

From the *Transactions* of the  
Bristol and Gloucestershire Archaeological Society

**Reading the Stones: archaeological recording at Gloucester  
cathedral.**

by Carolyn Heighway  
2008, Vol. 126, 11-30

© The Society and the Author(s)

## Reading the Stones: archaeological recording at Gloucester cathedral

By CAROLYN HEIGHWAY

*Presidential Address delivered at Newman Hall, Westbury-on-Trym, 29 March 2008*

The ridicule which formerly attached to the pursuits of Antiquaries, no longer exists ... a proper view of their importance is entertained, and their connexion with history forms now the primary...object of their application.<sup>1</sup>

The British Archaeological Association congress at Gloucester in 1846 was significant because it promoted interest in the history and archaeology of the cathedral at a moment when the building was in dire need of sympathetic repair and restoration.<sup>2</sup> The chairman's opening address recognised the importance of studying buildings. Nevertheless, it was to be another 140 years before the Cathedrals Measure established as a legal principle that the fabric of any cathedral should be recorded before being altered or replaced. Yet the building is a document, and like a medieval document needs to be copied and preserved. For Gloucester cathedral these documents in stone are all the more important because the medieval building accounts do not survive. All we have is a few chance mentions in chronicles,<sup>3</sup> and Abbot Frocester's *Historia*. Written c.1400, this is a sparse summary of the events of the reign of each abbot including the building which each achieved<sup>4</sup> – an account which has been described as 'suspiciously tidy'.<sup>5</sup>

Gloucester cathedral most commendably appointed a consultant archaeologist in 1983 – some years before such appointments became mandatory. However, the assumption then was that archaeology involved holes in the ground: buildings were the province of the architect alone. Nowadays the cathedral archaeologist is concerned with the whole of the precinct and its buildings

1. T.J. Pettigrew, opening address, in *Transactions of the British Archaeological Association at its 3rd Annual Congress held at Gloucester 1846* (London, 1848). In the following notes references to the Gloucester Cathedral Archaeological Archive are designated GCAR: titles with an asterisk are available on the website of the Bristol and Gloucestershire Archaeological Society (bgas.org.uk).
2. Evidenced by the survey of the fabric a few years later: see C. Heighway, 'Gloucester Cathedral in 1855: the First Ever Quinquennial', in *Archives & Local History in Bristol & Gloucestershire: Essays in Honour of David Smith*, ed. J. Bettey (BGAS, 2007), 198–221. I am grateful to Arthur Price for pointing out the significance of the visit to Gloucester of the British Archaeological Association, whose delegates included influential antiquaries and architects.
3. See M. Hare's summary in C. Heighway, 'Gloucester Cathedral and Precinct: an archaeological assessment' (3rd edition, 2003)\*, 27.
4. *Historia et Cartularium Monasterii Sancti Petri Gloucestriae*, ed. W.H. Hart (Rolls Series 1863–87): referred to in this article using the translation by W. Barber published as appendix XV of D. Welander, *History, Art and Architecture of Gloucester Cathedral* (1991), 597–639.
5. Richard K. Morris, 'Master Masons at Gloucester Cathedral in the 14th century', *Friends of Gloucester Cathedral Annual Report* (2003), 10–17.

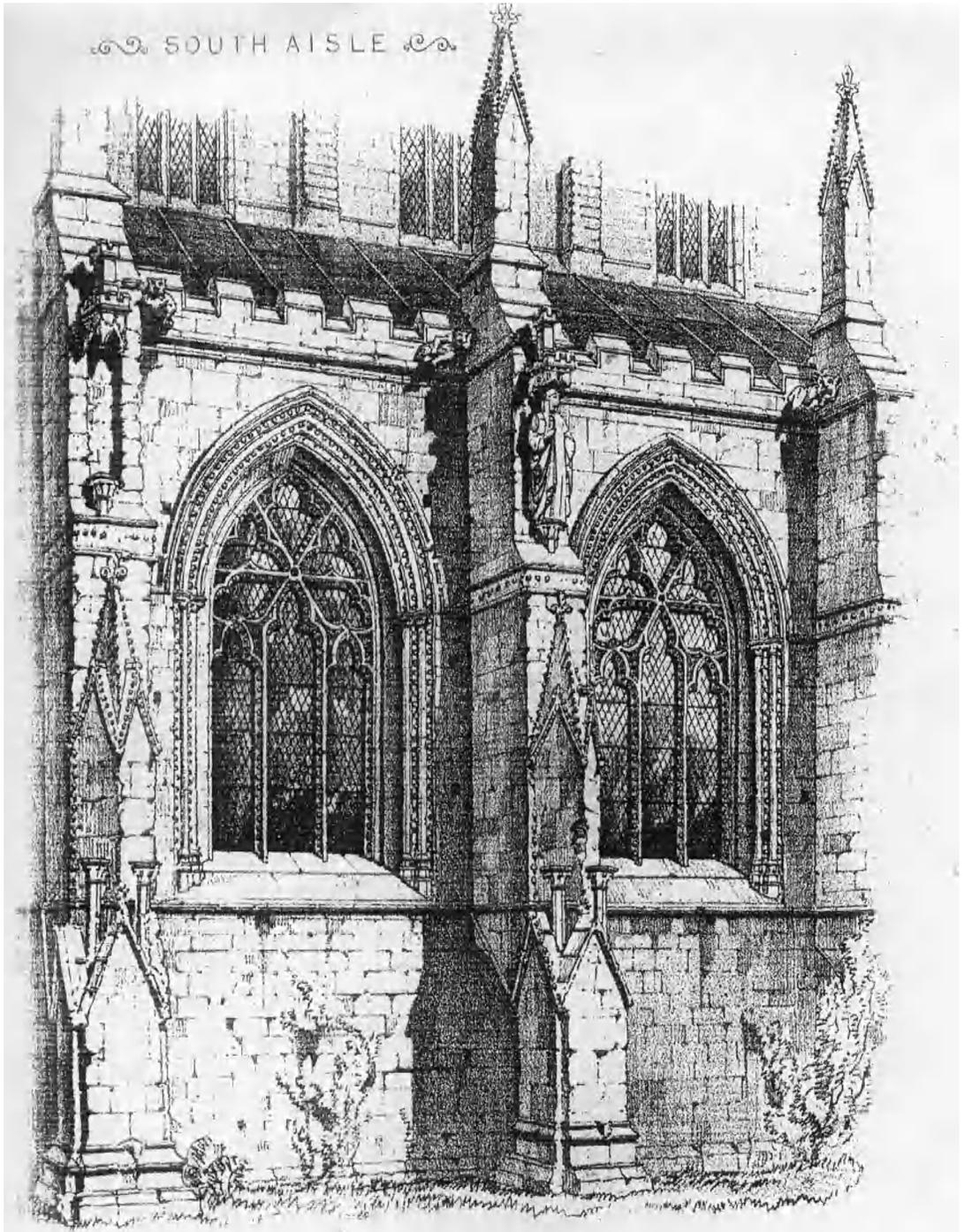


Fig. 1. Drawing of two bays of the south aisle by F.S. Waller, published as illustration 19 in his *General Architectural Description of the Cathedral Church formerly the Abbey Church of St Peter at Gloucester* (1856).

both above and below ground. I intend today to discuss only the cathedral church, but I would emphasise that the cathedral precinct not only comprises a huge slice of Gloucester's buried past, but also contains an outstanding group of medieval buildings, most of which have never been studied.<sup>6</sup>

In the 19th century, though some antiquarians were pressing for proper attention to be paid to the evidence of the building fabric, study depended on the cathedral architect or surveyor. Fortunately, Frederick Sandham Waller, architect to the dean and chapter from the 1850s, had a profound understanding of the development of the former abbey church, and also published and illustrated his work.<sup>7</sup> Waller's initial task on appointment was a survey of the cathedral fabric.<sup>8</sup> Waller's son Frederick William Waller, also cathedral architect, continued in similar vein, publishing for instance an analysis of the cathedral tower.<sup>9</sup> However his successor, his son Noel Huxley Waller, had different interests, being an engineer and soldier rather than an architect.

Study and record re-emerged with Bernard Ashwell, cathedral architect from 1960 to 1985, whose architectural practice, Astam Design, descended from that of the Wallers. Some drastic repairs were called for in Ashwell's time, such as the replacement of the medieval roofs. Ashwell made meticulous drawings of these before they were dismantled.<sup>10</sup> Furthermore, charged with repairs to the south transept, he undertook a detailed survey, which showed how the 14th-century builders had adapted the Romanesque structure, re-using architecturally the details of the buildings they were demolishing.<sup>11</sup>

Though much admired, the suggestion that such detailed recording should be standard procedure was met by the cathedral authorities with utter horror. This was not surprising: in those days each stone had to be measured by hand and in a building of great size and complexity such drawings were prohibitively expensive. However, English Heritage grants for work on cathedrals soon carried conditions that recording be done, and in 1991 the Cathedrals Measure made prior recording a requirement of all repairs. Photogrammetric technology was advancing fast, and in 1994 an English Heritage grant paid for a survey by W.S. Atkins of most of the outside of the cathedral; further surveys have been done since. There were now accurate drawings on which to base a record. In 2002 an electronic plan survey of the cathedral church was created by Cartographical Survey Ltd of Worcester on four levels (crypt, ground, gallery and roofs) – another vital element in the data now available.

6. Summarised in Heighway, 'Gloucester Cathedral and Precinct'. The most recent survey is R.K. Morris, 'Gloucester Cathedral: Rapid building survey of the Cathedral Precincts' (Mercian Heritage Series **146**, December 2001), commissioned as part of the cathedral's conservation plan. However, this does not include drawings. Bernard Ashwell, the former cathedral architect had an extensive file of notes which I cannot find in the cathedral archive but which may yet come to light. Some of his work is in my file of notes in the cathedral archaeological archive called 'Gloucester Cathedral Precinct Buildings'. Some buildings, including the Parliament Room, have been studied in a York University D.Phil. thesis: Rochelle Rowell, 'The Archaeology of Monastic Hospitality' (2000).
7. F.S. Waller's principal works are: *Gloucester Cathedral; notes and sketches for visitors* (1882); *General Architectural Description of the Cathedral Church formerly the Abbey Church of St Peter at Gloucester* (London, 1856); *Notes and Sketches of Gloucester Cathedral* (Gloucester, 1890).
8. Transcribed in Heighway, 'Gloucester Cathedral in 1855'.
9. F.W. Waller, 'Gloucester Cathedral Tower'; *Trans. BGAS* **34** (1911), 175–94.
10. B.J. Ashwell, 'Chronicle of the Works of Repair' (MS in cathedral library). The drawings enabled experts to date the roof: C Heighway, 'Archaeology of Gloucester Cathedral', in *The Archaeology of Cathedrals*, ed. T. Tatton-Brown and J. Munby (Oxford, 1996), 77.
11. B.J. Ashwell, 'Gloucester Cathedral; the south transept; a 14th-century conservation project', *Antiq. Jnl.* **65** (1985), 112–20.

Today, a brief provided by the consultant archaeologist specifies that records be made of stone types, masons' marks, re-used worked stone, and any other details which betray the history of the building. A very important contributor to the archaeology of the cathedral has been Steve Bagshaw who carried out archaeological recording work from 1999 to 2005. But the most important observers and record makers are the masons themselves: the master mason, Pascal Mychalysin, with his knowledge of stone types and medieval techniques, makes records of fabric before conservation, and the team of masons is both knowledgeable and observant and keeps a photographic record.<sup>12</sup>

### THE DEVELOPMENT OF THE ABBEY CHURCH: A SUMMARY

The church of St Peter originated with the minster founded 679 by Osric, prince of the kingdom of the Hwicce. It had a continuous existence throughout the Anglo-Saxon period and was rebuilt, or refurbished, in 1058. The site of the old minster is uncertain.<sup>13</sup> Beginning in 1089, the church was rebuilt anew by Serlo, the first Norman abbot, and it was dedicated, unfinished, in 1100.<sup>14</sup>

The ground plan of Serlo's church has survived almost complete, though the elevations create the impression of an entirely Gothic structure.<sup>15</sup> This is well demonstrated in F.S. Waller's drawing showing 14th-century and later work removed.<sup>16</sup> The eastern arm was composed of three storeys, crypt, apsidal choir, and gallery. At the dedication in 1100 the east end, crossing, and transepts were probably complete. The nave was continued in the early 12th century, terminating with western towers. Of work in the 13th century only the nave roof, rebuilt by 1242, survives.<sup>17</sup> A 13th-century spire and Lady Chapel have left no trace.

The transformation of the church to a Gothic structure could be said to begin in 1318 with the construction of the south aisle (Fig. 1).<sup>18</sup> The new façade had large windows and flying buttresses decorated in the latest local fashion of ballflower ornament.<sup>19</sup>

12. At present kept in the site manager's office, Pitt Street; its catalogue is appendix 5 of the cathedral archaeological archive.
13. It may have been south of the Norman church, or in the area of the present cloister. The evidence for the Anglo-Saxon minster is considered by M. Hare, *The Two Anglo-Saxon Minsters of Gloucester* (Deerhurst Lecture, 1992) and summarised in C. Heighway, 'Gloucester Cathedral and Precinct.'
14. Welander, *History, Art and Architecture*, 22–51.
15. Waller worked out the basic elements of the church development: see also C. Wilson, 'The origins of the perpendicular style and its development to c.1360' (London University Ph.D. thesis, 1980); idem, 'Serlo's church at Gloucester 1089–1100', in *Medieval Art and Architecture at Gloucester and Tewkesbury*, ed. S. Heslop and V. Sekules (British Archaeol. Assoc., 1985), 52–83; an overview of the structural history is to be found in Welander, *History, Art and Architecture*, passim.
16. Waller, *Notes and Sketches of Gloucester Cathedral* (1890), plate 4: reprinted in Welander *History, Art and Architecture*, 39.
17. Welander, *History, Art and Architecture*, 615. The south-west tower fell in 1164 and was rebuilt in 1245: M Hare, 'The Chronicle of Gregory of Caerwent: A Preliminary Account', *Glevensis* 27 (1993), 43–4.
18. Welander, *History, Art and Architecture*, 627. Though the outer wall face was rebuilt, the interior retains the Romanesque shafts and is out of plumb. It is likely that subsoil instability caused the outer casing of the wall to move outwards and peel away from the inner one; repairs therefore involved rebuilding the whole of the outer wall, whilst retaining the Romanesque shafts of the interior.
19. R. Morris, 'Ballflower work in Gloucester and its vicinity', in *Medieval Art and Architecture at Gloucester and Tewkesbury*, ed. Heslop and Sekules, 99–115.

The burial of Edward II in 1327 heralded the building of a spectacular royal tomb, the subject of current repairs and research.<sup>20</sup> A consequence of the royal burial was the creation of funds to transform the east end of the church.<sup>21</sup> The first part to be tackled was the south transept in the 1330s. At an odd place to start, since king Edward was buried near the high altar, the work may have been a ‘trial run’ prior to tackling the choir. It certainly involved some ambitious engineering. Externally, the designers drastically thinned down the walls and inserted large windows. Internally, applied mouldings, in the style to be known as ‘Perpendicular’, disguised the Romanesque elevation.<sup>22</sup>

The choir transformation was even more adventurous: it now rose to one third again of its Romanesque height, creating enormous clerestory windows and the even larger great east window, while yet retaining the galleries and most of the ground plan. Finally the north transept was rebuilt. The nave remained the same but for the enlargement of the clerestory windows.<sup>23</sup>

Later modifications were hardly less ambitious. The west end and the south porch were rebuilt during the 15th century.<sup>24</sup> The tower at the crossing was constructed about 1450: another daring project, given the uncertain stability of the foundations. Finally, the Lady Chapel, in soaring Perpendicular, was built around 1500. This was the last architectural addition to the abbey, which was dissolved in 1540.<sup>25</sup>

## DISCOVERIES: THE LAST 25 YEARS

### The Romanesque Church

I am currently working on a re-assessment of the Romanesque evidence making use of previous research<sup>26</sup> and using the new surveys mentioned earlier. So far I have only confirmed discoveries made by others, though I hope in due course to resolve some controversies.

Serlo’s church, shown here in a new plan and draft 3D model (Figs. 2 and 3) was of characteristic Romanesque thick wall construction (up to 1.5 metres – i.e. 5 feet – thick). The crypt remains much as it was built soon after 1089; though due to subsidence it had to be strengthened a decade

20. For some preliminary results, R. Bryant, C. Heighway and G. Bryant, *The Tomb of Edward II: a royal monument in Gloucester Cathedral* (King’s Stanley, 2007).
21. The funding derived either from pilgrim offerings or royal gifts: J. Luxford, *The Art and Architecture of English Benedictine Monasteries, 1300–1540* (Woodbridge, 2005), 157–62.
22. Wilson, ‘Origins of perpendicular style’, 130–4.
23. The transformation of the church is graphically demonstrated in a film called ‘Building Wonders’, made by Available Light for ITV West and available on DVD from the cathedral gift shop.
24. Heighway, ‘Gloucester Cathedral and Precinct,’ 27. The building itself tells us of more than one rebuild phase here. The vaulting in the interior of the west end is of two phases, the first having two equal western bays, the second two unequal ones as we see today. See S. Bagshaw, C. Heighway and A. Price, ‘The South Porch of Gloucester Cathedral: A Study of Nineteenth-century Stone Repair types’, *Jnl. British Archaeol. Assoc.* **157** (2004), 91–114, at 97.
25. Welander, *History, Art and Architecture*, 331.
26. See Wilson, ‘Origins of perpendicular style’ and ‘Serlo’s church at Gloucester’; J.P. McAleer, ‘Some Re-used Romanesque material in the Choir Tribune at Gloucester Cathedral’, *Trans. BGAS* **104** (1986), 157–74; M. Thurlby, ‘The Elevations of the Romanesque Abbey Churches of St Mary at Tewkesbury and St Peter at Gloucester’, in *Medieval Art and Architecture at Gloucester and Tewkesbury*, ed. Heslop and Sekules, 36–51.

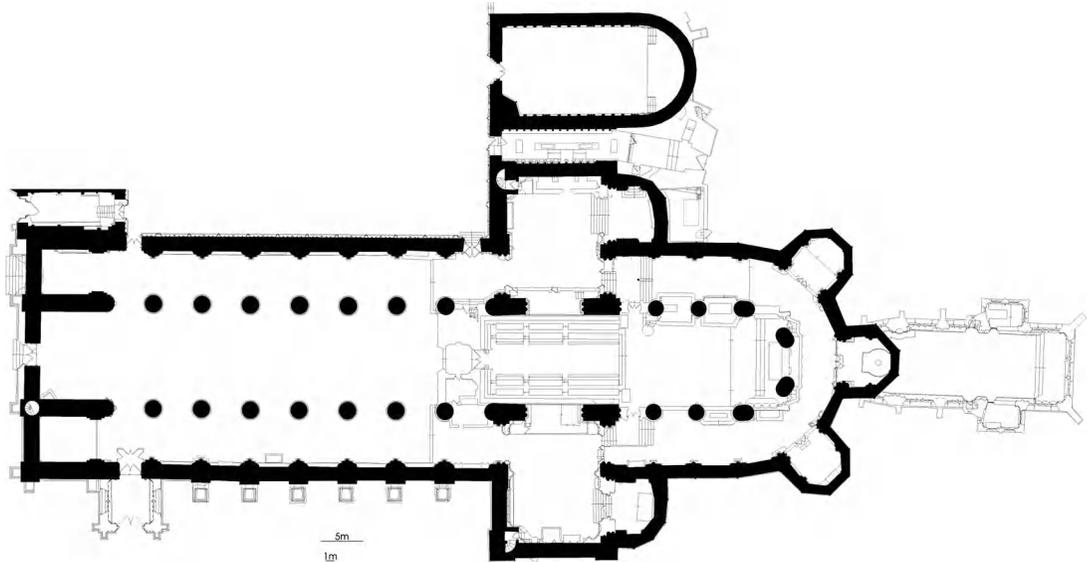


Fig. 2. A plan of Serlo's church by Gemma Bryant based on a survey by Cartographical Surveys Ltd of Worcester.

or so later.<sup>27</sup> The choir above, on the same plan as the crypt, had an arcade of arches both at ground floor and gallery level set on drum columns.<sup>28</sup> Externally, the choir and the east side of the transepts were decorated by blind arcading, of which a fragment survives on the north (Fig. 4). The choir may have had small clerestorey windows,<sup>29</sup> but even so the general impression of the interior of the presbytery would have been gloomy solidity.

27. The reason for this is often adduced to be the 1089 earthquake mentioned in the *Historia*. However, it is unlikely that the building was then far enough advanced to be badly affected. It is more likely that the construction of the superstructure exposed weaknesses in the foundations. It is noticeable that the strengthening, though it involved the thickening of all the piers, was more considerable on the south side: see F.S. Waller, 'On the Crypt of Gloucester Cathedral', *Trans. BGAS* 1 (1876), 147–52. When the crypt was further strengthened in the 14th century to take the new structure, the reinforcement was again greater on the south side. The instability of the south aisle has been attributed to the presence of the Roman ditch; however, the Roman ditch is now known to have run much further east. Wilson notes that the 14th-century south transept alteration included massive integral buttresses: the tower foundations on the south were clearly a cause of concern in the 1330s. It is likely that all this instability was caused by the underlying geology which consists of river sand resting on stiff lias clay (letter from E.J. Wilson and Associates, Consulting Engineering Geologists, 8 Nov. 1997, and borehole survey by Geotechnical Engineering Ltd).

28. The four eastern piers were elongated, enabling the builders to install arcade arches of large and similar size: the pier bases were recorded when Scott's reredos was put in 1867. Welander, *History, Art and Architecture*, 178.

29. Malcolm Thurlby considers that there was a barrel vault with no room for clerestorey windows: 'Elevations of Romanesque Abbey Churches at Tewkesbury and Gloucester', 36–51. Wilson originally suggested the clerestorey windows were very small and fitted inside the arcading ('Origins of perpendicular style', 129) but later modified his view to larger windows ('Serlo's church at Gloucester', 71).

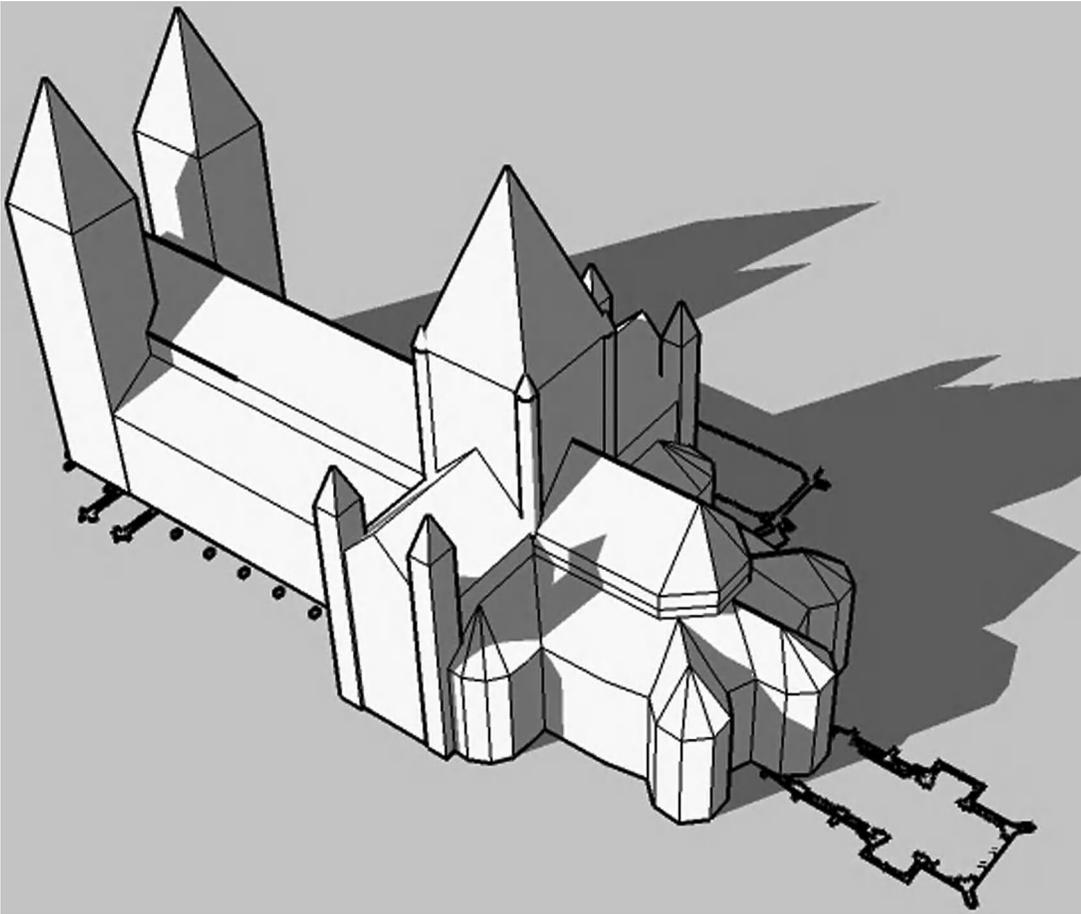


Fig. 3. Model of Serlo's church constructed in Sketchup by Gemma Bryant using dimensions from new surveys. A reconstruction by C. Wilson is reproduced in D. Welander, *History, Art and Architecture of Gloucester Cathedral* (1991), 75.

The crossing tower had a round turret at each corner.<sup>30</sup> The base of one of these can still be seen (Fig. 4) and the remains of two more are visible in the nave roof space (Fig. 5). The tower may have been decorated with blind arcading, like that at Tewkesbury.<sup>31</sup>

The nave, built after 1100, of course survives and the aisles also retain their Romanesque plan and elevation; the Romanesque appearance can be reconstructed.<sup>32</sup> There were two towers at the west end.<sup>33</sup>

30. Waller included only one turret on his drawing: Wilson ('Serlo's church at Gloucester', 52) deliberately omitted them.

31. R.K. Morris and R. Shoesmith (eds.), *Tewkesbury Abbey, History Art and Architecture* (2003), 78.

32. Wilson, 'Origins of Perpendicular style', reproduced in Welander, *History, Art and Architecture*, 66.

33. Similar to the original intention at Tewkesbury, where the towers, though never built, are indicated by the thick wall construction that was to support them. The point is discussed in Welander, *History, Art and Architecture*, 69–74.

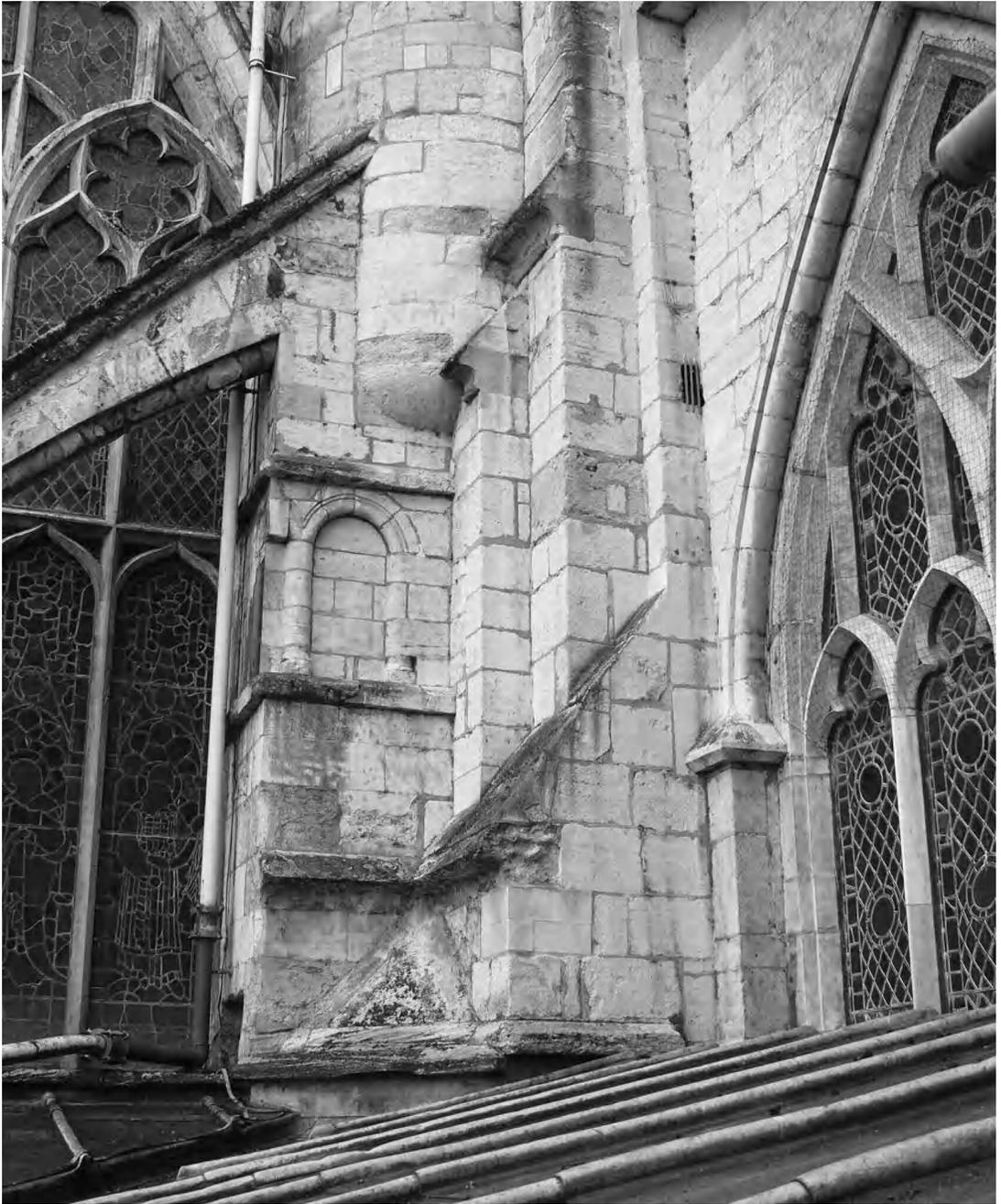


Fig. 4. The remains of a bay of blind arcading, and the lower part of the Romanesque turret, on the north side of the choir (photograph by C. Heighway).

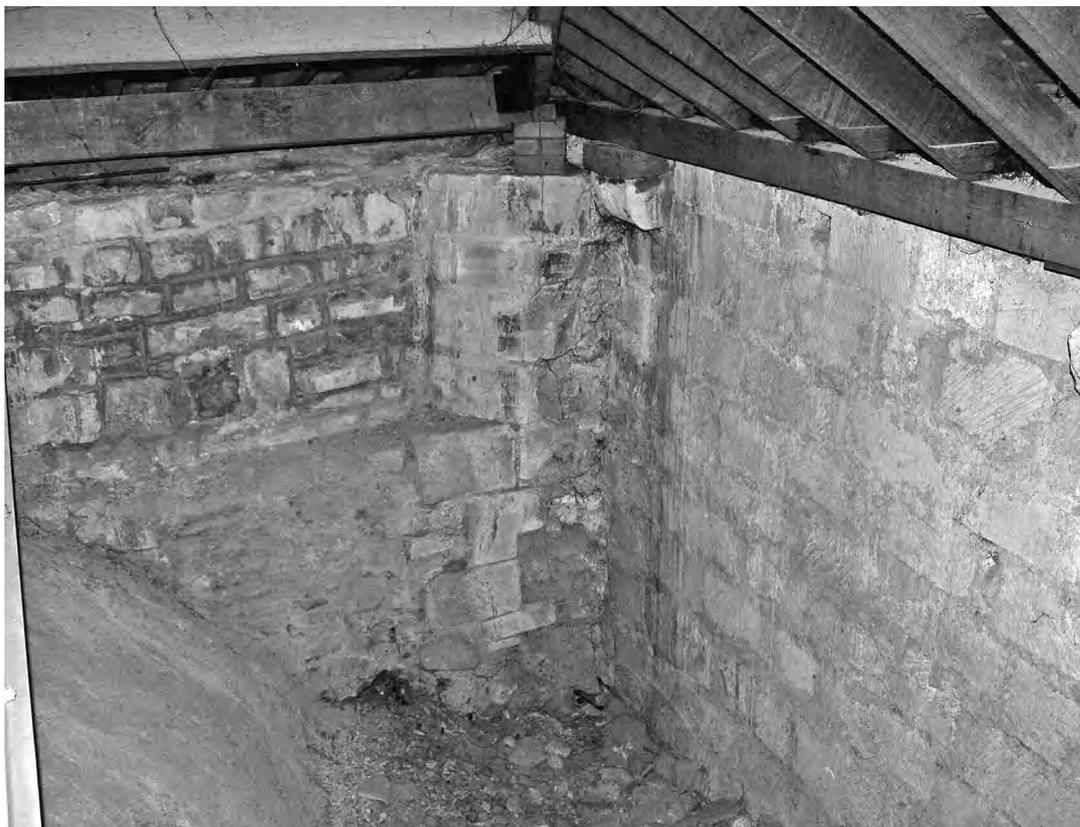


Fig. 5. The remains of one of the Romanesque turrets in the nave roof space at the east end (photograph by C. Heighway).

The south ambulatory was repaired in 2000 giving the usual opportunities for record. F.S. Waller's drawing of the corresponding north-eastern chapel shows how the 14th-century adaptations were made (Fig. 6) and Bagshaw's analysis of the ambulatory adds detail,<sup>34</sup> the south-eastern chapel being adapted in the same way. The walls of the chapels and ambulatories were raised and the roof lowered (to give more room for clerestory windows); the windows were enlarged and new tracery inserted.

The ballflower window on both gallery chapels rises up into the 14th-century heightening. Ballflower ornament was a fashion that went out of use locally in the 1330s: its use in this position must be evidence that, even as the London master of the south transept (probably Thomas of Canterbury<sup>35</sup>) was beginning his work, the chapels were having their walls raised and their decoration refurbished by local masons, presumably under separate contract.

Evidence for the original windows came from excavation in 1992, which discovered voussoirs inside a 14th-century reredos in the south-east chapel. These were very simple, with a plain roll

34. GEAR 00/F: S Bagshaw, 'Archaeological Recording at the south-east end of Gloucester Cathedral 2000\*', fig. 1.

35. As both Wilson (*Origins of perpendicular style*, 121–7) and Morris (*'Master Masons'*, 12) suggest.

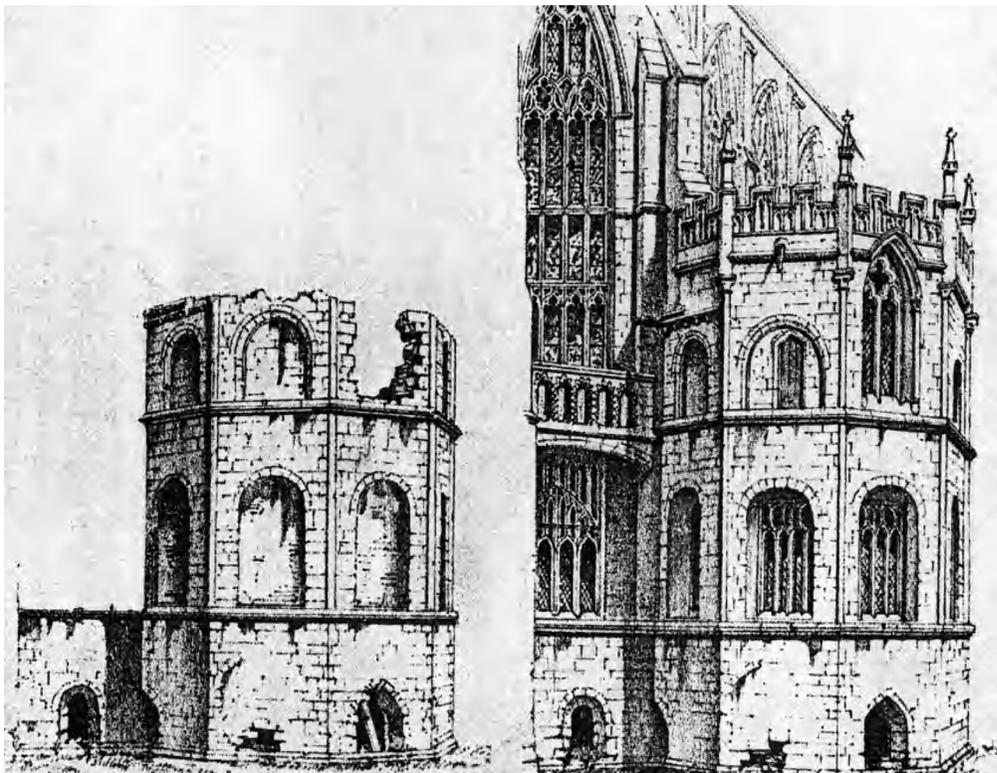


Fig. 6. Drawing of the north-eastern chapel by F.S. Waller, published as illustration 13 in his *General Architectural Description of the Cathedral Church...at Gloucester* (1856).

all round: they were decorated with an ashlar pattern painted in red paint over whitewash.<sup>36</sup> The excavation also uncovered evidence for the bench around the chapel walls. As built in the 12th century, all the chapels had surround seating.

Repairs to the south transept in 2002 revealed that the two upper stages of its turrets (Fig. 7) are additions of the 12th century.<sup>37</sup> Not only do they use different stone sizes and mortar, they also have chevron decoration re-used in plain walling. These 12th-century upper stages originally had string courses of dark green sandstone. The sandstone was replaced in the 19th century with Bath stone, which in turn had to be replaced in the 1990s.<sup>38</sup>

36. GCAR 92/C: published in C. Heighway 'Excavations and Observations of a Late Medieval Reredos in Gloucester Cathedral', *Glevensis* 27 (1993), 21–5.

37. As Wilson ('Origins of perpendicular style', 128) hypothesised; confirmed in 2002. See GCAR 02/C\*.

38. GCAR 02/C: S. Bagshaw, 'The South Transept of Gloucester Cathedral 2002–3'; *ibid.* 06/F: C. Heighway, 'Gloucester Cathedral N Transept NE Turret Archaeological Recording 2006–7'. Though the contrasting sandstone was a new discovery in the 1990s, the effect had in fact been noticed by F.S. Waller in the late 19th century; the cathedral guide notes 'dark sandstone in some of the upper string courses of the Transept turrets' and adds 'the string-course under the south clerestory of the nave was also partially sandstone': H. Haines and F S Waller, *Guide to Gloucester Cathedral* (3rd edition, 1884), 80. There is no longer evidence for a dark stripe at nave clerestory level.

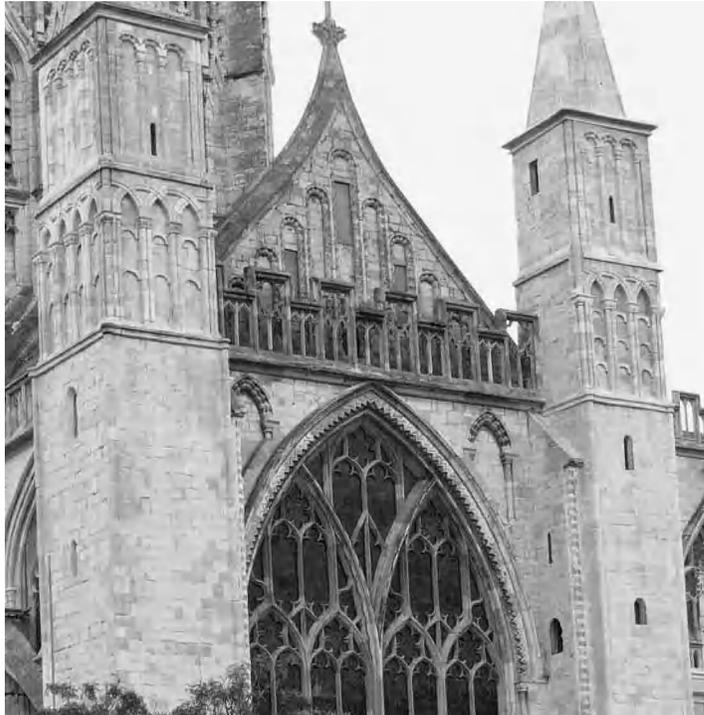


Fig. 7. The south transept (photograph by C. Heighway).

Work on the clerestory produced a different example of the ‘contrasting stones’ phenomenon. Bagshaw noticed, built into the nave walls which were heightened in the 14th century, a number of stones cut with a pattern of recessed circles and displaying Romanesque masons’ marks and tooling (Fig. 8).<sup>39</sup> The pattern can be arranged to fill a gable end. This sort of decoration can be seen on Romanesque churches elsewhere; the circles were originally filled with contrasting stone. It is unclear where the circle patterns were originally positioned, perhaps the west end. Their unweathered nature hints that they were rapidly superseded.

### Re-use of Romanesque Architectural Detail in the 14th-century Rebuilding

The achievement of the 14th-century builders was famously carried out by re-using the Romanesque fabric, not just as stone but in an architectural way. Every repair project exposes new examples of this process. Of course, in much of the 14th-century work stone is recycled by re-cutting. On the south transept, however, the re-use is architectural (Fig. 7). On the new 14th-century south elevation 12th-century chevron is re-used to decorate the window and the edges of the buttresses; the gable was replaced, complete with its Romanesque decoration and steep pitch (though introducing a slight ogee curve).<sup>40</sup> On the west side of the transept Romanesque bases

39. GCAR 01/F: S Bagshaw, ‘The south clerestory of the nave of Gloucester Cathedral: archaeological recording in 2001’\*.

40. The south transept medieval roof was replaced without record in the 19th century; however the north transept roof, which similarly is now pitched much lower than its gable, was late medieval until replaced by steel in 1961–2. It would seem that a Romanesque pitched roof was put back in the 14th century and then rebuilt to a lower pitch a generation later.



Fig. 8. Recessed circles, with Romanesque mason's mark, on a stone re-used in the raising of the nave walls (photograph by C. Heighway).



Fig. 9. The east side of the south transept, showing re-used Romanesque decoration (photograph by C. Heighway).

and capitals were re-used as window jambs.<sup>41</sup> The east elevation (Fig. 9) uses Romanesque chevron and roll-mouldings on the new 14th-century window arch, combined with 14th-century polygonal capitals and a re-used Romanesque beast-head label stop.<sup>42</sup> Some of these imitations of 12th-century work have in turn been recreated by today's masons.

The south choir elevation appears from a distance to be new 14th-century work, but the window jambs are lengths of Romanesque shaft joined together with Romanesque capitals and bases used interchangeably.<sup>43</sup> Even some of the roof-space windows have Romanesque jambs with a window-head new-made to match in the 14th century.<sup>44</sup> And of course plenty of Romanesque detail was made use of as recycled stone. The flying buttresses against the tower are made of soffit rolls from a Romanesque arch and one buttress springs from a massive capital (Fig. 10): these are probably from the Romanesque choir apse.



Fig. 10. Flying buttress formed out of Romanesque soffit rolls, and a re-used Romanesque capital, on the north side of the choir (photograph by C. Heighway).

41. GCAR 2002/C: Bagshaw, ‘The south transept of Gloucester Cathedral 2002–3\*’, fig. 19.

42. Ibid. 99/A and 99/B: Heighway ‘Gloucester Cathedral S transept and S choir elevations 1999\*’.

43. Ibid.

44. GCAR 93/H.



Fig. 11. The north gable of the north transept before restoration in 2007 (photograph by Rita Dawe).



Fig. 12. Lion sculpture at the apex of the north transept gable (photograph by Richard Bryant).

The north transept gable<sup>45</sup> was, like that on the south, rebuilt re-using the Romanesque arcading (Fig. 11); this is executed in an unusual style which the cathedral masons call ‘T-moulding’. The detailed record by the master mason shows how the gable was remade: the arcading is re-used architecture, most ashlar were re-used from the previous gable, and a few stones were cut new. At the top of the gable is a charming lion which may also be re-used Romanesque (Fig. 12).

Because the rebuild was not quite exact, the 14th-century masons sometimes ran out of carvings and had to make new pieces, copying the 12th-century style. Thus one of the 14th-century ‘T-mouldings’ re-used a Romanesque shaft.<sup>46</sup>

45. Ibid. 07/A: Heighway, ‘Gloucester Cathedral North Transept, Phase 2, North Gable’.

46. Ibid.

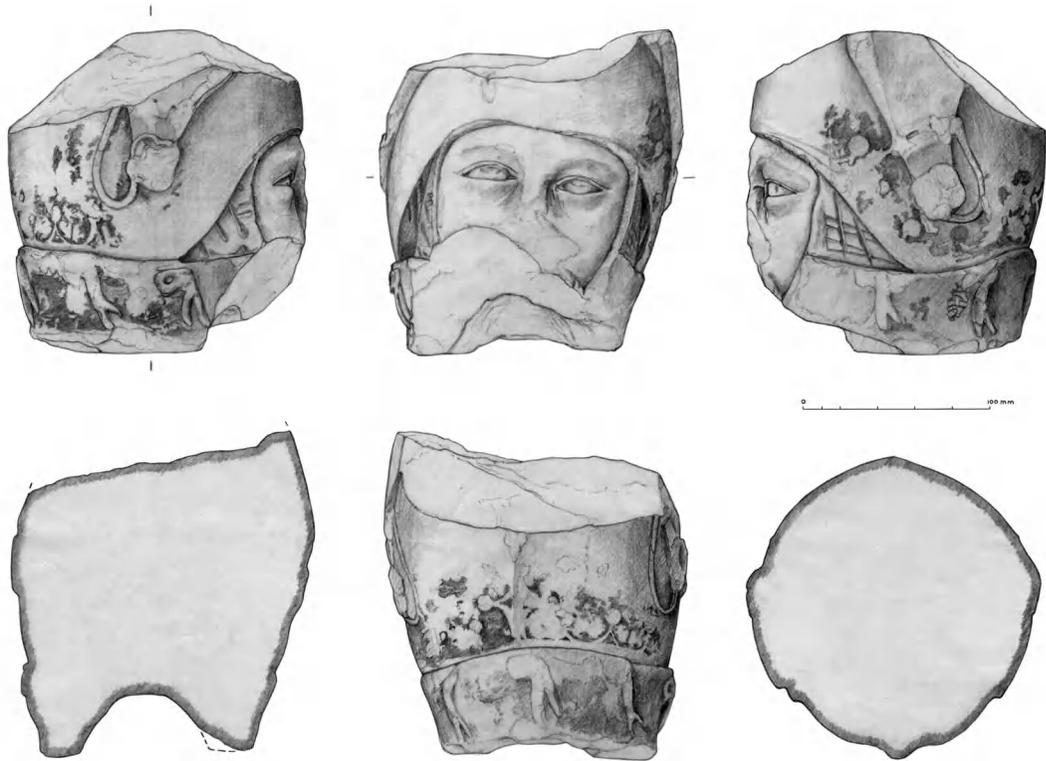


Fig. 13. Mid 15th-century sculpture of a knight's head (drawing by Richard Bryant).

The overall effect, as probably intended,<sup>47</sup> is an extraordinary blend of styles. And, of course, it was economical – to re-use cut stone not only saved the cost of stone but the cost of carving it.<sup>48</sup>

### Other Discoveries

There are almost no early floor coverings surviving in the cathedral; most have long since been destroyed by the relaying of floors. However, work in the tribune gallery in 2001 discovered under 17th-century bricks a mortar floor painted with a geometric pattern in red and white, probably late 13th century.<sup>49</sup>

Survivals of medieval sculpture at Gloucester cathedral are minimal: the few remaining pieces are exceedingly battered. So it was exciting to find, during alterations to the cloister garth in 1996, the mid 15th-century stone head of a knight, wearing armour of the time with every detail beautifully portrayed (Fig. 13).<sup>50</sup> The figure would have been about half life-size and was painted

47. Wilson, 'Origins of perpendicular style', 133.

48. Ashwell, 'Gloucester Cathedral; the south transept'.

49. GEAR 01/D: S. Bagshaw 'Gloucester Cathedral: a painted medieval floor in the Choir Gallery', *Church Archaeology* 5 and 6 (2004), 107–9.

50. Ibid. 98/C, WKS 184: paint analysis by Helen Howard for Courtauld Institute of Art; report by J. Sampson in preparation.

using gold and silver leaf, vermilion lead white, charcoal black, yellow earth, and red lake. It could have been a flanking figure from a tomb or reredos.

Masons' techniques are of interest. For instance it is surprising to see the use of carpentry joints, mortise and tenon, both on the tomb of Edward II and on the lavatorium buttresses.<sup>51</sup> Masons' marks – the masons call them banker marks – are frequently observed (see Fig. 14). Despite a growing archive of these, we are no nearer knowing exactly how they were used, except that they were almost certainly a way of reckoning work done and therefore pay.<sup>52</sup>

### Sources of Stone

Types of stone are an important element of the archaeological record. Medieval masons used different types of stone to do different work: ashlars and carving used 'Painswick' stone, fine, pale, and easy to carve; copings and buttresses were worked from the hard shelly Pea Grit weatherstone, which is more difficult to carve but has good weather resistance; another popular medieval weatherstone was Minchinhampton.<sup>53</sup>

The first cathedral project to involve proper analysis of stone types concerned the west end in 1995.<sup>54</sup> Until then identification of stone types was a rather uncertain process, but it has been transformed with the help of Arthur Price of Frocester Court, who has carried out extensive documentary and fieldwork research on local quarries and stonemasons. The west end of the cathedral is a rather dull piece of 15th-century building: its pedestrian appearance is increased by the fact that, as Arthur's survey showed, it is mostly Victorian replacement Bath stone and incorporates hardly any medieval work.

After dealing with the west end, the restoration programme moved to the south porch. A magnificent late medieval feature, it was badly decayed by 1870 and was entirely rebuilt. A considerable number of different types of stone had been used. 'Anston' for instance was known to have been purchased by Waller for use in the south porch; it then became unfashionable and ceased to be used.<sup>55</sup> Most of the south porch, and indeed the west end, had been restored using Bath stone, not always of good quality.

Ideally repairs today would use the same stone sources as the medieval masons, but this is not possible. The medieval quarries on the Cotswold scarp are no longer accessible or have had all their large blocks worked out. In the early 1970s French stone began to be used at the cathedral, initially Lépine from Chauvigny, near Poitiers. In 2000 the architect and master mason were investigating the whole problem of stone sources and use. After advice from various experts, both French and English, trial use of various stones including an attempt to use some from the Cotswold scarp, and experimentation and testing of the stone at the Building Research Establishment, a variety of stones was established as being suitable. For instance, Minchinhampton is often replaced by a weatherstone

51. Ibid. 99/G: C. Heighway and P. Mychalysin, 'Gloucester Cathedral Cloister Lavatorium Buttresses 2001', figs. 9 and 10.

52. Some very curious marks on the tower represent weapons and seem too elaborate to be banker marks; Pascal Mychalysin suggested they were to indicate positioning: Heighway and Mychalysin, 'Masons' Marks at Gloucester Cathedral Tower', *Trans. BGAS* 117 (1999), 159–63.

53. For a summary of the stone used in building Gloucester abbey and later in its repair see Bagshaw, Heighway and Price, 'South Porch of Gloucester Cathedral', also Heighway, 'Gloucester Cathedral and Precinct'.

54. GCAR 95/E.

55. All details in Bagshaw, Heighway and Price, 'South Porch of Gloucester Cathedral'.

from Chantilly known as Beaunotte-Beauval.<sup>56</sup> However, you will be glad to know that recent carving for the restoration of the tomb of Edward II used local stone like that used for the original monument: an expedition led by Arthur Price to the 19th-century Ball's Green quarry (now worked out and disused) near Nailsworth was able to collect a piece of stone of suitable size and a perfect match.

The Romanesque abbey begun in 1089 would have had access to stone near at hand from the Roman walls and buildings of Gloucester, as well as quarries on the Cotswold scarp. There is plentiful Roman brick used as spacers in the Romanesque fabric (some can be seen for example in the nave pillars) and it is possible that all the Pea Grit along the base of the Romanesque walls was taken directly from the Roman walls. There would certainly have been plenty of Roman stone available, as evidenced by the discovery in the triforium level of a Roman centurial stone.<sup>57</sup> Once in the building, the stone continued to be recycled in each phase.

### Repair and Conservation Principles

Principles of repair and conservation depended in the past very much on the architect, and before the end of the 20th century there was no legal control on work in cathedral churches.<sup>58</sup> The absence of regulation is perhaps exemplified by matters in the crypt in the early 1940s when the columns were cracking, a problem thought to be caused by the weight of George Gilbert Scott's 1867 reredos. The then architect N.H. Waller introduced an engineering solution. He removed some of the columns, dug large concrete foundations, and inserted steel supports in the remaining columns which were then encased in new stone. Such a solution would not be countenanced today. By 2005 the steel supports were expanding and the stone of one column was splitting. The stone was renewed and cathodic protection introduced to inhibit rusting – it was deemed too destructive to remove the comprehensive steel structures.<sup>59</sup>

Today extensive research is carried out to establish causes, materials and structural history. Each repair proposal is supported by a full explanation by the cathedral architect Ian Stainburn to the chapter and statutory bodies of the philosophy upon which the repair design is based. If structural integrity is impaired, total replacement can sometimes be necessary but in such a case very precise information about the medieval construction is gathered and materials carefully selected. F.S. Waller's policy was similar. In 1855 he wrote:

The general principle kept in view...is to retain in all cases as much as possible of the old work, restoring only where actually perished, to take all... precautions that can be adopted to prevent further decay in the external stonework<sup>60</sup>

56. Stainburn Taylor, 'The cathedral church of St Peter...Stone selection and introduction to specification – masonry and glazing repairs to south transept, west elevation and south west turret, January 2002', architect's project no. 1900–5071.
57. GCAR 84/G; see *Britannia* 17 (1986), 429; *Roman Inscriptions of Britain* (forthcoming), no. RIB3069. I am grateful to Dr Roger Tomlin for providing the RIB text prior to publication.
58. See C. Bianco, 'Ecclesiastical Buildings in Use', in J. Hunter and I. Ralston (eds.), *Archaeological Resource Management in the UK* (1993), 95.
59. GCAR 05/C.
60. See Heighway, 'Gloucester Cathedral in 1855', 201; compare this with the 'Gloucester Cathedral Conservation Plan' (2004):

3(17) It is a presumption that the existing fabric or components of it will be preserved provided that they continue to fulfil their intended functions. Equally, there will be a presumption that they will be replaced if no longer able to fulfil those functions or are likely to put the fabric at risk...

(4.1–4.2) Prior to any masonry repair a full investigation and record of the subject area is undertaken to identify the type age and condition of each stone to determine the appropriate method of repair, consolidation or replacement of it.

1	10	19	28	37	46
2	11	20	29	38	47
3	12	21	30	39	48
4	13	22	31	40	49
5	14	23	32	41	50
6	15	24	33	42	51
7	16	25	34	43	
8	17	26	35	44	
9	18	27	36	45	

Fig. 14. Masons' marks, mostly of the 11th century, from the south-east ambulatory walls and chapels: unpublished record by S. Bagshaw in archive of GCAR 00/F.

At a time when architects were all too prone to re-make their buildings to some ideal form<sup>61</sup> Waller's attitude was enlightened. So before I finish I want to exonerate him from a serious accusation. David Cole, in his account of Sir George Gilbert Scott's work, states that the 'south aisle... had been restored by Waller, who had intended to restore its easternmost window to match the other decorated six; Scott repaired it as it stood'.<sup>62</sup> The window in question was the easternmost of the aisle's 14th-century ballflower windows and about 1400 it had been raised to light a tomb beneath it, the ballflower ornament being carefully re-used.<sup>63</sup> The proposal was to change the window back to its early 14th-century appearance. Scott firmly squashed this idea,<sup>64</sup> but the proposer was not Waller. Waller had been unable to work from 1862 to 1865 and had handed over to his partner Thomas Fulljames.<sup>65</sup> However, Fulljames was not the instigator either: in 1862 we find him arguing strongly against a similar suggestion for the north aisle windows – to remove the Gothic tracery and 'retore' their supposed 12th-century appearance. Fulljames's argument was a strong support of Waller's conservation principles.<sup>66</sup> The insidious 'medievalizer' may have been a member of the Chapter!

We have come a long way from my opening quotation and the ridiculing of antiquarian pursuits. But then archaeologists too have come a long way (one might almost say they have come up in the world), and 'buildings archaeology' has become essential to the conservation process. Almost the greatest difficulty has been dissemination of the results of archaeological research of this kind; inevitably bitty because they following repair programmes and not any research line, they do not lend themselves to formal monographs or even articles. I therefore want to commend the Bristol and Gloucestershire Archaeological Society for putting the cathedral archaeological reports on its website and to thank the Society for honouring me with the Presidency and thus giving me the opportunity for highlighting in this lecture some of the many observations at Gloucester cathedral in the last 25 years.

61. 'Fulljames and...other church architects of his day were technically good but they were backward-looking at their aim to re-medievalize, to recreate a past age rather than to conserve existing detail': B. Carne, 'Thomas Fulljames, 1808–74: Surveyor, Architect, and Civil Engineer', *Trans. BGAS* **113** (1995), 14.

62. David Cole, *The Work of Sir Gilbert Scott* (1980), 101.

63. R.K. Morris, 'Ballflower work in Gloucester and its vicinity', p. 102 and n. 15.

64. Gloucester Cathedral Library, letter from Sir G Scott: I am grateful to the cathedral librarian for drawing my attention to this.

65. Carne, 'Thomas Fulljames', 9.

66. Gloucester Cathedral Library, MS 53, p. 55.