

The building  
stones of  
St Mary's,  
Deerhurst

by Steve Bagshaw

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## Introduction

I would like to begin by thanking Michael Hare in his capacity as Chairman of the Friends of St Mary's Church, Deerhurst, for inviting me speak in the church this evening. I am delighted to have been asked to do so. While thanking people I should also mention Will Morris and his family at Priory Farm, Deerhurst, who have helped with access to the structure, the loan of ladders and so on.

As I am talking on a geological theme, I should mention that tomorrow is the 150th anniversary of the death of Hugh Strickland, the pioneering 19th-century geologist, and friend of Darwin, on 14 September 1853.<sup>1</sup> Strickland lived near here at Apperley Court and discovered the now famous 'bone bed' in the Lias at nearby Coombe Hill in 1842; he is buried in the churchyard and is commemorated in the west window of the north aisle. To mark this anniversary Rose Williams has set up a display at the back of the church with archival material and with some of Strickland's own geological specimens, kindly on loan from Cambridge. Strickland's family showed an active interest in the building stones used in the church, for soon after the beginning of the restoration of 1861–2, his sister, Frances, sent some notes to the incumbent, the Rev'd George Butterworth, in which she commented that 'The workmen think some of the stone came from Towbury Hill. I wish it may be discovered, as it is of great importance to ascertain where the stone of ancient buildings was brought from'; Towbury Hill is north of Tewkesbury at NGR SO 880370 and would have been a source of Arden Sandstone.<sup>2</sup> It is a pity that Hugh Strickland didn't come down and write a geological report on the church; it would have made interesting reading.

The research on which tonight's talk is based was carried out for a PhD on the building stones in the medieval churches of Gloucestershire for the University of Sheffield. The petrological survey of Deerhurst, that is the survey of the building stones, is one of three case studies, the other two being the minster church of St Oswald's at Gloucester and Gloucester Cathedral.

We shall first look at some of the different types of stone that have been identified in the fabric. This will include identifying some possible sources of the stone and a discussion of their physical properties; and, in an attempt to put the results in context, we will look at how the stones have been used elsewhere, primarily in the medieval churches in this part of the county. Having become acquainted with the various types of stone, we shall then look a little more closely at their distribution in the fabric and consider what these results say about the sequence of structural development of the building.

A glance back over the titles of previous lectures is enough to demonstrate that there are many ways to study an old church such as St Mary's here at Deerhurst. The early medieval sculpture always attracts a lot of attention, and last year's compelling lecture by Richard Bailey showed quite how much research remains to be done on the carvings that are scattered about the fabric.<sup>3</sup> St Mary's has quite an extensive

documentary history and these texts have been studied;<sup>4</sup> the early medieval landscape and land boundaries have been reconstructed and discussed.<sup>5</sup> The building has been considered in relation to the early medieval liturgy, and there is a significant amount of analysis and comment (including some wild speculation) on some of the better known architectural features. Most of you, I am sure, will be aware of the ground-breaking work of the team headed by Philip Rahtz in the 1970s and 1980s and of the final publication of the results in 1997.<sup>6</sup>

A lot of work has been done here and yet it remains impossible, when referring to the literature, to answer one of the most basic of archaeological questions that one may ask of material culture, that is 'What is it made of?'. This lacuna in our knowledge of St Mary's is the result of the lack of development of petrological studies within the wider discipline of buildings archaeology. In short the study of building stone has been a low priority in archaeological research. The problem was identified by English Heritage in 1991, and a subsequent report by David Peacock constitutes an archaeological response to the problem, setting out aims, principles, methods – and possible pitfalls – for an archaeology of stone.<sup>7</sup>

Happily things are changing: there is a growing body of work on particular types of building stone and on the identification and analysis of stone both from excavations and in standing structures.<sup>8</sup> An indication of how much things have improved is provided by the recent archaeological work that has accompanied the campaign of repairs to Gloucester Cathedral. The archaeological analysis begins after the petrological identifications have been added to an accurate 1:20 scale drawing of the stonework. For example, the principal way of identifying the extensive mid 19th-century repairs is petrological; these repairs were carried out using Great Oolite limestones from around Bath. These building stones are not difficult to distinguish from the Inferior Oolite used in the medieval period due to differences in colour, texture and weathering characteristics.<sup>9</sup>

Nowadays, a study of the building stones is an essential element of any research project on medieval churches, as Philip Rahtz recognised in relation to St Mary's, Deerhurst.<sup>10</sup> I hope that after tonight's talk, you too will be able to appreciate the importance of such a study.

### The building stones of St Mary's

Gloucestershire is a county of varied scenery. It divides up into three physiographical areas: the Cotswolds, the Vale and the Forest of Dean.<sup>11</sup> The Cotswold escarpment forms the most dramatic physical feature in the county, running in a north-easterly direction from Bath to Chipping Campden. Rising from a height of around 240m just north of Bath it reaches a maximum height of 330m (around 1080ft) on Cleeve Common, near Cheltenham.

The scarp is capped predominantly by bands of limestone from the two major units of the Middle Jurassic: the Inferior Oolite Group and the Great Oolite Group. These terms do not in any way refer to the building qualities of stone quarried from these groups. Inferior in this case simply means below; William Smith, the father of English geology, described the Inferior Oolite as the Under Oolite.<sup>12</sup>

As the Inferior Oolite tends to dominate the scarp, it is not surprising that it also forms the major component in the assemblage of oolitic limestones found here in the

church. Then, as the rocks dip away to the east, the landscape passes up through the strata of the Great Oolite. Both Groups produce freestones, that is a rock capable of being worked in any direction – and thus suitable for carving. Well-known freestones include Painswick and Cheltenham Stone from the Inferior Oolite, and Bath and Taynton Stone from the Great Oolite. There are many others, their names predating current geological nomenclature.

The medieval churches of the central – or high – Cotswolds contain much interesting and important architecture, but from a petrological perspective they can be less informative. In this area where there were few navigable rivers and a poorly developed road network, but where good quality freestone and tilestone were readily available, individual medieval churches tended to be built using only a small number of locally procured rock types. An example is provided by the west end of the north wall of the nave of the church of St Bartholomew, Whittington, some 6km east of Cheltenham; here we can see Inferior Oolite rubble at the base of the wall, large Inferior Oolite blocks at mid-wall height and smaller Inferior Oolite blocks at the top. There is less variety, much of the stone has not travelled very far, and so there is less petrology to study compared with here in the Severn Vale, where circumstances are different, as explained later.

If we now take a giant topographic step over the River Severn and into the Forest of Dean, we find strata which are older geologically. The Forest is a basin-shaped structure with a rim of older Devonian sandstones and younger Carboniferous limestones, with Coal Measures and Pennant Sandstone at its centre. This is also an area with readily available freestone, but here the sandstones are hard and comparatively difficult to work and this, together with a low level of settlement, meant that the medieval stone industry never developed to the same extent that it did in the Cotswolds. The medieval churches that encircle the Forest are primarily built of Devonian and Carboniferous sandstones. The Carboniferous limestones, now quarried on an immense scale for roadstone and aggregate, rarely appear in the fabric of the churches, as in an area of hard rocks these are even harder, making them unattractive to the medieval masons.

The Severn Vale, where we are here at Deerhurst, is an area of low relief produced by soft Triassic and Jurassic (Liassic) marls and clays. It forms a narrow strip of land in the south of the county, where it is known as the Vale of Berkeley, then expands laterally on approaching Gloucester where it is around 25km wide; north of Gloucester it continues to widen, forming the Worcester Basin and the Vale of Evesham. The rocks underlying the Vale produce mostly poor quality building stones. Lower Lias clay underlies much of the east and central parts with bands of Lias limestone and mudstone forming low, but prominent, hills and ridges in an open landscape. Most of us have travelled along one of these ridges on our way to the church this evening as the A38 follows just such a ridge for some of its course between Gloucester and Tewkesbury.

Lower Lias Limestone is the stone type that occurs most frequently in the fabric of St Mary's. Unlike Somerset, where the Blue Lias and White Lias are superior building stones, in Gloucestershire the Blue Lias is very much inferior in quality to Lower Lias. Even the Lower Lias is not an ideal building stone, being hard and brittle, but at the same time susceptible to the action of frost. This vulnerability to weathering, however, can vary from one outcrop to another and, indeed, between differing beds at the same quarry. The 19th-century quarrymen were evidently well aware of the differing

physical properties of the various beds of Lias; they had a name for each bed, the Blue Bed, Black Bed and so on, with certain beds being reserved for the production of hydraulic lime or paving and others deemed more suitable for use as a rough building stone.<sup>13</sup> The burning of Lias limestone for brown lime was practised in this area, at least in the post-medieval period. The first edition of the 6 in. Ordnance Survey maps from the 1880s show what are described as 'old and disused' quarries and limekilns on the Lias beside the ridgeway (that's the A38) at Deerhurst Walton and further down the River Severn at Ashleworth and at Chaxhill near Westbury-on-Severn.<sup>14</sup>

An awareness of the vulnerability of Lias to frost weathering can be detected, for example, in some of the many brick buildings erected in the Vale in the 18th and 19th centuries; it is not uncommon to find, in these structures, footings of Lias beneath the brick superstructure. Below the ground they would not be exposed to the frost and would, therefore, decay no faster than any other type of building stone.<sup>15</sup> An example of the effect of frost on Lias limestone may be seen at the north-west corner of the barn at Priory Farm that borders the churchyard, close to the east end of the north aisle. The barn is, I think, just over 100 years old, and it may be seen that a few larger pieces have come away at the corner. The annual production from the winter's frosts leaves a neat line of small fragments lying at the base of the wall.<sup>16</sup>

This type of knowledge – of the physical properties of different types of stone and how to use them in a building to their best effect – is a valuable indicator of the level of development, or if you like, the degree of sophistication and continuity of the building industry at any given time. We know from the historical record, for example, that from the mid-18th century the quarrying and supply of building stone was organised on an industrial scale and structured by an emerging capitalist economy. However, as we move further back in time, past the Regency boom that so stimulated quarrying around the hills of Bath and Cheltenham, past the Great Rebuilding of the English village, to the medieval period, the documentary references for quarrying and building become far more scarce. Moreover, building accounts for medieval parish churches rarely survive, so we have to look to the actual buildings themselves for this type of information.

Returning to the Lias limestone, the church of St Andrew and St Bartholomew, Ashleworth, about 7km south-west of Deerhurst on the opposite (west) bank of the Severn, provides an instructive example. We see in the earliest work in the north wall of the nave that the exterior face of the wall is built using cut blocks of a calcareous rock called tufa. This came from a substantial Quaternary-age 'spring' deposit near Dursley (Gloucestershire). Tufa is soft when first dug but rapidly hardens.<sup>17</sup> By contrast, the interior face of the wall was constructed with Lias limestone laid in courses of herringbone masonry. Ashleworth is only a few hundred metres from outcrops of Lias limestone and yet in the 11th or 12th century, its use was restricted to interior locations. Such an arrangement suggests that the builders had an awareness of the deficiencies of the nearest available building stone and chose a more durable alternative to withstand the weather. This awareness would also have prompted the 13th-century masons to use tufa over Lias for the eastern quoins of the chancel at Ashleworth.<sup>18</sup>

I will say a little more about tufa later on, but the pattern of using Lias limestone for rubble walling, with imported stones being used for dressings and for carving, can be seen over much of the Vale, including here at Deerhurst. The imported stones are most often Middle Jurassic limestones from the Cotswold stone belt, but the old adage of never placing a limestone and a sandstone side by side (because of the deleterious

effects this normally has on the sandstones) is constantly defied with a variety of Devonian, Carboniferous and Triassic sandstones combined with the Lias with varying degrees of success. The nearest Lias limestone outcrop to Deerhurst is around 500m north-east of the church. There were quarries and limekilns on a ridge running from the River Severn (at NGR SO 876307) to Redhouse Farm (at NGR SO 885294).<sup>19</sup>

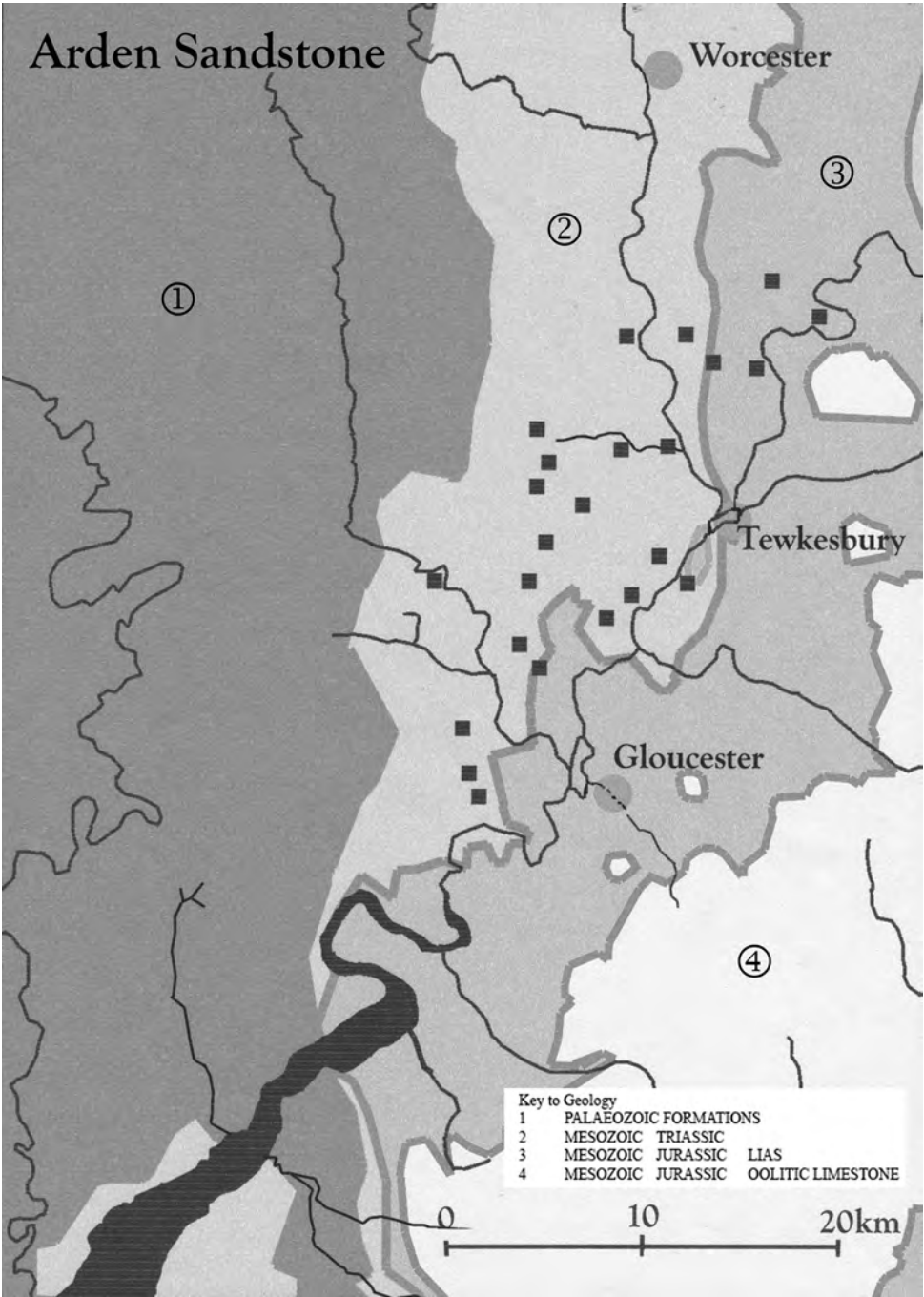
Moving on to a second type of stone that also outcrops in the Vale north of Gloucester, and which is also present in the fabric here in some quantity, this is a Triassic rock from the Mercia Mudstone Group (formerly known as the Keuper Marl) named Arden Sandstone. The outcrops of this rock form narrow ridges (sometimes called skerries) and low rises in the landscape and include coarse- to fine-grained calcareous sandstones that are dull white to green-grey in colour and as building stones can be easily confused with Lias limestone. Deerhurst Walton and Notcliffe, 1km to the south-east of St Mary's, are situated on one such outcrop, and former quarries are visible at Ripple and Pendock in Worcestershire.

This sandstone usually makes a poor building material; it is composed of angular grains of quartz in a weak calcareous matrix and this combined with its open texture and pronounced bedding structures with occasional clay 'galls' means that it does not resist the weather well. This must be the reason that it is so little used in the post-medieval period and consequently why there are so few references to its use; it is a largely forgotten building material. Take, for example, Notcliffe and Deerhurst Walton; there are 18th- and 19th-century brick buildings, half-timbered structures and other more modern buildings up there, but I have not been able to identify Arden Sandstone in any of the buildings – or even in the garden walls or rockeries – which is quite surprising considering that the village sits on a deposit of the stone.

Arden Sandstone was, however, used widely in those medieval churches that were built on, or very near to, the outcrops. I won't list them all, as it would get monotonous, but two good examples are provided by Eldersfield and Pendock (both Worcestershire, but only a few kilometres to the north-west of Deerhurst). In these two churches the sandstone has been used for everything from window tracery to decorative carving to plinths. Both of these churches are situated directly on outcrops of Arden Sandstone. Moving north towards Worcester, Arden Sandstone was more extensively used for rubble or roughly-dressed stonework, but the carving was executed with a superior Triassic sandstone such as Bromsgrove Sandstone, Oolitic limestone from Bredon Hill or the Cotswolds and, increasingly, Carboniferous sandstones from Shropshire.

The distribution of Arden Sandstone in the medieval churches of Gloucestershire and Worcestershire (Fig. 1) shows the typical pattern of use of a lower quality stone, in that it is rarely transported far from its outcrop. Lias limestone has a similar type of distribution but this time confined to the eastern, Lower Jurassic, portion of the Vale. At St Mary's church, Forthampton, around 3km north-west of Deerhurst, we can see how Arden Sandstone was used and observe the problems caused by its use. The window at the western end of the south wall of the nave was originally all Arden Sandstone, but it has decayed and was replaced with the present Bath Stone insertion in the late 19th or early 20th century. The original reveals are still in position, and a closer look shows that these too are suffering and will soon need to be replaced. At the church of St John the Baptist, Chaceley, again just across the river, we can see a late 13th- or 14th-century window of Arden Sandstone at the east end of the north wall of the nave, though it should be noted that the mullion has been replaced.





*Fig. 1 Distribution map showing churches built using Arden Sandstone*

The Lias limestone and Arden Sandstone are the only building stones that can be quarried in this part of the Severn Vale. All the other stones that have been identified in the fabric of St Mary's have been transported here from further afield.

Stand opposite the entrance to the church and look at the masonry around the doorway. You will notice large blocks of purple sandstone scattered in the fabric (see cover photograph). This is rock from the Devonian Period Old Red Sandstone of the Brownstones Formation. The nearest source to Deerhurst would be around 23km to the south-west, just north-east of Mitcheldean in the Forest of Dean. Of course that does not mean that this stone was quarried at Mitcheldean. It is more likely that the ancient quarry was situated nearer to the River Severn, perhaps around Littledean or in the Lydney area.

Old Red Sandstone does not much appear in the fabric of the medieval parish churches in this part of the county, but an exception is the church of St James at Staunton, which is 9km west of Deerhurst. Staunton is one of the churches where Arden Sandstone was used for general walling and for carving. The medieval fabric at Staunton is mainly of 14th-century date, but a small area of the south wall of the nave contains herringbone masonry (Fig. 2) and on that basis has been termed Norman, though it could be earlier.



*Fig. 2 South wall of the nave of the church of St James, Staunton*



It is here that two or three pieces of Old Red Sandstone have been identified. There are other materials in this small area of earlier masonry at Staunton that may explain the presence of the Old Red Sandstone in this earliest part of the building. Firstly there are fragments of brick, or ceramic tile, in the courses of herringbone. These are 4.5–5 cm thick. As well as the tile there are thin fragments of Pennant Sandstone (the nearest outcrop of which is in the middle of the Forest of Dean).

Old Red Sandstone, Pennant Sandstone, and tile of this thickness are materials that commonly occur together in Romano-British buildings in this area. Together with tufa and Stonesfield Slate tilestone (from the Jurassic Great Oolite, Througham Limestone Member)<sup>20</sup> they constitute an assemblage of stone that is recognisably Roman. If they are found together in a medieval church the possibility must be considered that they represent reused material from a Roman building. This is what I am suggesting for this early work at Staunton.

But there may be other explanations for the presence of these materials in medieval buildings. Firstly one has to ask 'are these materials intrusive?', in other words 'are they part of the original masonry or the result of a later repair?'. So, for example, the brick in the course of herringbone masonry in the Anglo-Saxon church at Leonard Stanley appears to have come from the Stonehouse brickworks and not from one of the Roman villas at Frocester. Here, the brick indicates a modern repair.<sup>21</sup> And to confuse the situation, the types of Old Red Sandstone and Pennant Sandstone favoured by the Romano-British builders were also very widely used in the 19th century; they turn up everywhere. The reason that the distribution of these stones is broadly similar in Romano-British and Victorian times is that, after the virtual extinction of the building stone industry in the post-Roman period, it did not develop on a comparable scale or with a comparable degree of diversity until the 19th century.

The exterior face of the wall blocking the chancel arch here at St Mary's contains some Old Red Sandstone and Pennant Sandstone. Now we know from the accounts of the builders, Collins and Cullis of Tewkesbury, that this blocking wall was dismantled and rebuilt in 1862 at a cost of £6 15s 0d including new stone.<sup>22</sup> Not all of the stone in this wall was new in 1862; some of the larger blocks of Inferior Oolite appear to have been reused from an earlier part of the building. At the top of the wall there are some elongated slabs of Old Red Sandstone. The edges of these slabs are sharp, their faces flat and the stones appear to have been cut with a saw. We also know that Collins and Cullis had Red and Grey sandstones brought to the church in 1861 and 1862 for the restoration of the interior, principally for paving;<sup>23</sup> the pieces of Old Red Sandstone in the top of this blocking wall probably represent material left over from the paving contract. Exactly the same thing was done in the precinct of Gloucester Cathedral in the same year (1862), when after the repaving of the area around the infirmary, the Old Red Sandstone that remained unused was incorporated into the ruin of the 13th-century infirmary hall.<sup>24</sup> In these examples, the presence of Old Red and Pennant Sandstone can be shown to be the result of the 19th-century preference for these specialist rock types and does not indicate a Roman origin for these stones.

To return to Staunton, a closer look at the herringbone courses shows that the tile and sandstones are all set in a coarse-grained, poorly sorted pink mortar. It is possible to see this in the places where the white 14th-century mortar and the dark-grey 19th-century mortars have come away from the wall.<sup>25</sup> The stones in this part of the wall are not the result of repairs and so, in the absence of any evidence to the contrary,

in this case it is likely that they do indicate that the stone has been robbed from a nearby Romano-British structure. I say nearby, because this collection of rock types includes a high proportion of Arden Sandstone. If you remember, Arden Sandstone is not a high-quality stone and so is unlikely to have been transported for any great distance when quarried in any period. As Staunton is at the centre of the area in which the Arden Sandstone outcrops, it is thus likely to have been robbed from a nearby Romano-British structure. We have looked at this small area of stonework at Staunton in some detail because the same rock types appear in the fabric of St Mary's and, I would argue, much of the early medieval structure here is similarly composed of recycled building materials.

Returning to Deerhurst, we will now consider the limestones from the Jurassic stone belt that are used for the architectural components (such as arches) and for sculpture. Because of the sheer variety of Cotswold limestones, it is not always possible to make a precise identification for every individual stone. Where it is possible to make an identification we find that most of this stone is from the building stone beds of the Inferior Oolite Group. The principal types were known until recently as the Lower Freestone and the Peagrit (now respectively called the Cleeve Cloud Member and the Crickley Member, part of the Jurassic Lower Inferior Oolite, Birdlip Limestone Formation).<sup>26</sup> These are the rocks found toward the top of the escarpment in the hills around Cheltenham and Gloucester. A little detail can be added. Lower Freestone occurs most frequently and is relatively soft when first quarried. It has an even texture and is particularly suitable for working and carving, making it the principal building stone in the medieval period and the stone most likely to have been exported beyond the county.

The capitals on both north and south arcades of the nave are of Lower Freestone, as is the opening with twin triangular heads high up in the west wall of the nave. In that opening the stone can be identified as a variety of Lower Freestone known as Painswick Stone. This could have been quarried from the escarpment anywhere between Birdlip and Selsley, most likely from near Painswick. One of the stones in the southern aperture of the opening with twin triangular heads has a slot for a lewis; a lewis is a lifting device that was used in Roman, medieval and post-medieval construction, but when found in early medieval buildings, it normally denotes the reuse of Roman masonry.<sup>27</sup> So we have, in this opening, an architectural feature with classically-inspired decoration (the fluting and reeding on the central pier and on the jambs) and which is probably composed of recycled Romano-British stone. This could be seen as quite a powerful statement of *Romanitas* – the desire to be Roman, or to be like the Romans.

I suggest that these stones were salvaged from *Glevum*, Roman Gloucester, as Gloucester lies between the source of the stone and Deerhurst, so the stone would almost certainly have come through Gloucester and up the Severn. The question is, when? The reason for suggesting *Glevum* as the immediate source of the stone is because the lewis, in the Romano-British building industry, was a device whose use was mostly restricted to large-scale engineering projects such as public buildings, bridges, projects associated with the military and so on. At present there is no evidence for such a major structure at Deerhurst; hence Gloucester is the likely source (for example, from the Late Roman city walls which abound in lewis holes).

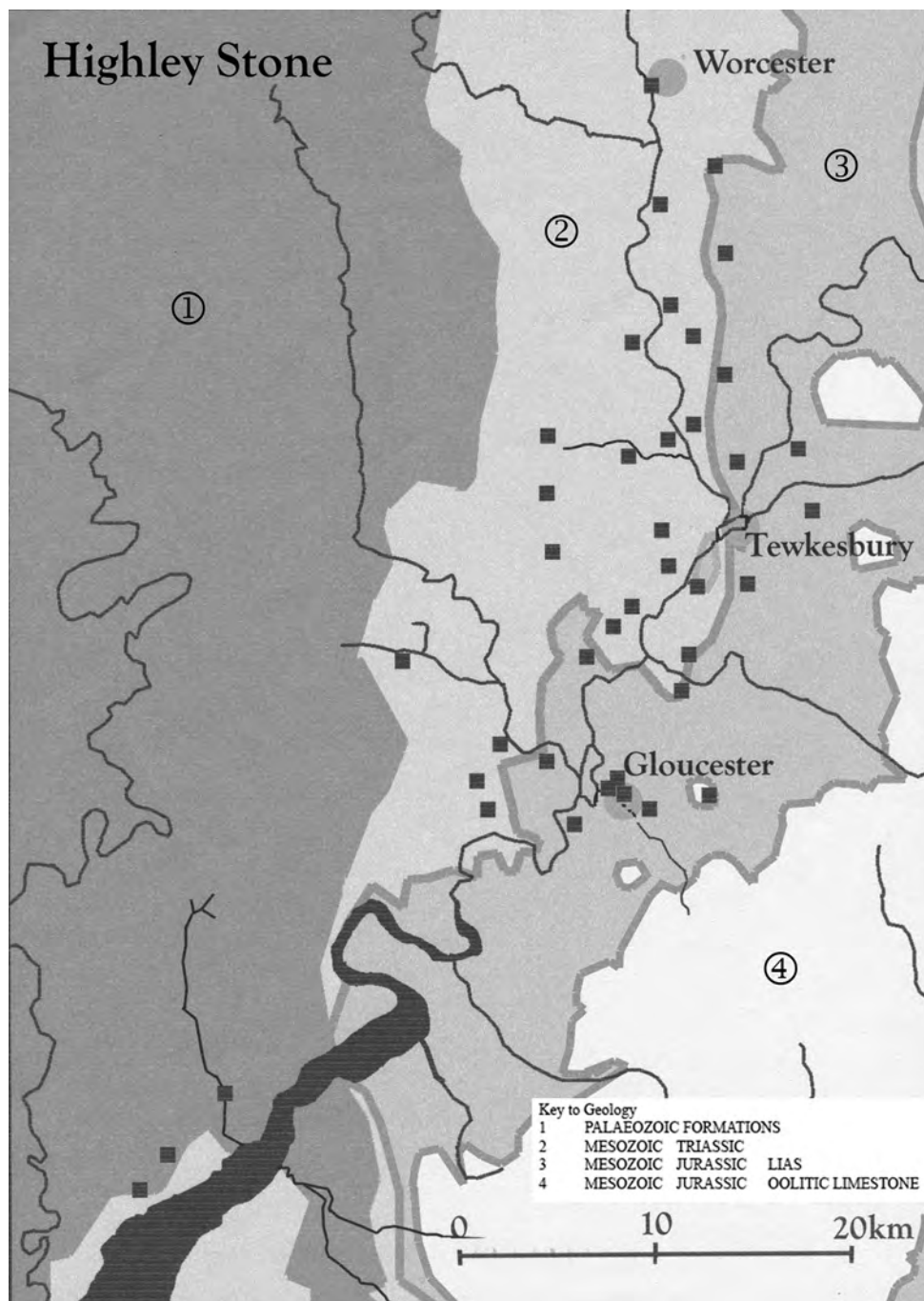
If you have a look at the mouldings on the 14th-century west doorway when you leave the church tonight, you will see that the surface of the stone is pitted with tiny

cavities a few millimetres in length. This is Peagrit (Jurassic Lower Inferior Oolite, Birdlip Limestone Formation, Crickley Member, Crickley Oncolite Member), a very important Roman and medieval building stone because of its ability to resist the weather. It is probably the most weather-resistant stone in the county and was known as weatherstone; in the area from Gloucester north to Evesham it was often selected for exterior sills, copings, string-courses, hood-mouldings and suchlike.<sup>28</sup> In other words it is used in any position where it will be throwing water off the building. It is composed of carbonate pisoliths, roughly the size and shape of large lentils, set in a sparry matrix. When exposed to the elements, the peas weather out leaving their impression in the carbonate cement that holds the rock together. You can see Peagrit in its unweathered form in the central freestanding column at the east respond of the south arcade.

Peagrit rarely appears in early medieval, or Anglo-Saxon, carved stonework. However it was used here in Deerhurst for carving the bowl and stem of the font and for the similarly decorated stone from Elmstone Hardwicke.<sup>29</sup> Recent comparisons between the size, shape and designs suggest that the Deerhurst and Elmstone Hardwicke sculpture might originally have been part of the same early medieval monument.<sup>30</sup> In the three-light window at the east end of the north wall of the nave of St Michael's church, Tirley, 3km to the south-west, Peagrit was used, very typically, for the sill of the window, with Arden Sandstone for the mullions (partly rebuilt, as are the jambs) and Lower Freestone for the head. Peagrit was also used for the gargoyles here at Deerhurst.<sup>31</sup>

Just a little more on the Cotswold limestones at Deerhurst. During recent work on the south clerestory, an examination was made of the stonework of the windows and the stretches of wall in between.<sup>32</sup> The clerestory windows were repaired and some of them completely replaced during the restoration of 1861–2, using Great Oolite from Bath. The accounts of the builders tell us that Bath Stone was brought to the church in some quantity for use in the nave parapet, the clerestory windows and so on.<sup>33</sup> However, during a preliminary survey of the stone types it was noticed that this Bath Stone appears in the obliquely-coursed herringbone masonry, which is supposed to be early medieval in date. A closer look at some of these herringbone courses showed that they run, rather improbably, through masonry that is wholly 19th-century in date. Furthermore, the courses are level and regular, in contrast with much of the other herringbone in the fabric. In short, it is clear that some of the purportedly early medieval herringbone work is in fact a rebuild of 19th-century date. This is quite unsettling, considering that the presence or absence of herringbone masonry has been used as one of the criteria for determining the sequence of structural development of the building.<sup>34</sup>

I would like to mention one other type of stone before moving on to look at the petrological drawings.<sup>35</sup> This is the green sandstone that is used in the south arcade of the nave at Deerhurst. Before doing the research on the building stones of Gloucestershire, I would have assumed that this stone came from the nearest source of Coal Measure Sandstone, that is from the Forest of Dean. But after surveying the medieval churches in the county and those in southern Worcestershire between Gloucester and Worcester, the distribution of this green sandstone tells another story (Fig. 3). The most obvious point is that the stone does not occur in the churches in and around the Forest of Dean. In fact the Forest does not appear to be related to the distribution of the stone in any way. The second point to note is that the stone rarely occurs more than a few kilometres from a navigable river. In other words, the stone has been transported down the River Severn, and in some case up its major tributaries. Why?



*Fig. 3 Distribution map showing churches built using Highley Stone*

The answer is connected to the way the stone has been used. The stone is used decoratively in small quantities. It appears, for example, in the jambs and voussoirs of archways, or in columns or piers, where it is alternated mostly with red sandstone or a white limestone such as Painswick Stone to produce a dramatic polychromatic effect.<sup>36</sup> In the church of St Michael, Bulley, around 7km west of Gloucester, it is used in this way in the south door, the chancel arch and the nave quoins. It is also found, for example, in string courses, where its strong colour again makes for a prominent feature. Where the stone occurs *in situ*, its use can be dated to the late 11th and 12th centuries. Earlier this year we discovered a string course of this type of sandstone, which had previously been hidden behind 19th-century repairs, high up on a turret of the south transept at Gloucester Cathedral.<sup>37</sup>

We have to look to Worcester for an explanation, and we should remember that Deerhurst was in the diocese of Worcester until 1541. At Worcester cathedral Highley Sandstone is used polychromatically in the late 11th and 12th centuries, most spectacularly in the Chapter House where it alternates in bands with pale Middle Jurassic limestone, probably from Bredon Hill.<sup>38</sup> This appears to have initiated a fashion for this polychromatic effect in the diocese, which was enthusiastically followed in the churches where the stone could be relatively easily obtained, that is to say those close to the rivers. The source of the stone lay upstream from Worcester in the quarries beside the River Severn at Highley in Shropshire, some 55km north of Deerhurst.<sup>39</sup>

### The petrological drawings

Having looked at some of the more significant stone types that occur in the fabric we can move on to the petrological identifications.

*The east wall of the chancel* (Fig. 4)

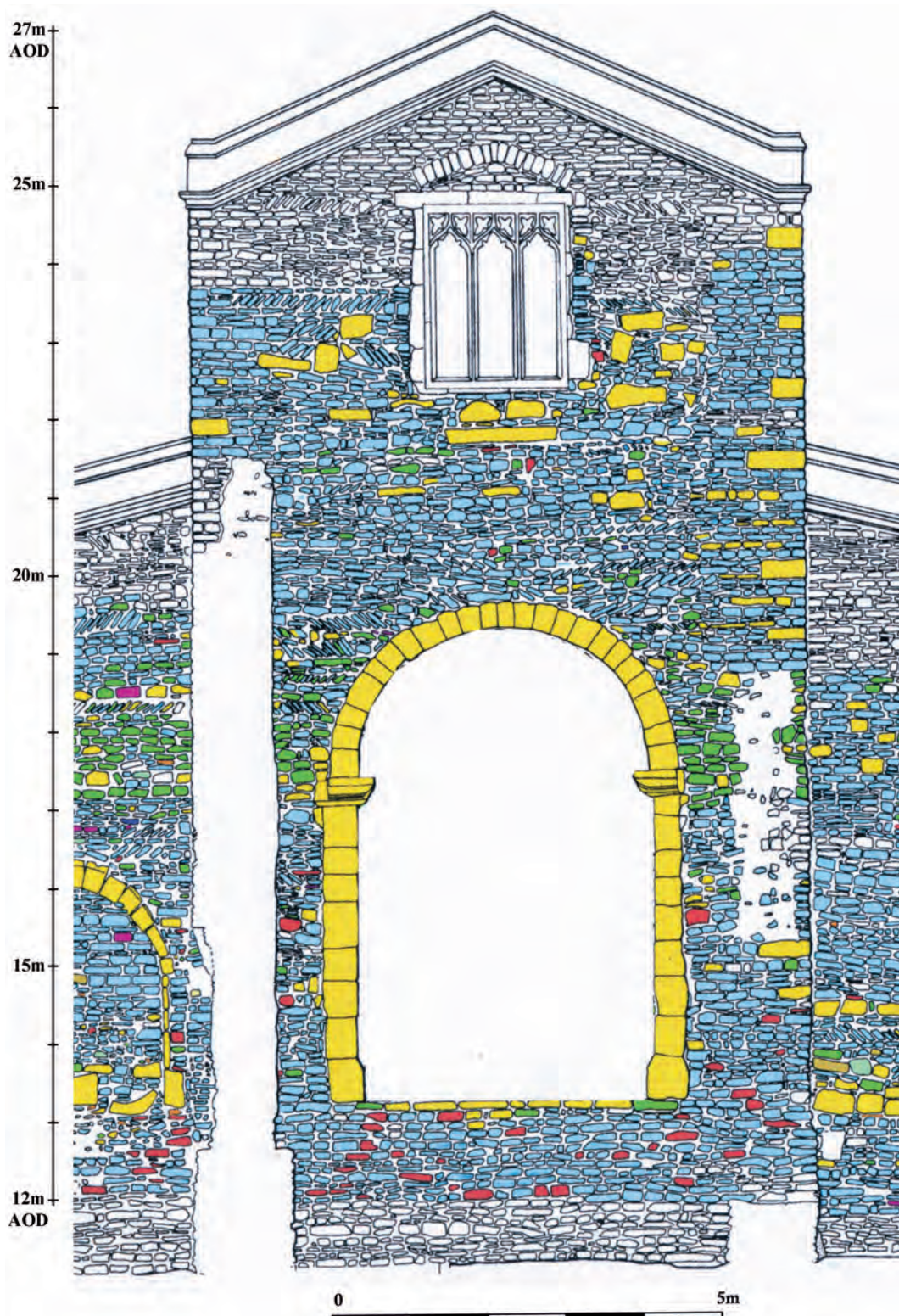
If we look first at the exterior of the east end, the initial impression is of a structure of Lias limestone with architectural features picked out in Cotswold limestone and a more

| KEY                                                                                 |                               |
|-------------------------------------------------------------------------------------|-------------------------------|
|  | OOLITIC LIMESTONE             |
|  | LIAS LIMESTONE                |
|  | PEAGRIT                       |
|  | ARDEN SANDSTONE               |
|  | HIGHLEY STONE                 |
|  | BROWNSTONES/OLD RED SANDSTONE |
|  | PENNANT SANDSTONE             |
|  | TUFA                          |
|  | BRICK/CERAMIC TILE            |

*Key to Stone Types in Figs 4-10.*

*(The elevations used for the petrological analysis were first published in Rahtz et al., as n. 5 below)*





*Fig. 4 Elevation drawing with petrological coding of the east wall of the chancel and parts of the adjoining east walls of the aisles. The aisle walls are fully illustrated in Figs 6 and 7.*

or less random scatter of a limited number of rock types throughout the stonework. The method used to try and interpret these results follows the approach taken by Diana Sutherland and David Parsons in their seminal work on the petrology of Brixworth church.<sup>40</sup> This involves delineating areas of masonry on the basis of their petrological content. In other words, one is attempting to define areas of stonework where the combination and proportion of rock types are roughly similar and then to mark the boundaries between these areas on an elevation drawing.

For example, at the bottom of the wall the stone is 90% Lower Lias Limestone and 10% Old Red Sandstone. This constitutes an assemblage, and its upper limit is the point at which the types of stone or their proportions change. In this case the change occurs around 15m AOD on either side of the chancel arch, where Oolitic limestone, Pennant Sandstone and Arden Sandstone start to occur. In marking the various assemblages on an elevation drawing we are effectively charting the changing sources of stone used at a given time for the building. In places the boundaries between assemblages are very clear, for example at 17.50m AOD in the east walls of the chancel and south aisle (Figs 4, 6).<sup>41</sup>

In other places, such as the upper parts of the exterior wall of the chancel, there are no obvious boundaries; in fact the assemblages appear to grade into one another. The division between assemblages, if it can be detected, can appear almost arbitrary. It must be stressed that the boundaries between assemblages do not necessarily correspond with the boundaries between work of different periods. The assemblages chart changes in the source of stone, and the source of stone for a building could remain constant over several centuries. Conversely, the sources of stone may fluctuate within an episode of building. So it is not possible at Deerhurst to reconstruct uncritically the sequence of building from this petrological data alone.

So, if we look again at the east wall of the chancel, above the Lias limestone and Old Red Sandstone at the bottom of the wall, there is an assemblage that includes these two rock types but also has Inferior Oolite, Arden Sandstone and fragments of Pennant Sandstone tile. There is a band of Lias limestone above this and then a radical change with a distinct band of stone composed primarily of Arden Sandstone. This band of Arden Sandstone is the best defined assemblage yet to be identified and has been traced in other parts of the building at a similar level; here it occurs between 17.0m and 18.50m AOD. Above this the Arden Sandstone decreases, and then above the chancel arch, the Lias limestone increases in proportion with Oolitic limestone occurring in the masonry above 21m AOD.

The upper part of the wall shows no obvious signs of a break in construction or of a change in the source of the stone. Philip Rahtz has suggested that above 15m AOD both apse and east wall were raised simultaneously. As we shall see, the petrology supports this conclusion, so the east wall must have reached a height equal to that of the surviving parts of the apse in this period, that is to say Period IV in the Rahtz and Watts chronology.<sup>42</sup> What has been made clear by the work at the top part of the elevation is the extent of the 19th-century restoration. The quoins, that is the stones at the angles or corners of the elevation, have been completely rebuilt above 20m AOD on the south and 18.50m AOD on the north. Not only have the quoins been rebuilt, but so has the masonry for around 1m into the elevation. In view of the discovery of 19th-century herringbone in the south clerestory, it seems highly likely that the herringbone courses which run into the 19th-century masonry at the south angle are also of 19th-

century origin. The lower of these two herringbone courses has been used as evidence that the apse could not have extended any higher than approximately 23.50m AOD, as the herringbone course was considered to have shown that the apse could not have been bonded to the wall at this point. However, the identification of the herringbone as probably 19th-century removes this hypothetical limit on the height of the apse. In short the evidence for the height of the apse visible in this east wall was removed in the 1860s. As things stand the apse could have extended to the very top of the existing east wall, or what survives may represent its original height.

A single piece of May Hill Sandstone was identified in the lower north-east angle of the chancel;<sup>43</sup> this stone is probably the remains of a quern. The nearest outcrop of May Hill Sandstone (from the Silurian Period) is 12.5km west-north-west of Deerhurst; it was frequently used from the Middle Iron Age as a quernstone and was also used for this purpose in Roman Britain although less often. Quartz Conglomerate (from the Devonian Period Old Red Sandstone) is the most commonly occurring quernstone in local Romano-British assemblages.<sup>44</sup> An example of a Quartz Conglomerate quern is built into the wall beside the path from the main churchyard gate.<sup>45</sup>

I have ignored the chancel arch and the window and blocked openings at the top of the wall, because we are concentrating on the structural development of the building rather than the date or decoration.<sup>46</sup>

### *The ruined apse (Fig. 5)*

We can now compare the east wall with the surviving bay of the polygonal apse, looking at the exterior face with the angel panel at the top (Fig. 5, right). Try and ignore the yellow frame of Oolitic limestone for the moment. You can see that at the base of the elevation, the assemblage differs from the Old Red Sandstone and Lias limestone found at this level in the east wall. In fact we can see the south-east angle of the chancel at the bottom left and a short length of the south wall of the nave, and as with the east wall, it is built of Old Red Sandstone and Lias limestone. And moving up this narrow strip of the south wall of the chancel, we can see that the pattern seen in the east wall is repeated.

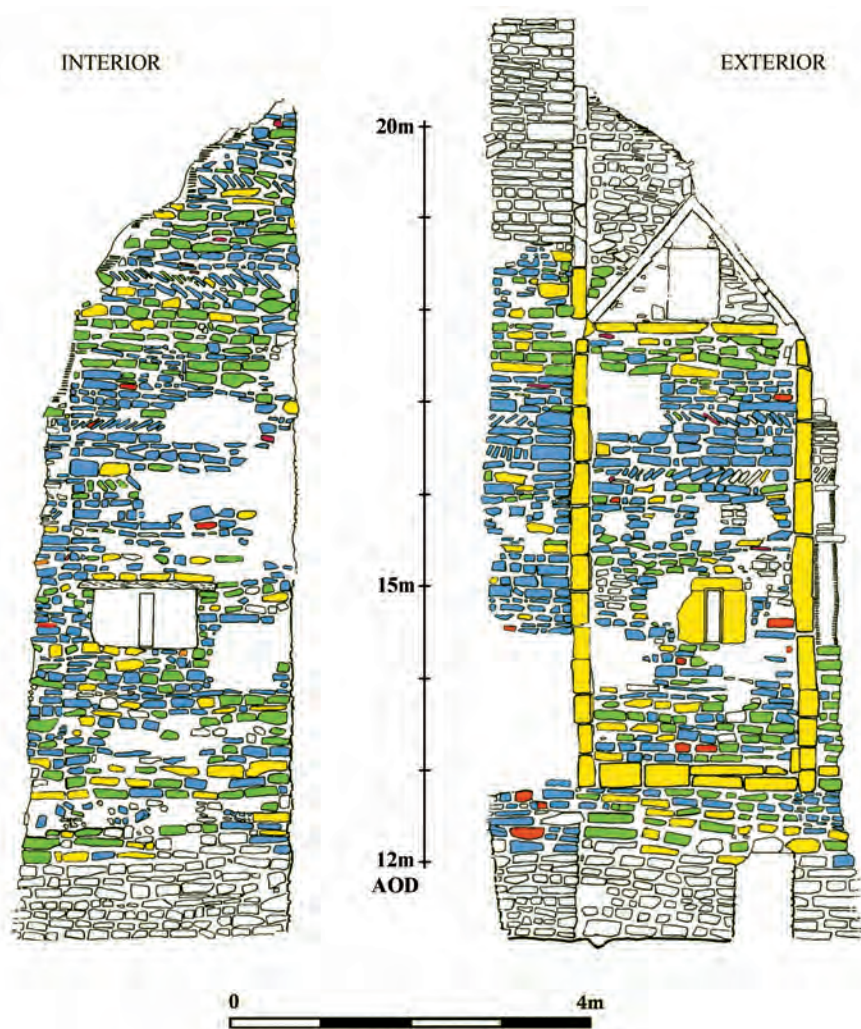
The apse differs from the east wall, in that below 15m AOD, it is composed of Arden Sandstone, Oolitic limestone and Lias limestone with a small amount of Old Red Sandstone. Then above this level the petrological sequence follows that seen in the east wall and the narrow strip of the south wall of the chancel, with the increase in Lias limestone just above 16m AOD and the distinctive band of Arden Sandstone at 17.30m AOD.<sup>47</sup>

This pattern is repeated, as one would expect, on the interior face of the apse (Fig. 5, left). From all this it is possible to say that the lower parts of the chancel belong to a separate, earlier period of construction. At a later date, the lower courses of the apse were built against this early work; then both apse and east wall were raised simultaneously.

### *The east wall of the south aisle (Fig. 6, right)*

The east wall of the south aisle was originally built as part of the principal south porticus of the Anglo-Saxon church.<sup>48</sup> In the small area at the base of the elevation



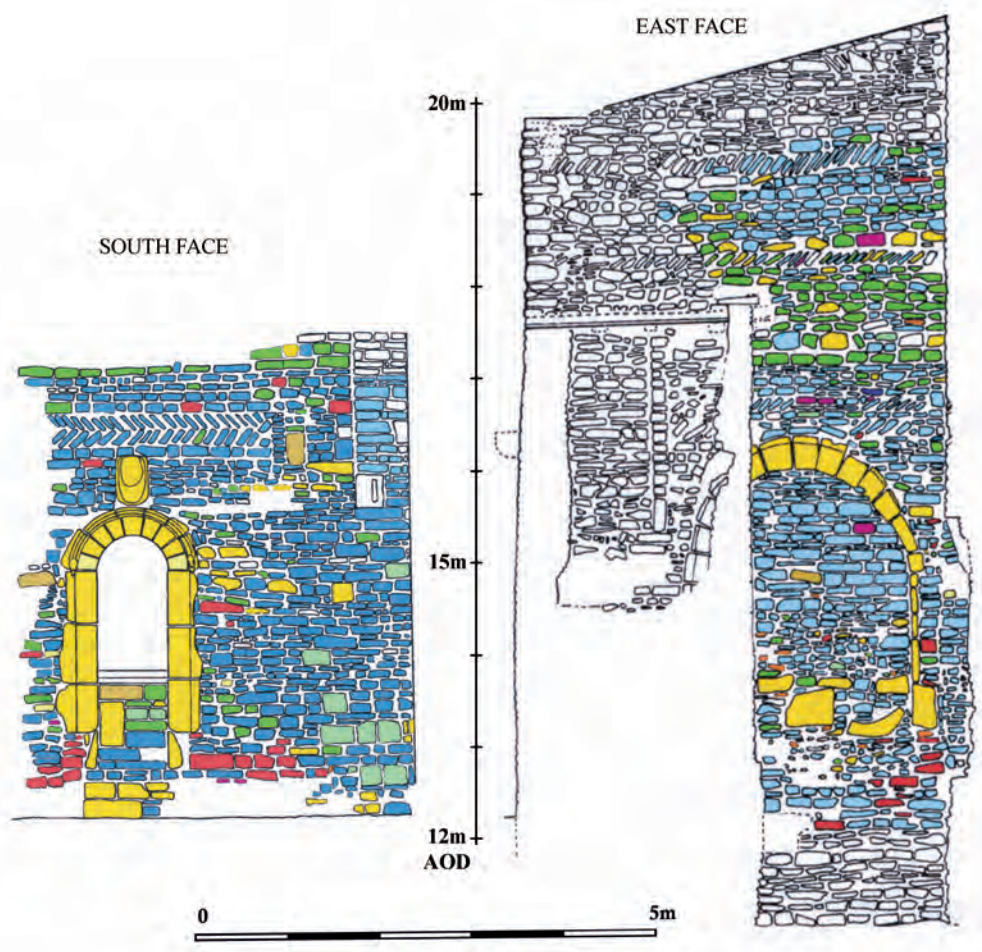


*Fig. 5 Elevation drawings with petrological coding of the interior and exterior faces of the apse (for the key to Stone Types see p.12)*

(excluding the scar below the doorway), there is Lias limestone and Old Red Sandstone, following the pattern seen in the lower part of the east wall of the chancel. Above this there is the blocking of the opening and also disturbance to the masonry caused by the insertion of the round-headed opening in the 11th century, and then at 17.20m AOD there is the band of Arden Sandstone.

*The east end of the south wall of the south aisle (Fig. 6, left)*

The eastern part of the south wall of the south aisle was constructed as the south wall of the principal south porticus. Again there is a concentration of Old Red Sandstone between 12m and 13m AOD, though it should be noted that much of the eastern part of



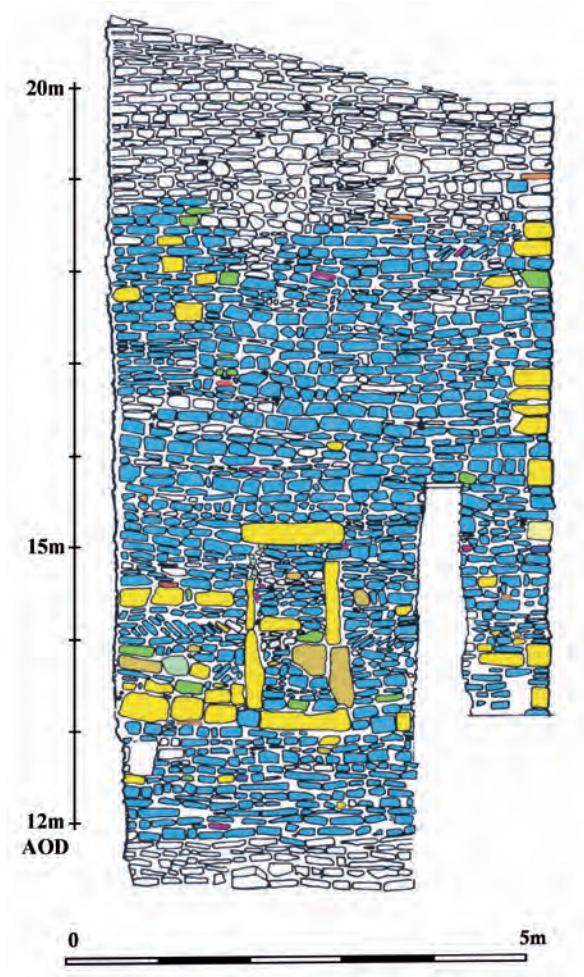
*Fig. 6 Elevation drawings with petrological coding of the south and east walls of the south porticus (the modern vestry at the east end of the south aisle) (for the key to Stone Types see p.12)*

the elevation has been rebuilt in work associated with the adjacent monastic buildings. Again, we find at 17.0m AOD that there are the lower courses of the assemblage of Arden Sandstone. So the south porticus is also tied into this episode of building which thus far includes the east wall of the chancel above 15m AOD and the apse. The concentrations of Old Red Sandstone in the lower courses of both elevations may suggest that the masonry, perhaps below 13m AOD, belongs to an earlier period of construction.

#### *The east wall of the north aisle (Fig. 7)*

The wall of the north aisle was originally constructed as part of the principal north porticus. This elevation is completely different; it shows none of the petrological





*Fig. 7 Elevation drawing with petrological coding of the east wall of the north aisle  
(for the key to Stone Types see p.12)*

patterning seen in the stonework that we have looked at so far. There is no concentration of Old Red Sandstone in the lower courses, no progression through a mixed assemblage of sandstones and limestones – and the distinctive band of Arden Sandstone is not present. Most of the Arden Sandstone that appears in this elevation is there as the result of post-medieval or 19th-century repair.

The area of masonry to the south of the doorway contains a variety of Peagrit associated with later medieval work, a piece of 12th-century green sandstone, and a piece of Guiting Hill Stone (probably from the 1860s),<sup>49</sup> while the large blocks of Lower Freestone rest on 19th-century roof tiles; it appears that this area represents a repair.

*The eastern half of the north aisle (Fig. 8)*

The early medieval masonry that survives in the north elevation of the north porticus (on the left-hand side of the elevation) is similar to that in the east wall. It is overwhelmingly of Lias limestone with a scatter of Oolitic limestone, sandstone tile, brick and tufa. It may or may not be significant, but the suite of building materials present in the north porticus is similar to that found in the upper east wall of the chancel. Inside the church it can be seen that the east wall of the porticus is not in bond with the north wall of the chancel. However, the opening from the chancel to the porticus at first-floor level is original, indicating that a porticus was planned in this position but built later. The similarity of the assemblage to the assemblage at clerestory level *may* indicate that this took place while the upper part of the building was under construction or very soon after.<sup>50</sup>

The face of the former porticus to the west (Philip Rahtz's north b porticus) is shown on the right-hand side of the elevation.<sup>51</sup> It appears to have been mostly rebuilt with the insertion of the 14th-century window.

The green sandstone from Highley, coded pale green, is present only in the masonry associated with the insertion of the window and the blocking of the door beneath in the eastern porticus and also in the 14th-century fabric in the north b porticus. It does not appear in the early medieval masonry.

*The western half of the north aisle (Fig. 9)*

The green sandstone is also present in some quantity in the lower courses of the remainder of the north aisle. The chronology and structural sequence of this part of the building has never really been addressed. Much of the elevation is clearly of a single build, and the now-blocked doorway is integral with the masonry around it. I would like to pause just for a moment to ask how such a collection of stones came to be in a late-medieval wall such as this. One way of explaining the movement and circulation of materials in a building such as St Mary's is a model, developed by an archaeologist named Pat Foster, called 'the exploding church'.<sup>52</sup> It works like this. If you imagine the first stone church on a site, perhaps a small two-celled structure like the nave and chancel here, then the masonry in this first church is progressively thrown outwards, through the processes of rebuilding and enlargement. One may, for instance, begin by imagining the north wall of the nave intact prior to the creation of the arcade. The wall is then pierced and the material that is removed, that is both faces of the wall and the core, may be reused in the newly constructed aisle wall, perhaps mixed with some freshly quarried stone, perhaps with stone from other parts of the church. Then, as has happened in places in the north aisle, either the whole structure has come down and been rebuilt, or it has been refaced, perhaps with the earlier core remaining intact, and again some freshly-quarried stone was also added.

Then, if one adds that the original structure was composed of material recycled from Romano-British buildings, one gets an idea of the processes that have been at work to produce masonry such as that in the western half of the north aisle, with, for example, a fragment of *opus signinum*, tufa, Pennant Sandstone and green coal measure sandstone (Highley Stone), all mixed with freshly-quarried stone.<sup>53</sup> A similar pattern is visible in the west wall of the aisle (not illustrated).

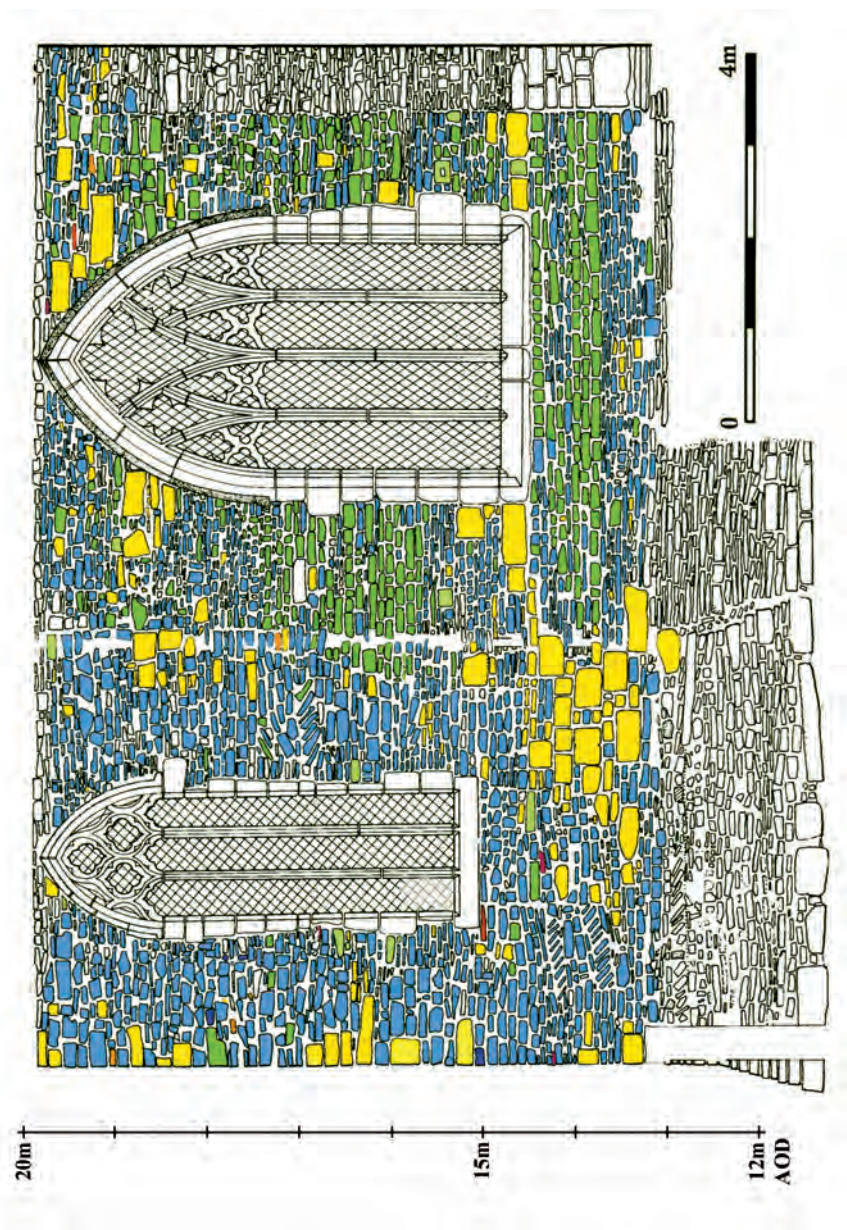
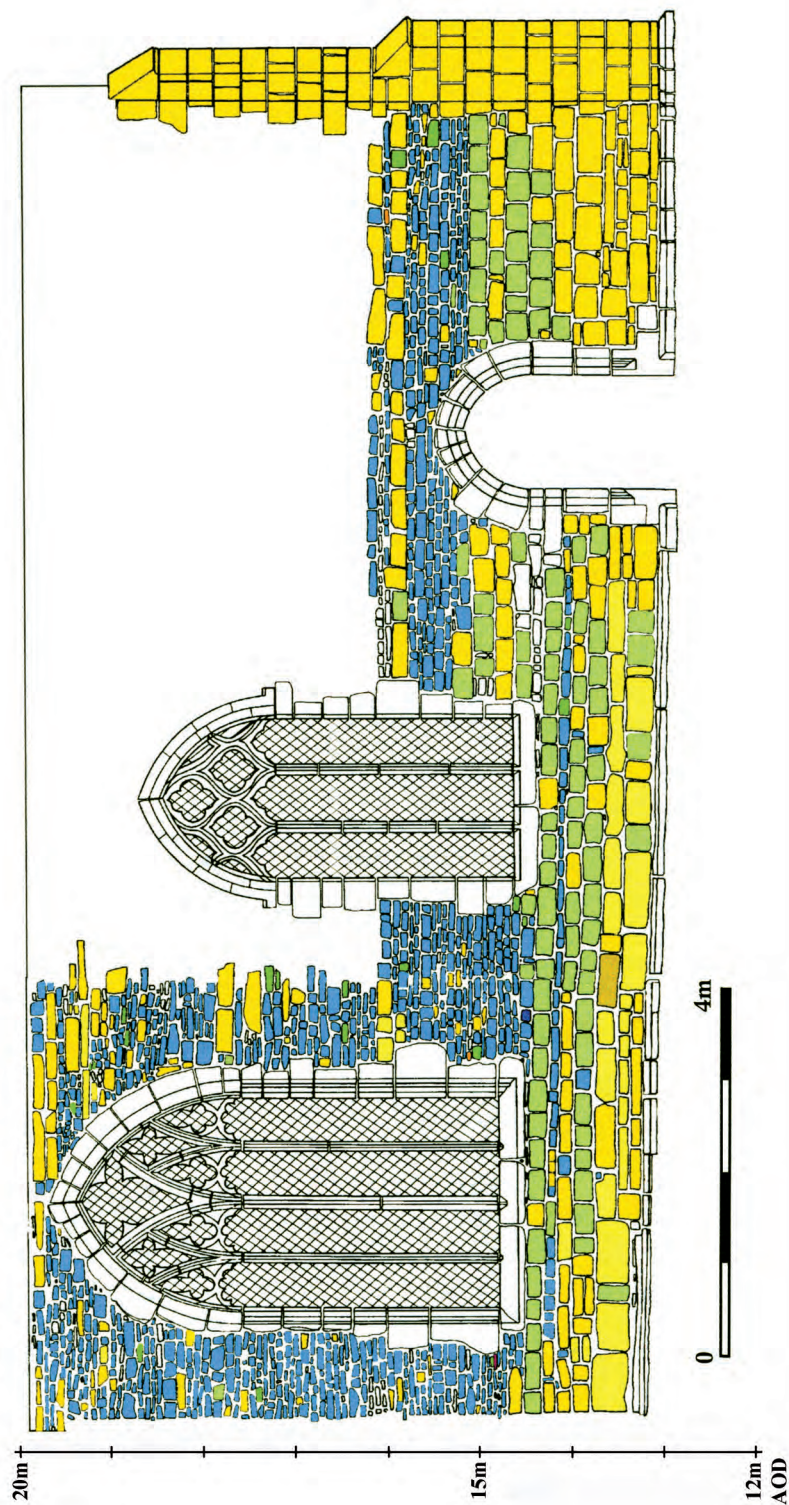


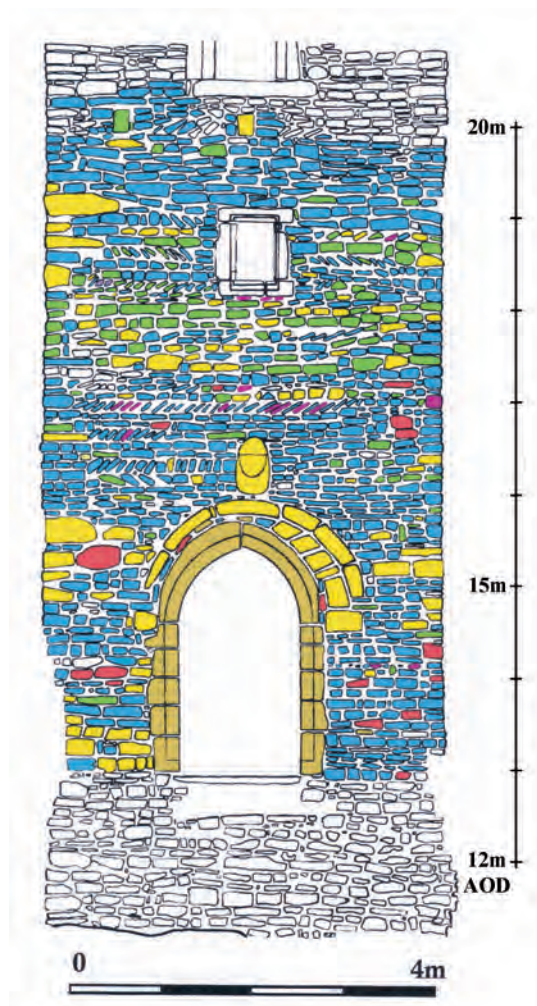
Fig. 8 Elevation drawing with petrological coding of the eastern part of the north wall of the north aisle  
(for the key to Stone Types see p.12)





*Fig. 9 Elevation drawing with petrological coding of the western part of the north wall of the north aisle  
(for the key to Stone Types see p. 12)*





*Fig. 10 Elevation drawing with petrological coding of the west wall of the Anglo-Saxon porch (later tower) (for the key to Stone Types see p.12)*

### *The Anglo-Saxon porch (Fig. 10)*

The Anglo-Saxon porch survives as the lower part of the tower. This is the only part of the west elevation to have been drawn. The height of the ladder limited the petrological identifications to 20m AOD. A point to note about this part of the church is that it was always an important entrance – and may have been important for other reasons too such as rituals associated with the veneration of relics – and so the fabric may have been altered or disturbed more than in other parts of the building.<sup>54</sup>

Firstly we can see the doorway cut from Peagrit, which was inserted in the 14th century. Behind it, as it were, are the remains of the earlier round-headed doorway, which are composed of worked pieces of Lower Freestone. Moving up the elevation, the assemblage dominated by Arden Sandstone, which was identified in the eastern

parts of the building, also appears here at the same level. Here it includes more Inferior Oolite (coded yellow) and it is interrupted by the insertion of an opening between 18m and 19m AOD. Nonetheless the assemblage can clearly be identified between 17.50m and 18.70m AOD, and so this ties in the construction of the porch – at this level – with the construction of the east wall of the chancel and south porticus.

Some fairly fundamental questions remain concerning the fabric around the doorway. For example was the round-headed doorway inserted into the fabric or is it original? Neither is it clear how much of the stonework that is adjacent to the jambs is the result of rebuilding or repair. However, despite these difficulties, we can still see that the Old Red Sandstone is concentrated in the lower part of the elevation, and this suggests a connection with the earliest assemblages of Lias limestone and Old Red Sandstone, which have been identified at the east end of the church.

## Conclusions

Having looked briefly at the elevations, what can the results tell us about the development of the church?

One of the criticisms of the research that has been carried out over the past few decades here is that it has produced a series of detailed studies on various parts of the structure, but that the integration of these individual studies remained essentially subjective. In other words, there was no consistent method of relating these disparate parts of the structure either to each other or to the overall pattern of development operating in the building.

The primary method of assessing the relationship between, say, two walls has been on the basis of whether the walls are bonded or abutted to each other. But there have been disagreements as to the reliability of this method.<sup>55</sup> There has also been the suggestion that a technique called 'robbing for bonding' may have been used. Robbing for bonding is when part of an existing structure is dismantled and then rebuilt along with a new adjoining structure, so that both new and old have interlocking stonework and do not, as would normally be expected, abut.<sup>56</sup>

The petrological analysis provides a method of relating one part of the structure with any other. So we can look, for example at the Anglo-Saxon south porticus and see that, at 17m AOD, the porticus was being constructed simultaneously with the porch. Or we can compare the east walls of the chancel and north porticus and say, with some certainty, that they were not erected simultaneously. The study lends no support to the suggestion that the technique of 'robbing for bonding' was used at Deerhurst in the early medieval period, though it was evidently used where the later medieval priory buildings adjoin the east end of the south aisle (Fig. 6, left).

So to return to the distribution of stone in the fabric, we can say that the east wall of the chancel, the south porticus and the porch were extended to something approaching their present height during a single episode of building, Period IV in the chronology proposed by Rahtz and Watts. The north porticus is excluded from this phase of building, and so, as we would expect, is the entire north aisle.

In the lower parts of the structure of the chancel, south porticus and tower there is a recurring trend showing concentrations of Old Red Sandstone, suggesting either a relationship between these structures at this level or a common source of stone.<sup>57</sup>

On the sources of the stone there is, in all of the early medieval fabric, material

suggesting that the building stone was procured from the ruins of Roman structures. However, identifying a specific source has not been possible. For example the two villas nearest to Deerhurst, one over the back of Coombe Hill (at NGR SO 882263) and the other around 5km to the south at Willington Court in Sandhurst (at NGR SO 837241), have both been excavated but remain unpublished.<sup>58</sup> Even when excavations are published, for example the recent work at Tewkesbury, the only stones retained for examination are those with architectural decoration or sculpture.<sup>59</sup>

The patterning of the assemblages that occur above 15m AOD might be produced by obtaining the stone from various Romano-British buildings. For example the quantity of Arden Sandstone required to produce a 1m band of stone around the nave, chancel, south porticus and tower, assuming that the core of the wall contains similar quantities of the sandstone as the face, would be approximately 90 cubic metres. As a rough guide, this quantity of stone could have been obtained from a rectangular structure 6m by 3m in plan and 3m in height. Now these are only very approximate calculations, but they give an idea of the logistics involved in obtaining, transporting and reusing stone.

It may never be possible to locate these hypothetical Roman buildings, but it is possible to say that the stone has not travelled far and so contrasts with, for example, eighth-century Brixworth or the early medieval churches in the hinterland of York, where Romano-British building material was transported far greater distances.<sup>60</sup> At Deerhurst, stone of varying quality from the Roman past was available at modest distances and could be utilised for the construction of what is one of the most spectacular survivals of Middle Saxon architecture among the kingdoms of the English.

## NOTES

## Abbreviations

|      |                                             |
|------|---------------------------------------------|
| AOD  | Above Ordnance datum (mean sea level)       |
| GA   | Gloucestershire Archives                    |
| GCAR | Gloucester Cathedral Archaeological Reports |
| NGR  | National Grid Reference                     |

- <sup>1</sup> For Strickland, see H. Ritvo, 'Strickland, Hugh Edwin (1811–1853)', *Oxford Dictionary of National Biography* (Oxford, 2004) [<http://www.oxforddnb.com/view/article/26664>, accessed 23 October 2013], with further bibliography.
- <sup>2</sup> GA, P112/IN/4/8. In his reply dated 20 March 1861, Butterworth commented that 'the workmen assure me that the stone with which the oldest Saxon parts are constructed, is Cotswold oolite, (where it is not the blue lias.) They cannot find the Forest stone.' (GA, P112/CW/3/1). As this lecture shows, honour can be done to both parties in this exchange of views.
- <sup>3</sup> R. N. Bailey, *Anglo-Saxon Sculptures at Deerhurst*, Deerhurst Lecture 2002 (Deerhurst, 2005).
- <sup>4</sup> For the early history, see P. Wormald, *How do we know so much about Anglo-Saxon Deerhurst?*, Deerhurst Lecture 1991 (Deerhurst, 1993).
- <sup>5</sup> D. Hooke, *The Anglo-Saxon landscape of north Gloucestershire*, Deerhurst Lecture 1990 (Deerhurst, 1990); M. Aston, 'Fieldwork at Deerhurst: a preliminary survey', in P. Rahtz and L. Watts with H. Taylor and L. Butler, *St. Mary's Church, Deerhurst, Gloucestershire: fieldwork, excavations and structural analysis, 1971–1984* (Woodbridge, 1997), 1–11.
- <sup>6</sup> Rahtz *et al.*, *St Mary's Church, Deerhurst*.
- <sup>7</sup> English Heritage, *Exploring our past: strategies for the archaeology of England* (London, 1991), 40–3, 51–2; D. P. S. Peacock, *The archaeology of stone: a report for English Heritage* (London, 1998).
- <sup>8</sup> See for instance the various studies in *Stone: quarrying and building in England, AD 43–1525*, ed. D. Parsons (Chichester, 1990).
- <sup>9</sup> For fuller details of 19th-century and medieval stone use at Gloucester Cathedral, see S. Bagshaw, C. Heighway and A. Price, 'The south porch of Gloucester Cathedral: a study of nineteenth-century stone repair types', *Journal of the British Archaeological Association* 157 (2004), 91–114.
- <sup>10</sup> Rahtz *et al.*, *St Mary's Church, Deerhurst*, 232.
- <sup>11</sup> For the layman, a good general introduction to the geology of the area is provided by W. Dreghorn, *Geology explained in the Severn Vale and Cotswolds* (Newton Abbot, 1967); for a detailed account of the immediate environs of Deerhurst, see B. C. Worssam, R. A. Ellison and B. S. P. Moorlock, *Geology of the country around Tewkesbury: Memoir for 1:50 000 geological sheet 216* (London, 1989). For introductions to the building stones of the area, see A. J. Price, 'Geology and building materials', in D. Verey and A. Brooks, *The Buildings of England: Gloucestershire*, 1, *The Cotswolds*, 3rd ed. (London, 1999), 23–9; A. J. Price, 'Geology and building materials', in D. Verey and A. Brooks, *The Buildings of England: Gloucestershire*, 2, *The Vale and the Forest of Dean*, 3rd ed. (London, 2002), 25–33.
- <sup>12</sup> For Smith see J. L. Morton, *The remarkable life story of William Smith, the Father of English Geology*, 2nd ed. (Horsham, 2004).
- <sup>13</sup> Price, 'Geology and building materials' [in *Gloucestershire*, 2], 28, 31–2; also Worssam *et al.*, *Geology*, 26–9, 42. For the terminology used by quarry workers, see R. I. Murchison, *Outline of the Geology of the neighbourhood of Cheltenham*, 2nd ed. revised by H. E. Strickland and J. Buckman (Cheltenham, 1844), 49–50. Accounts lying loose in GA, D843/1/1 relate to the purchase of stone and lime in 1859 by Thomas Collins (the builder who was to carry out the restoration of Deerhurst Church in 1861–2) from Thomas Jones, a quarryman at Bockeridge Common in Twynning (Gloucestershire), just to the north of Tewkesbury; these accounts also illustrate the terminology involved.
- <sup>14</sup> Ordnance Survey, County Series Maps, Scale 1:10 560, 1st edition: Gloucestershire XIX N.W. (at NGR SO 892281; also at SO 876302, in Tewkesbury but close to the boundary with Deerhurst); Gloucestershire XVIII S.W. (at NGR SO 806254); Gloucestershire XXXII S.E. (at NGR SO 735136). These maps were surveyed and published between 1879 and 1892.
- <sup>15</sup> An example at Deerhurst, visible from the road, is provided by an extension to a barn at Abbot's Court Farm (NGR SO 871295).
- <sup>16</sup> Since Steve gave his Lecture in 2003, the lower part of this corner of the barn has in fact been rebuilt with freshly-quarried Lias imported from Somerset, as it has not been quarried in Gloucestershire for at least 100 years.



- 17 Arthur Price points out that the use of tufa from Dursley is likely to reflect the fact that both Ashleworth and Dursley were members of the great royal estate of Berkeley, documented in Domesday Book. For maps of the Berkeley estate, see M. Hare, 'Anglo-Saxon Berkeley: history and topography', in *Anglo-Saxon Studies in Archaeology and History* 18, ed. H. Hamerow (Oxford, 2013), 119–56, Figs 1, 2.
- 18 For an account of Ashleworth church, see T. Overbury, 'Ashleworth Church', *Transactions of the Bristol and Gloucestershire Archaeological Society* 48 (1926), 379–85 (with a photograph showing the herringbone masonry facing p. 380).
- 19 See n. 14 above.
- 20 Arthur Price comments that the ancient quarries for this tilestone were probably at Cooper's Hill (Brockworth) or nearby High Brothridge (Cranham), both Gloucestershire.
- 21 S. Bagshaw, 'Early Medieval Church to Tractor Shed: building survey at Leonard Stanley Priory', *Glevensis: The Gloucester and District Archaeological Research Group Review* 31 (1998), 3–12.
- 22 The entry in the account reads, 'Taking out and rebuilding wall under chancel arch part new stone' (GA, P112/CW3/1).
- 23 The original estimate of Collins and Cullis included 1450ft of Forest stone (GA, P112/CW3/1). However, the contractor's ledger (GA, D843/1/1) reveals that much less was used in practice.
- 24 See S. Bagshaw, 'Archaeological recording of the monastic infirmary at Gloucester Cathedral', unpublished report, GCAR 2001/G, 8. The report is available online on the website of the Bristol and Gloucestershire Archaeological Society: [www.bgas.org.uk/publications](http://www.bgas.org.uk/publications).
- 25 Since Steve delivered this lecture in 2003, the lower part of this wall has been repointed, but slight traces of the pink mortar can still be discerned.
- 26 M. G. Sumbler, A. J. M. Barron and A. N. Morigi, *Geology of the Cirencester district: Memoir for 1:50 000 geological sheet 235* (London, 2000), 39. In the version of this lecture delivered in 2003, Steve mainly employed the terminology for stone types used in the quarrying and building industries; the more formal geological names for stone types have been added in most cases by Arthur Price.
- 27 Another large stone with a lewis-hole has recently been observed in the porch of Wightfield Manor at NGR SO 869287, just over 1km south of the church. Wightfield Manor was built in the 1540s by the Cassy family, using materials from at least two monasteries recently dissolved, Tewkesbury and Deerhurst (for the Deerhurst material, see M. Thurlby, *The Architecture and Sculpture of Deerhurst Priory: the later 11th-, 12th- and early 13th-century work*, Deerhurst Lecture 2009 (Deerhurst, forthcoming)). It would be tempting to suggest that this stone is of Roman origin, reused first at Deerhurst and subsequently at Wightfield. However, Arthur Price has examined the stone and points out that it was designed for use with a two-pinned lewis rather than the normal three-legged Roman lewis; the bedding of the stone is also contrary to normal Roman practice. Arthur suggests that this stone is most likely to be late-medieval in origin.
- 28 To the south of Gloucester, Minchinhampton Stone from the Great Oolite fulfils the same role.
- 29 Steve also suggested that the Adam and Eve cross-shaft now in the porch at Newent church was made of Peagrit, but more recent geological identification suggests that the stone is 'possibly' from the Taynton Limestone Formation of the Middle Jurassic, Great Oolite Group: R. Bryant, *Corpus of Anglo-Saxon Stone Sculpture*, X, *The Western Midlands* (Oxford, 2012), 42–3, 233. Arthur Price comments that he has inspected the Newent stone twice and has been unable to reach a definite conclusion as to its precise source.
- 30 Since Steve's lecture was given in 2003, the Elmstone Hardwicke stone has received much attention. It has been shown that it must in fact have been part of a separate monument distinct from the Deerhurst font: Bryant, *Corpus*, 163–70, 198–201. For a possible historical context for the occurrence of the same motif at Deerhurst and Elmstone Hardwicke, see M. Hare, 'A possible commemorative stone for Æthelmund, father of Æthelric', in *Intersections: the archaeology and history of Christianity in England, 400–1200: papers in honour of Martin Biddle and Birthe Kjølbye-Biddle*, ed. M. Henig and N. Ramsay, BAR British Series 505 (Oxford, 2010), 135–48.
- 31 On the occasion of the lecture, a fragment was exhibited which had fallen from one of the gargoyles on the north side of the nave in the course of the previous winter.
- 32 Steve began work on the south clerestory, but this was sadly unfinished.
- 33 GA, D843/1/1.
- 34 Rahtz *et al.*, *St Mary's Church, Deerhurst*, 152, 166.

- 35 The use of Highley Stone at Worcester Cathedral was noted in 1994 (see n. 38 below), but Steve's recognition of the use of this stone in the parish churches of south Worcestershire and north Gloucestershire is an original and important contribution.
- 36 For further discussion of the polychromatic stonework in the south arcade at Deerhurst, see Thurlby forthcoming (as n. 27 above).
- 37 S. Bagshaw, 'The south transept of Gloucester Cathedral, 2002–3; archaeological recording', unpublished report, GCAR 2002/C, 6–7 (available online, see n. 24).
- 38 P. Barker, *A short architectural history of Worcester Cathedral* (Worcester, 1994), 37, 115–16; U. Engel, *Worcester Cathedral: an architectural history* (Chichester, 2007), 27–8, 71–2.
- 39 In geological terms Highley Stone comes from the Upper Carboniferous Warwickshire Group, Halesowen Formation.
- 40 D. S. Sutherland and D. Parsons, 'The petrological contribution to the survey of All Saints' church, Brixworth, Northamptonshire: an interim study', *Journal of the British Archaeological Association* 137 (1984), 45–64; D. Parsons and D. S. Sutherland, *The Anglo-Saxon Church of All Saints, Brixworth, Northamptonshire: survey, excavation and analysis, 1972–2010* (Oxford, 2013).
- 41 The boundaries between assemblages in the east walls of the chancel and the north and south aisles are marked schematically in a drawing published in S. Bagshaw, R. Bryant and M. Hare, 'The discovery of an Anglo-Saxon painted figure at St Mary's Church, Deerhurst, Gloucestershire', *Antiquaries Journal* 86 (2006), 66–109, fig. 14 (p. 89). See also figs 12 and 13 (pp. 86–7) for a series of drawings showing the occurrence of individual stone types in these walls and also in both faces of the apse.
- 42 Rahtz *et al.*, *St Mary's Church, Deerhurst*, 166–75.
- 43 In Fig. 4 this stone is uncoloured; it is at the same level as the bottom of the bases of the chancel-arch.
- 44 R. Shaffrey, *Grinding and Milling: a study of Romano-British rotary querns and millstones made from Old Red Sandstone*, BAR British Series 409 (Oxford, 2006), 19–21 and *passim*.
- 45 This wall was rebuilt in 2009 as part of new flood defences; a photographic record of the quernstone was made and it was then built into the new wall in roughly its original position on the east face. It may be seen by visitors by leaning over the wall (with all due care!) at a point just north of the floodgates, about 2.75m south of the fence between the field and the vegetable garden.
- 46 These features were discussed in detail by Steve in Bagshaw *et al.*, 'The discovery of an Anglo-Saxon painted figure', 84–97.
- 47 The presence of a band of sandstone at this level of the apse was noted by the archaeologists of the 1970s: Rahtz *et al.*, *St Mary's Church, Deerhurst*, 39–44.
- 48 The term 'porticus' is used to denote annexes flanking the main body of an Anglo-Saxon church: see H. Gittos, *Liturgy, architecture, and sacred places in Anglo-Saxon England* (Oxford, 2013), 146–211; É. Ó Carragáin, 'The term *porticus* and *imitatio Romae* in early Anglo-Saxon England', in *Text and Gloss: studies in insular learning and literature presented to Joseph Donovan Pheifer*, ed. H. C. O'Briain, A. M. D'Arcy and V. J. Scattergood (Dublin, 1999), 13–34.
- 49 On the use of Guiting Hill Stone, see S. Bagshaw, 'The stones of St Mary's, Deerhurst', *Church Archaeology* 3 (1999), 37–40, at 38, citing GA, P112/IN4/10 (see also GA, D843/1/1, p. 152).
- 50 The last three sentences of this paragraph are an editorial addition, intended to tease out the possible implications of Steve's observation.
- 51 Rahtz *et al.*, *St Mary's Church, Deerhurst*, 17–27, 44–59, 180–3. The interpretation favoured by Rahtz and his colleagues involved a series of extensions westwards from the original two-storeyed porticus north of the choir. However, recent excavation during liturgical reordering, coupled with observation of the south aisle wall in winter (when it is not covered by foliage), has suggested that the Period IV church was flanked by additional two-storeyed porticus halfway along the nave: see R. Bryant, M. Hare and C. Heighway, 'Excavations at St Mary's church, Deerhurst in 2012: an interim report', *Glevensis: The Gloucester and District Archaeological Research Group Review* 45 (2012), 20–6. On this basis the wall of the 'north b porticus' would constitute an infill between two existing porticus; the date of the masonry of this infill remains uncertain.
- 52 We have been unable to trace any published work by Pat Foster on this subject. We have ascertained that Pat Foster was associated with the Department of Archaeology at the University of Sheffield at the time that Steve was studying there, but we have been unable to establish contact with him. We incline to the view that the idea attributed to Pat Foster was in the form of a personal communication.

- 53 *Opus signinum* is a mortar-based flooring material with a substantial measure of crushed brick, giving a pinkish appearance. The piece of *opus signinum* is found 1.2m east of the buttress at the north-west corner of the aisle at a height of 15.8m AOD; in Fig. 9 it is given the same coding as brick and tile. A wall running north-south, which contained several lumps of *opus signinum*, was excavated about 2m to the west of the present tower; it was most probably of late-Roman date, but could be of later origin (Rahtz *et al.*, *St Mary's Church, Deerhurst*, 75–81, 154–6).
- 54 On possible relic-venerations at Deerhurst, see now M. Hare, 'The 9th-century west porch of St Mary's Church, Deerhurst, Gloucestershire: form and function', *Medieval Archaeology* 53 (2009), 35–93, at 79–86.
- 55 See for instance the comment in the 1997 report that 'there may be bonding and butt-jointing in the same building programme': Rahtz *et al.*, *St Mary's Church, Deerhurst*, 150. At Brixworth, David Parsons has noted that 'It is clear at many points in the church fabric, however, that adjuncts (e.g. the *porticus*) were not systematically bonded in, and that lack of bonding does not necessarily imply that two adjacent parts of the building are not contemporary': Parsons and Sutherland, *The Anglo-Saxon Church of All Saints, Brixworth*, 103.
- 56 'Robbing for bonding' was suggested by Harold Taylor in *Deerhurst Studies 1: The Anglo-Saxon Fabric 1971–76* (Deerhurst, 1977), 5–6; he considered that the 'main rectangle' was earlier than the upper part of the polygonal apse, but was partly rebuilt when the apse was constructed so as to enable the apse to be bonded to the east wall of the chancel. See also Rahtz *et al.*, *St Mary's Church, Deerhurst*, 125 n. 7.
- 57 It was noted above (n. 51) that two-storeyed porticus are now considered to have existed halfway along the nave. In the south wall of the south aisle, part of the south wall of the proposed porticus is preserved, and here also the same combination of Lias and Old Red Sandstone may be observed. There is in addition a certain amount of oolitic limestone, plus two pieces of modern brick. Much of the limestone retains sharp edges and is evidently modern patching, probably dating from the restoration of 1861–2.
- 58 J. Sanders, 'Staplins Farm', *Glevensis: The Gloucester and District Archaeological Research Group Review* 6 (1972), 7; A. J. Roberts, 'Fieldwork at Willington Court Roman Villa, Sandhurst, Gloucestershire', *Glevensis: The Gloucester and District Archaeological Research Group Review* 42 (2009), 17–29.
- 59 For Romano-British occupation at Tewkesbury (including some evidence for stone buildings), see A. Hannan, 'Excavations at Tewkesbury, 1972–74', *Transactions of the Bristol and Gloucestershire Archaeological Society* 111 (1993), 21–75. For various minor excavations at Tewkesbury Abbey between 1987 and 1998, see N. Birdsall and R. K. Morris, 'Recent architectural works and archaeology', in *Tewkesbury Abbey: history, art and architecture*, ed. R. K. Morris and R. Shoesmith (Logaston, 2003), 257–74, at 264–5 (with comment on the building stones used in the Abbey at 272–3).
- 60 Parsons and Sutherland, *The Anglo-Saxon Church of All Saints, Brixworth*, 37–70, 147–58; R. K. Morris, 'Churches in York and its hinterland: building patterns and stone sources in the 11th and 12th centuries', in *Minsters and Parish Churches: the local church in transition, 950–1200*, ed. J. Blair (Oxford, 1988), 191–9.

## STEVE BAGSHAW

Steve Bagshaw was born in 1963 in Essex; his family moved to Stroud in 1978 where Steve attended Marling School. He became interested in archaeology in his thirties, gaining a first-class degree in Archaeology from Sheffield University and starting a PhD on the subject of the re-use of Roman stone in early medieval buildings. From 2001 to 2006 he worked with the Consultant Archaeologist to Gloucester Cathedral; he carried out a great many petrological and archaeological surveys, most of which can be found on the website of the Bristol and Gloucestershire Archaeological Society, with a link on the Cathedral's website. Steve also worked on archaeological recording projects at Deerhurst, which was to be one of the case studies in his PhD. Steve was an extremely competent geologist, surveyor, draftsman, and archaeologist whose collaboration is much missed. He died in Gloucester on 13 September 2013.



## THE ANNUAL DEERHURST LECTURE

The Annual Deerhurst Lecture was established by the late Arnold Porter in 1984 on the model of the annual Jarrow Lecture. The lecture takes place in St Mary's Church, Deerhurst and is managed by the Committee of The Friends of Deerhurst Church in cooperation with the Parochial Church Council of Deerhurst with Apperley.

The lecture is normally given on a topic relating to recent research into the history and archaeology of the early medieval period, though occasional lectures concern later periods. The principal focus of the lecture is often, though not invariably, Deerhurst itself with its two early churches: the parish church of St Mary, probably built in the early 9th century, and the chapel of the Holy Trinity (known as Odda's Chapel), dedicated in 1056.

The lecture is usually given on the middle Saturday of September. Details of the next lecture to be given are normally available on the website of the Friends of Deerhurst Church at <http://deerhurstfriends.co.uk/lectures-events/>.

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THE BUILDING STONES OF MARY'S CHURCH, DEERHURST

Steve Bagshaw

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by  
STEVE BAGSHAW

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#### Editorial note

The lecture printed here was delivered by Steve Bagshaw on 13 September 2003. At the time Steve was working on a doctoral thesis at the University of Sheffield, and the original intention was that his lecture would be published once his doctorate was completed. Unfortunately ill-health and other factors compelled Steve to set aside his archaeological work. He died suddenly at the young age of 50 on 13 September 2013, ten years to the day after his Deerhurst Lecture was given.

The text has been prepared for publication by a team comprising Richard Bryant, Michael Hare, Carolyn Heighway and Arthur Price. We are very grateful to Steve's former partner, Anna Nevoa, for making Steve's archaeological papers available to us, including the text of his lecture as delivered, and to all the members of Steve's family for permission to publish the text. Ray Wilson very kindly converted the hard copy of the text into a Word document. We also owe a debt of gratitude to Richard Gem, to whom Steve had given copies of his coloured stone-by-stone drawings, for allowing us to use them for this publication. Steve himself would have wished to thank the late Philip Rahtz for the enthusiastic consent which he gave for the use of the published elevation drawings prepared in the 1970s. Steve used these as base drawings for his own work.

A short tribute to Steve, prepared by Carolyn Heighway, will be found at the end of this publication.

#### *Front Cover*

*The cover photograph shows the lower part of the west wall of the Anglo-Saxon porch and provides an indication of the variety of stone types used. For a detailed elevation drawing of this wall with petrological coding, see Fig. 10.*

*(Photograph: Michael Hare)*