monument in two ways: a detailed architectonic survey of the central tower and in-depth analysis of the biographical sources and documentary evidence.

1 INTRODUCTION

The present research is part of a wider study on Wells Cathedral carried out by the Department of Architecture and Civil Engineering of the University of Bath and constitutes a synthesis of the author’s MPhil given at the University of Bath under the supervision of Dr D. D’Ayala and Mr. M. Wilson-Jones.

The decision to investigate the crossing and the central tower of Wells Cathedral in particular arises from the singular, inspirational quality of the Scissor-Arches, and an instinctive need to try to explain their insertion from both a formal and an engineering point of view. The analysis of the bibliographical sources highlights the lack of information on the crossing and the central tower, in contrast with a vivid debate on the remodeling of the east end in the first half of the 14th century. However, an observation by Draper (1981) about the reasons for remodelling the east end, pointed me in the right direction. Draper affirms “the setting out of the eastern extension at Wells was designed to make provision for the shrine of the de Marchia in the bay behind the high altar. His tomb was, in fact, placed in the south transept and is usually dated shortly after the bishop’s death in 1302.” The heightening of the central tower could have been motivated by the desire to create a landmark consonant with a place of Pilgrimage. However, the fact that the lady Chapel was intended partly as a shrine for the holy body of William de Marchia may also suggest a liturgical aspect to the scissor-arches, for they act as a screen separating the laity from the east end. For anyone entering from the west end or the north porch the scissor-arches constitute the main focus of attention, yet, their shape and the presence of the oculi in the triangular spandrels allows visual contact with the east end beyond. In the Salisbury version, by contrast, this visual contact is absent. At Wells, consequently, during the solemn liturgical procession, the laity, who had to stay in the nave, could perceive what was going on in the final stages of the processions in the east end.

Linking the heightening of the central tower with the remodeling campaign of the east end demanded an in-depth analysis of the debate over this section of Wells Cathedral, as well as the execution of a fresh architectonic survey in the attempt to establish a chronological sequence. The results of my survey at Wells point to a revised chronology, one which offers a new reconciliation between the physical and the documentary evidence as well as art-historians considerations.
2 CRITICAL READING OF THE SURVEY OF THE CENTRAL TOWER

Even if the topic of the present research is the crossing and the central tower, the survey regards only the central tower. For the sake of simplifying the analysis, the fabric under investigation is divided into three sections: the first one is delimited inside by the first row of arches and externally by a masonry course at 2.55 m. below the roof top; the second one, inside is formed by the second row of arches, and externally, is bounded upward by the top of a deep recession of 2 feet and 2 inches (65 cm); the third one, from the end of the recession to the top of the roof, i.e. the heightening of the central tower in 1315–22.

Starting from the first section, the external masonry surface presents signs, which are found also on the corresponding internal face, i.e. same masons’ marks and diagonal tooling on the ashlar. These signs are visible on both surfaces because the external surface is mainly under the nave roof. Inside the decorative apparatus presents vertical tooling. As far as the external west surface under the nave roof is concerned, it should be pointed out that the presence of an earlier roof level. In the south-west corner there is a similar moulding to that one, which frames the nave roof. Moreover, the extrados of the nave vault presents traces of a lower level. When it was changed is difficult to establish. However, a possible date could be at the ‘Interdict break’, more probably together with the upper part of the second level of arches at the beginning of the 14th century.

Both the first and the second section present an articulation of the internal wall by piers and arcades. However, the two articulation have different sequence – the first one present 4 bays, the second 3 bays on each side; the decorative apparatus of the first section is simpler than that one of the second one. Nevertheless, the most striking difference is in the conception of the wall. For the first section, it is possible to speak of a mere blind arcade; the second one is a gallery, very similar to that of the triforium.
Figure 5. The second row of arches elevation (left), and plan (right). It is possible to see the difference in the masonry blocks between the lower and upper part.

Figure 6. A portion of the plan at third level: on the left the section at the grids level, on the right the section of the level above the wooden floor.

They can be read as two different answers to the Anglo-Norman research of the articulation of the thick wall. All these considerations highlight the fact that these two sections belong to two different building phases.

The second section has the same depth of the third section; however, its concept is different. Here we are not in presence of two leaves with an empty space between them. As the connection starts at a height of 6 feet and 4 inches (192.5 cm) and is constructed of solid masonry, which runs to the top of this level, it would be better defined as a wall passage.

Moreover, the upper part of the masonry, both external and internal, differs in size in respect to the lower part. Regarding the moulding of the arches, a series of waves interrupted by fillets is present. Morris (1996) in his study on the arch moldings of the relevant flyers at Salisbury Cathedral, finds four types: the double ogee, the sunk chamfer, the wave and the ‘undulating moulding’. He dates the wave moulding not before the beginning of 14th century. If it is correct, than it should be assumed that the decorative apparatus of this part was executed during the raising of the 14th-century portion. Outside, this level corresponds to the recession above the stringcourse. These considerations lead to the conclusion that the upper part of this row of arches belongs to a different and later building phase with respect to the lower part.

At the third level, stair-wells are present in all four corner piers, while, for the two previous levels, the staircase is present only at the southeast corner, even if passages capable of accommodating stairs are present on all four corners at the level of the first row of arches. This absence could be explained with the different conception of the two first parts in respect to the third. The stairs of the third level were thought to be used for inspection and may be maintenance. Their absence at the second level is due to a different function. This level is a sort of internal gallery open towards the crossing. Indeed, it has to be remembered that the present crossing vault is dated at the second half of the 15th century. Moreover, the gallery passage at the second level is similar to the clerestory passage. Probably, its role was not merely decorative, but it could have had a liturgical function.

After analysing the moulding in detail on the third section, it is possible to point out the recurrent presence of what Morris defines an “interrupted double ogee” consisting of “two opposed roll-and-fillet moldings, approximately a double ogee, separated by a fillet.” In Morris, the reference to Wells regards the Lady Chapel. However, the presence of the double interrupted ogee moulding in the external decorative apparatus of the central tower (1315–22) creates a precedent for the Lady Chapel. Moreover, the fact that he dates this kind of moulding in the Decorated period confirms the building date of this part of the central tower. Regarding a possible involvement of William Joy in this part of the building, it could not be excluded, as Morris shows in his study, due to the recurrent connections between the Wells, Salisbury and Exeter cathedrals’ workshops.

Speaking of the outer shell of the central tower, Reid (1973) dates the walling up to c. 1356, when the Abbot in Glastonbury conceded forty loads of stone from the quarries at Douling ad reparacionem magni campanil ecclesie Wells. Harvey (1996) dates the walling up after the fire of 1439 and relates the forty loads of stone to the insertion of what he defines as grids. Draper
Figure 8. The third level in section and elevation. The section drawing enhances the peculiarity of the structure: two shells divided by an empty space and connected every 7 blocks by a transversal one. The elevation shows signs of a precedent roof system.

(1981) judges that the forty loads of stone would have been used for the insertion of the scissor-arches. Consequently he postpones their construction from 1338 to 1356.

Going back to the walling up, by stylistic consideration the quatrefoil circle superimposed on a trefoil arch is an element more of the 15th century than the 14th and surely not datable as early as 1356. Moreover, the grids and the walling up are strictly connected and this shows that they have been built contemporaneously. These observations, derived from the architectonic survey, together with the example of Exeter Cathedral and the proved fact of the interconnections between Exeter and Wells Cathedral, constitute sufficient evidence that the walling-up was executed after the fire of 1439. Moreover the homogeneity of the walling-up with the top of the tower further enhances the thesis of dating the structure after the fire of 1439.

Many considerations suggest that the fire of 1439 involved only the top of the tower. Indeed, there is no sign of blackening either inside or outside. This confirms the hypothesis of Sampson that the fire involved only the roof. Moreover, at the upper level of the tower just below the roof there are signs of a previous roof system different from the present that dates from the 15th century. In fact there are evident signs of the walling-up of the holes for the location of the beams and signs of cutting into the wall fabric where the present beams are connected with the masonry. Besides, if the tower had been constructed or considerably repaired after the fire, it would be reasonable to expect some sign of this intervention (for example toothing) where the piers meet the walling-up; yet this is not the case.

At this point it is possible to give a critical reading of a key fact that emerges from the survey of the four external fronts. On all four external fronts, at the level of the last arch just below the roof, the walling perfectly courses with the adjacent piers. As this area was subject to a massive restoration during the beginning of the 20th century, it was not possible to affirm that the toothing belonged to the repair after the fire. However, the fact that this area corresponds inside to the old level of the roofing provides sufficient proof to the hypothesis that this area was altered after the fire.

Moreover, inside in the portion above the corbel, the stone blocks present a chromatic variation towards the red. The high temperature due to the fire could have caused such variation. Furthermore, as only the top of the tower was altered after the fire, it is perfectly congruent that the walling-up was executed after 1439 and consequently that only the top is perfectly toothed with the pillars. As for the lateral shaft, its insertion clearly follows the alteration of the fabric after the fire of 1439. It is supported by the pier but not connected to it; instead it is partly superimposed over the adjacent wave moulding and, stylistically, contrasts with the simpler mouldings of the piers. If we mentally suppress it the sequence become a wave and a fluting bead moulding. This kind of moulding may be found in the scissor-arches, (Morris 1996).

The alteration of the upper part of these piers, after the fire of 1439 is confirmed by the fact that the original mouldings of the piers end at the spring of the arches. From here to the top of the roof, the masonry
looses its regularity and the blocks of stone are smaller and less regular than those of the piers. This part is composed in total by 6 courses of stone blocks. The first three are higher than the others. Between the third and fifth course there are the putlog holes. At present they support no beam. The last course presents a cavetto moulding. It constitutes a frame at the connection between the masonry and the roof. Regarding this element Harvey (1996) gives an explanation, which perfectly matches with the fact that this part was built after the fire of 1439. Indeed, he shows that this course was built with stone blocks of the old parapet, the design of which is a peculiar characteristic introduced by Thomas of Witney, (Morris 1996).

The previous considerations relating to the walling up and the alterations of the roof indicate that the ‘grids’ were added during or after the walling-up. In fact if they were introduced in 1356 when the window bays between the piers were totally open, they would have been visible from outside and would not have any connection with the double shell wall structure, and so creating incongruence. Moreover, one of Harvey’s arguments in favour of their insertion in 1356 is the fact that they present similar mouldings to those of the scissor-arches. In fact, the architectonic survey shows that their mouldings are similar partly to the piers that bear them, partly to the external piers. Consequently, taking Harvey’s hypothesis to the extreme conclusion, they should belong to the building phase of 1315–22, and that is clearly impossible. Furthermore, the grids present the ‘interrupted ogee moulding’, which was already noted in the description of the external piers.

Finally it is necessary to take into consideration the fact that the decorative apparatus of this part of the tower is more complex outside than inside. Taken together with the fact that during the external survey some marks of whitewash were found, this could indicate that the masonry was intended not to be exposed to weather. The same kind of washes has been found on the central tower of Salisbury Cathedral, indicating a relatively common practice of the Middle Ages. It is uncertain if they belong to the original building or if they constituted a sort of ‘restoration’ work, conducted after the construction of the tower. However, an explanation of the presence of the whitewash could be that in this way the central tower became a sort of landmark, visible from very far. This hypothesis could explain the greater complexity and richness of the external decorative apparatus in respect to the internal one. To sum up it is possible to affirm that the piers belong to the Decorated Period and the walling up is definitely Perpendicular.

In conclusion the analysis of the architectonic survey on the central tower leads to the identification of the following constructional phases: (1) first row of arches; (2) second row of arches till the third course above the annulet; (3) the upper part of the second row of arches; (4) the heightening of the central tower up to the present spring line of the lancets; (5) modification of the crown of the tower, walling-up of the bay and insertion of the grids.

3 CRITICAL READING OF THE BIBLIOGRAPHICAL SOURCES

Both Sampson (1998) and Rodwell (2001) place the construction of the central tower at the end of the third phase (1200–05), before the ‘Interdict Break’. According to the data from the survey this is right as afar as the first section is concerned – i.e. from the extrados of the crossing vault to the top of the first level of arches.

In the preceding section it has already explained that the first section and the lower part of the second section present both the wall blocks tooled in diagonally, while all the shafts moulding have a vertical tooling. As the diagonally tooling is generally dated before the ‘break’ and the vertical one after, it is very probable that the decorative apparatus was finished after the ‘break’.

However, these two sections differ also stylistically. It has already been established that the upper part of the second level of arches belongs to a different building phase. Nevertheless, even the first section differs from the lower part of the second section. The main difference is constituted by the evident fact that the first section has four bays per side. Moreover, it has already pointed out that the nave roof started initially at a lower level. It is possible that after the ‘break’ the elevation of the central tower was altered and probably not totally finished. The upper part of the second row of arches level could have been built at the beginning of the 14th
century, at the start of the heightening of the central tower. The further discrepancy between the lower part and upper part of the second row of arches level can be explained with the damage due to the earthquake in 1248. The construction of the upper part of the second level of arches increased the total height of the central tower. These two facts, i.e. the earthquake and the increasing of the tower height, can explain the change of the level of the nave roof, because it belongs to the same building phase of the upper part of second level of arches.

To sum up, the first level of arches is dated 1200–05; the lower part of the second level of arches and the decorative apparatus of the first level of arches is dated after the mid-nave break; the upper part of the second level of arches has to be dated at the beginning of the 14th century just before the heightening of the central tower.

After the death of Bishop Jocelin in 1243, work on the cathedral came to a stop until 1286, when the construction of the Chapter House begins. Evidently its construction, finished in 1306, took precedence in respect of the completion of the tower for practical reason, and probably funds did not permit both the constructions to be undertaken at the same time. Moreover, stylistic analysis on the upper part of the second level of arches dates this part at the beginning of the 14th century, in sympathy with these considerations, even if all the scholars agree in attributing these first two sections to its inception in the first decade of the 13th century.

The heightening of the central tower was carried between 1315–22. Harvey (1996) suggests the name of Thomas of Witney as a possible master mason for the heightening of the central tower. The study of Morris (1991) on the involvement of Thomas of Witney at Exeter, Winchester and Wells, based on stylistic analysis, gives further evidence in this direction. He isolates some specific mouldings used by Witney at Exeter Cathedral, such as the wave, the undulating moulding and the use of the ogee moulding. All these kind of mouldings are present on the external fronts of the central tower. However, Thomas of Witney is more famous as a structural and architectural specialist, (Morris 1991), and these decorative details could have been the production of the masons of his workshop.

All the scholars agree that the central tower was transformed between the 1315 and 1322 and this caused the sinking of the western piers. Only recently, Sampson (1998) has pointed out that “settlement was occurring at the time of the first building, not just in the 1330 . . .”. In a documentary statement of 19 May 1338 the church is described as inordinately fractured and greatly deformed, by the Chapter, [R.i., 201 (Cal. I, 239)].

Moreover Sampson (1998), speaking of the east nave, has pointed out that “Colchester . . . observed the way in which the six eastern nave piers on the south side all lean away from the crossing, whereas those to the west of the mid-nave break are vertical. In the triforium, from the third bay west to the break, extra relieving arches have been built in the rere-arches of the opening.”

Consequently the insertion of the scissor-arches was due to the subsidence, the wind-pressure and the fact that the crossing probably with a spire increased the instability of this part of the structure. The added load due to the heightening of the central tower increased a problem already present, but it was not the main cause of the threatening collapse. Some kind of reinforcement was inserted, i.e. “moulded orders inserted within the arches next to the crossing in the easternmost arches of the nave and the innermost arches of each transept on the west side”, (Harvey 1996).

Harvey has noted that these mouldings are similar to those of the Lady Chapel, and dates the insertion of these elements just after the completion of the heightening of the central tower, i.e. by c. 1325. Moreover, in another paper on the state of conservation of Wells cathedral, he and Colchester (1981) note that “between the vaults and the roof, above each pier, is a projecting block of toothed masonry for abutment.” They explain these elements as the start of temporary stone flying buttresses, which were never built. Similar flying buttresses were introduced “at the north-west and south-west corners of the crossing from the clerestory to main arcade of nave and transept”, (Harvey and Colchester 1981). In fact, both the mouldings and the flying buttresses have to be read as a first attempt to solve the problem of instability at the crossing, consequently dating them after the statement of 1338. This means that the scissor-arches were inserted in a second time when these first remedies failed to prevent the collapse of the tower.

Historians agree that the insertion of the scissor-arches started ca. 1338. Only Draper (1981) raises some doubts on this date, and analysis of the complex structure of the scissor-arches, indeed makes it very difficult to agree with the 1338 dating. As Draper has pointed out hyperbole is frequent in the medieval documents. Consequently the statement “at
the Chapter meeting of 19 May 1338 as *enormiter confacta and confacta et enormiter deformata*” cannot be taken as a certain date. Moreover, it cannot be forgotten that before the insertion of the scissor-arches the flying buttresses named above were introduced. All these considerations with the addition of the problem of the Black Death spread all over Europe in 1347, suggest the possible conclusion that the scissor-arches were built later. Harvey (1996) agrees with these observations, but the analysis of the mouldings convinced him that the scissor-arches could not have been constructed after the 1340s. However, the study of Morris (1996) on this topic regarding the scissor-arches of Salisbury Cathedral shows that this consideration is not valid. A possible starting date can be 1356 when the Abbot in Glastonbury conceded forty loads of stone from the quarries at Doulting “*ad reparacionem magni campanili ecclesie Well*”, (Draper 1981). Harvey (1996) has always related this with the construction of the ‘grids’. The architectonic survey has shown that these elements have been built later, together with the walling up of the window bays of tower. Consequently, Draper (1981) is right when he relates this document to the construction of the scissor-arches.

Regarding the scissor-arches it is necessary to understand their architectonic and structural role, even if this part was not included in the survey. From the architectonic point of view, they can be regarded as flying buttresses. In fact, each scissor-arches consists of two great pointed arches, which are connected by the respective vertices. However, it is sufficient to divide them along a vertical axis instead of a horizontal one. In this way we obtain a sinusoidal curve. Moreover, if we isolate the crossing piers from their more complex context, it can be easily understood that the formal solution could be a sort of flying buttresses applied from inside instead of the outside. As far as the formal definition is concerned, there are a lot of examples in the supports of the windows and openings of most Gothic buildings of the period, i.e. Gloucester Cathedral, Salisbury Cathedral, Exeter Cathedral, etc. Moreover, from the 1230s, the use of the scissor bracing in roof carpentry became common, (Fletcher 1976).

From the structural point of view, the suggestion that the added weight of the tower was not the main cause of the distress of the crossing and the consequent insertion of the scissor-arches may none the less remain valid, as the main factor of instability of the crossing was due to subsidence and it occurred just after the building of the crossing and the first east bay of the nave, (Sampson 1998).

However, it is possible to give another explanation. The architectonic survey executed on the external and internal fronts of the central tower shows a very interesting fact. The deviation from the plumb line is minimum 5–6 cm outside and 1–2 cm inside. The difference between inside and outside could be caused by the diffuse erosion of the external stone blocks. This fact can constitute a verification of the theory already exposed that the distress of the crossing was present at its inception and not because of the heightening of the central tower. The added load of the central tower increased the instability of the two piers of the crossing. The fact that the east nave was leaning was a consequence of the instability of the crossing. The first attempt after the heightening of the central tower was the introduction of the flying buttresses at clerestory level. However, the problem was more complex because the piers needed to be braced in all three directions, to counteract the thrust toward south and north-west. The solution was partly already experimented at Salisbury. Morris (1996), in his study on the scissor-arches of Salisbury Cathedral has proved that they are earlier than to those of Wells, dating them c. 1320–30. Consequently they become the prototype for those of Wells cathedral. Moreover he explains the apparent discrepancy of the more complex moulding system of Salisbury strainer arches by differences in the economic resources of the two cathedrals. However this cannot be the only explanation. In fact, the Wells scissor-arches have a more complex architectonic structure. The addition of complex moulding would be a disturbing element in the whole balance and harmony of the structure. Indeed the peculiarity of Wells scissor-arches is constituted by their solution to a complexity of formal architectonic and structural problems in a compromised context. The solution was necessarily different from other similar cases, and it is its peculiarity that encouraged the necessary experimentation to answer the problem with a unity of purpose.

4 CONCLUSION

The findings emerged from the critical reading of the architectonic survey and their comparison with analysis of the documentary and bibliographical sources invite a new proposal for dating the construcional sequence relating to the central tower of Wells Cathedral. To summarize there are 8 building phases of the tower: Phase 1 – 1200–05, corresponding to the present first row of arches level, probably without the decorative apparatus; Phase 2 – after the mid-nave break c. 1219, second level, corresponding to the present lower part of the second row of arches. In this period the decorative apparatus was carried out to the third block above the ring of the annulet shaft; Phase 3 – beginning of the 14th century, upper part of the second row of arches level, to present stringcourse, which divides it from the grids level; Phase 4 – 1315–22, heightening of the central tower, with probably a spire;
Phase 5 – after 1338, insertion of the flying buttresses at the clerestory level; Phase 6 – from 1356 onwards, insertion of the scissor-arches; Phase 7 – after the fire of 1439, walling up, insertion of the grids and transformation of the upper part of the tower and roof; Phase 8 – c. 1475 onwards, construction of the present fan vault above the crossing by William Smyth.

The solution at Wells has to be read in the context of the complex transformation of the eastern end, i.e. the crossing, the central tower, the quire, the presbytery and the Lady Chapel. The aim behind this transformation was the attempt to canonize William de Marchia and transform Wells Cathedral into a place of pilgrimage. The construction of the West Front in the 13th century totally hid from the sight the first stage of the central tower. Even the building of the second row of arches did not modify the predominant presence of the façade. The heightening of the central tower aspired to make it a landmark, visible from faraway. From this the possibility that the external fronts were covered with whitewash assumes an outstanding significance. However, the canons did not succeed in obtaining the canonization of William de Marchia, and the petition was abandoned after the 1329. Nevertheless, the building project was carried on with the completion of the eastern arm. The insertion of the scissor-arches can be read as part of the project. Draper has pointed out that "at Wells in the 13th century, the transept were shut off from the laity by the pulpitum on the west side of the crossing because the stalls extended beneath the crossing and the north transept was used as the chapter house." Taking this into account, with the additional fact that the eastern end was intended to be the shrine of the de Marchia, the scissor-arches may also have assumed the role of a screen, which separated the canons from the laity. They in effect acted as a sort of visual and physical frame between the two parts of the cathedral. Moreover, their presence, especially that of the west scissor-arch, counterbalances the horizontal emphasis of the decorative apparatus of the nave. Thus they are the perfect answer to a compromised situation, in which the pre-existent part had to be altered the least, and the new insertion had to harmonise with the rest. Despite the contribution of no less than twelve generations of master masons, Wells Cathedral maintains a unique and impressive coherence.

REFERENCES


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