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A new survey of the fabric of the Church of the Holy Trinity, Bosham, West Sussex

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with a major contribution by
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The tower and spire of this church have been carefully studied by Fred Aldsworth in recent papers in this journal. This study reassesses the whole of the architectural history of the church using both the documentary evidence and the archaeological evidence. For the latter, the changing use of the building stone types has been particularly useful.

INTRODUCTION

The church at Bosham is perhaps most famous for being depicted on the Bayeux tapestry.[1] This was because Earl Harold sailed from Bosham in the spring of 1064, and the tapestry shows Harold and his soldiers riding to Bosham (the inscription actually tells us this — *Harold dux Anglorum et sui milites equitant ad Bosham*), and then Harold with a retainer entering the church (*Ecclesia*), both on their knees. The next scene shows Harold feasting on the upper floor of a house that was probably at his manor at Bosham, which was next to the church.[2] The church is carefully shown on the tapestry, but as with the more famous depiction of the abbey of St Peter (Westminster Abbey), it is no more than a stylised depiction. There can, however, be little doubt that there was a stone church at Bosham in 1064, and one of the questions this new survey will try to answer is how much of the present church was already there in 1064.

Bosham is the earliest documented Christian church in Sussex because the Venerable Bede tells us that when the exiled Bishop Wilfrid went to Sussex in about AD 681 he found the South Saxon province a mostly pagan place. He goes on:

> There was, however, a Scots [i.e. Irish] monk named Dicul who had a very small monastery at a place called Bosanham, surrounded by woods and the sea, where five or six brothers served the Lord in a life of humility and poverty: but none of the natives was willing to follow their way of life or listen to their teaching.[3]

It is, therefore, quite likely that the earliest church at Bosham, perhaps a timber structure, was situated somewhere in the vicinity of the later church. Any surviving traces of this church will only exist below ground, and the same applies to the site of Bishop Wilfrid's own church at Selsey, which was probably situated at Church Norton on Pagham harbour, six miles south-east of Bosham.[4] Unfortunately, the history of Bosham between about AD 681 and the mid-eleventh century is very obscure, and very few facts about the early history of Bosham church are known.[5]

The early history of Bosham church has also been much confused by 'early traditions', mainly written down in the mid-nineteenth century, which state that the present church sits on a Roman *basilica*, and that the bases of the chancel arch once formed part of this *basilica*.[6] As we shall see, this cannot be correct (*see* below), and this 'tradition' only arose because the very fine carved bases of the chancel arch were re-exposed in 1865, when the floor level was lowered by about 2 ft (*c*. 0.06 m).[7] At the same time a stone coffin was found under the south side of the chancel arch, which was immediately stated to be the 'the remains of the daughter of Canute'. This attribution is based on another 'early tradition',[8] which unfortunately has no basis in fact, though the 'tradition' has continued to the present day, and the 'grave' of 'a daughter of King Canute' is now firmly marked by an inscribed floor slab, placed there 'by the children of the Parish, August 1906.' This slab is about 5 ft (1.5 m) south of the stone coffin that was uncovered in 1865. This coffin, and another stone coffin, was uncovered again in April 1954, and a plan was drawn. Another more recent 'tradition' suggested that coffin was for Earl

Godwin (the father of King Harold),[9] or even of King Harold himself. Apart from the fact that the stone coffins are likely to be later medieval, it is known that Godwin was buried in the Old Minster at Winchester,[10] and King Harold was either buried at Battle, or on the sea shore at Hastings, with his body probably being later moved to Harold's own church, Waltham Abbey in Essex.[11]

The first person to study the history and 'archaeology' of Bosham church was the Revd Henry Mitchell, who was vicar of Bosham for 57 years (1845–1902). He supervised all the nineteenth-century restorations (*see* below), and stripped the plaster from the walls and reduced the floor in the nave, as we have seen. He also wrote about the church's early history and traditions and published the first engraving of the chancel arch and the newly stripped west wall of the nave.[12] He was succeeded as vicar by the Revd K.H. Macdermott (vicar, 1903–15),[13] who wrote the first detailed account of the church[14] and undertook more restoration work. The present church guide is largely based on his work, and it unfortunately contains a most misleading 'interpreted' rough plan.[15] In about 1935, however, a useful measured plan of the church was made for the *Victoria County History* by W. H. Godfrey. This plan was phased, and it was used for the visit on Friday 12 July 1935 to Bosham church of the Royal Archaeological Institute.[16] The full account of the history of Bosham parish, and its church, which was written by W.D. Peckham before the Second World War, was not published by the *Victoria County History* until 1953. This is still, to date, the best published history and description of Bosham church.[17] Subsequent to this several architectural historians have published brief accounts of Bosham church, almost all of them dealing mainly with the Anglo-Saxon or early Norman phases of the building. Most notably the late Dr Harold Taylor looked at the church (and carefully drew the mouldings of the chancel arch) as part of his great study of Anglo-Saxon architecture in England.[18] Another very useful summary of the early history and architecture of the church was written by Richard Gem for the visit of the Royal Archaeological Institute on 23 July 1985.[19] Just before this, in April/May 1981, the floor level in the crypt at the east end of the south aisle was lowered, unfortunately without the involvement of an archaeologist. Below the floor two inhumation burials were apparently found which had been cut down into the natural brickearth. The lower fill of these graves seems to have been made almost entirely of pure charcoal indicating possibly a date in the late Anglo-Saxon or Norman periods.[20] At the same time two sheets of metal (possibly zinc) were found face down on the old crypt floor. They must date from the earlier nineteenth century, and had traces of Gothic script lettering on one side, including much of the Lord's Prayer. They had been originally been mounted on a wall, and were perhaps deposited in the crypt when the walls of the church were stripped in 1865. Fred Aldsworth and Alison McCann also used the legible text on the zinc plates to transcribe some nearly illegible Gothic text on one of the pillars, which must also date from the early nineteenth century.

By far the most important archaeological works to be carried out on Bosham church are Fred Aldsworth's careful studies of the tower in 1988,[21] and of the spire in 1998.[22] The work on the tower was a 'watching brief' on the outside of the tower when the roughcast render (put there in 1913) was removed, and then replaced by a new render. At the same time some of the quoins were replaced with new blocks of stone from Jaumont in France.[23] The 'watching brief' soon became an opportunity for Fred Aldsworth (then working for West Sussex County Council) to make detailed measured drawings (at a 1:20 scale) of all four walls of the tower, both externally and internally. He then went on to do a full analysis of the building stone types (helped in part by Bernard Worssam), and to work out the phasing of all the masonry in the tower walls. His conclusion was that there were four main phases:

1. Pre-Norman Conquest: the original three-stage tower;
2. Early Norman (*c.* 1080–1110): the new belfry (top) stage;
3. Repair to the south-west quoin;
4. Fifteenth century: new belfry windows and probable erection of present spire.

Aldsworth's subsequent analysis of the spire,[24] was able to show that the carpentry structure was built in a single phase (except for the major repairs of 1841), and dendrochronological analysis by Dan Miles showed that the spire was made from oak timbers, some of which had been felled in the winter of 1405–6 and the summer of 1406. The

paper also looked in more detail at the now almost invisible Romanesque corbel table at the top of the tower.

The following analysis, commissioned by the parish, now examines chronologically the surviving above-ground masonry of the church. It is based on a study of the fabric carried out in 2003–4, by myself and Dr Worssam. Although this is partly helped by the 1860s stripping of the plaster from the interior walls, it is not assisted by the Victorians' use of very heavy pointing (and the accumulation of much subsequent dirt) on the internal masonry.

I. LATE ANGLO SAXON

The earliest parts of the fabric of the present church are the lower three storeys of the western tower, a few fragments of the shell of the nave, and the western third of the chancel, but almost certainly not the chancel arch (*see* below). This indicates a relatively large church with an irregular plan (fairly typical of Anglo-Saxon churches). The tower, which never seems to have had a western doorway, measures internally 20 ft (6.1m) east to west by 16 ft (4.9 m) north to south (Fig. 1). It was joined to a nave with internal dimensions of 56 ft (17 m) by 24½ ft (7.5 m), and beyond this a sanctuary of 19 ft (5.8 m) wide by about 15 ft (4.6 m) long, which is only slightly smaller in area than the tower. The original walls are about 2½ ft (0.8 m) thick. The arch between the tower and the nave, which is about 7 ft (2.1 m) wide and about 13½ ft (4.1 m) high, is an original feature, though the top of the arch may have been slightly rebuilt after the Norman Conquest. The internal quoin stones in the south-west and south-east corners of the nave all appear to be the original Anglo-Saxon ones, unlike those on the north.

The structure of the original tower was carefully studied by Fred Aldsworth, and he was able to show that it was made with rubble work and 'long and short' quoins of large blocks of Bembridge limestone, and what is an early use of Quarr stone. A lime mortar, containing crushed Roman brick, is used for the mortar, and a similar material was apparently used to cover the original tower in an external render. Each of the two internal upper floors is roughly marked by an external string course, using the same materials. Just above the second floor level is a break in the rubble work, with flint being used instead in the top storey. At this stage the quoins at the angles are still largely of Bembridge limestone and Quarr, but some other materials were used, including a ferruginous sandstone, perhaps coming from the Lower Greensand to the north of the South Downs. In the lower two stages is a series of original single-splayed windows, but externally they have inserted Quarr stone jambs of the early Norman period.[25] In the second storey, as Fred Aldsworth has shown, was the original belfry. Although the windows here are blocked, and much mutilated, one can see that originally they had double openings on the north and south sides, and in the surviving jambs and round-headed arches are blocks of chalk and Ditrupa limestone,[26] as well as some smaller pieces of Quarr and Bembridge limestone. Chalk is also used for the top corbel table and string course of the original tower, although all the chalk blocks were subsequently hacked back to the face. It seems very likely that the Ditrupa limestone, as well as many of the Quarr and Bembridge limestone blocks were reused from a Roman building, and the most obvious source is the nearby Roman 'Palace' at Fishbourne[27] (the stone could even have been moved from there to Bosham by water), though another Roman building at Bosham itself, or at nearby Broadbridge, could have been the source. A few other fragments of Ditrupa limestone can be seen in the church walls. In the late-Anglo-Saxon period new freestone quarries were only just starting to be opened up, and it is likely that the quarry at Quarr, in the Isle of Wight, was only being fully exploited after the Norman Conquest (*see* below).

On the east face of the east wall of the tower there is a large triangular-headed doorway at first-floor level which must have led originally into a gallery above the tower arch at the west end of the nave. A horizontal timber in the external wall below the doorway may once have been associated with this gallery. Above the doorway is another horizontal scar, and above this again are traces of three other blocked windows. It was also possible for Fred Aldsworth to suggest the position of the original nave roof against the tower wall. The Anglo-Saxon tower was originally 45½ ft (14 m) high to the top of its corbel table. Nothing is known about the form of the original roof.

The east wall of the tower was clearly integral with the west wall of the nave, but except at the

lowest level, the external quoins on the north-west and south-west corners of the original nave were removed when the arcades to the aisles were put in. However, some of the original quoin stones were probably reused, and externally one can still clearly see the vertical breaks between the aisle masonry and the disturbed masonry at the ends of the arcade walls. The same applies at the east end of the nave, but a few large blocks of Quarr and Bembridge limestone are visible at the bottom, which are probably *in-situ* Anglo-Saxon quoins. These are easily seen on the south-east (Fig. 2), while on the north-east they can be partly seen in the newly cleaned east wall in the boiler house.

The rubble work in the north and south nave walls above the arcades has also been rebuilt with the arcades, and the three round single-splayed windows above the north arcade (which were unblocked in *c*. 1862) must also be post-Conquest. Their external and internal surrounds are made with Quarr stone and a few pieces of Caen stone, and perhaps date from the later twelfth century (Fig. 7).

The one other area of probable Anglo-Saxon masonry is the western third of the north and south walls of the chancel (Fig. 4). This masonry is apparently integral with the east wall of the nave, though this is now quite difficult to see, and to be certain about. Externally there is possible evidence for a blocked doorway at the west end of the south wall, but this is now only marked by a rough masonry relieving arch (Fig. 4). There are no clear jambs to the doorway, externally or internally. In the north wall, however, a blocked-up original single-splayed window was uncovered internally, and partly dug out, in 1865. This window is similar to those in the lower floors of the tower. It still has some internal plaster on its eastern reveal. There was presumably a matching window on the south, but this would have been destroyed by the inserted thirteenth-century (and 1845) window on this side.

In summary, the late Anglo-Saxon church at Bosham consisted of a rectangular aisleless nave, flanked on the west by a contemporary tower, and on the east by a small almost square sanctuary. Above the west end of the nave, there was probably a small gallery that was entered from a doorway in the tower.

Little else can be said about the form of the Anglo-Saxon church, but the masonry described so far was almost certainly built before 1064, when Earl Harold left Bosham for Normandy. It is probable that the church in this form was built in the early to mid-eleventh century, and the most likely patron for the new church is Earl Godwine, who held the great manor of Bosham. His great holdings in the area (he died in 1053) and those of his son Harold, are well described at the very beginning of the Sussex entry in *Domesday Book* T.R.E. (i.e. in the time of King Edward 1066). By 1086 the manor, of course, belonged to William the Conqueror, and was held in demesne.[28]

EARLY NORMAN

The Norman Conquest, of course, brought many great changes to Bosham, as well as to England as a whole, and before the end of the eleventh century major additions were probably made to the church. These can perhaps be associated with Osbern, a royal clerk of Norman origin, who also held much land in the area, and who became Bishop of Exeter in 1072. He joined his Bosham estates to those of the bishopric, and this small Exeter enclave in Chichester diocese was to cause much strife between the two bishops in later years.

The major changes of the early Norman period were firstly the addition of a new top stage to the tower and secondly the enlargement of the sanctuary (later called the chancel) on the east. It is almost certainly at this time that the magnificent new chancel arch was inserted (Figs 2 & 3). All of these new works can be associated with the use of a Quarr stone, which was cut and carved in a much more careful way. It was probably soon after the Norman Conquest that major quarries were opened a mile and a half west of Ryde on the north-east coast of the Isle of Wight to supply the needs of the many new cathedrals, abbeys and churches that were built in south-east England from the 1070s. The two biggest buildings near Bosham that used this new stone were Winchester and Chichester Cathedrals, and for Winchester Cathedral we even have documentary evidence of King William Rufus granting the bishop (Walkelin) half a hide of land and a licence to dig for Quarr stone.[29]

The name Quarr comes straight from the Latin *quadraria* (or *quarria*) — hence our word Quarry — and it meant very specifically a place where rectangular blocks of stone were cut, and not just

a pit (*fossa*) where rubble stone was dug out. The Isle of Wight quarries were so famous that they gave their name to a new abbey, Quarr Abbey, founded nearby in 1132. Unfortunately, the best stone for Norman small block ashlar seems to have been worked out by the end of the twelfth century, but the quarry sites are now very overgrown and covered up and need much more study before one can say this with certainty. Nevertheless, the Quarr stone that was used in the Norman period is now well-known, and from its texture of small broken shells it has sometimes been nicknamed 'Featherbed stone'.[30] In the Norman period it is found in much smaller blocks (initially set in thick beds of mortar), and for much carved work. By about the 1090s it was being carefully carved, and there were only relatively thin joints of mortar between the blocks. This is what we find in Bosham's magnificent chancel arch, as well as in the masonry of the new top stage of the tower, and in the horizontal string course on the outside of the central section of the chancel walls. At Chichester Cathedral, where rebuilding work probably started in the late 1070s, we can see how the use of Quarr stone evolved over a century or so, until it was replaced by a different form of Bembridge limestone in the thirteenth century.[31] We also see the introduction at Chichester Cathedral in the early twelfth century of another very fine quarried stone, Caen stone from Normandy. At Bosham, Caen stone seems only to have been used in quantity from the late twelfth century, though a very small amount may have been used before 1066 in the reused 'Anglo-Saxon' sculpture mentioned above. It is also clear that the fine corbel table of Quarr stone, at the top of the heightened tower, is very similar indeed to the corbel tables used on the outside of the aisles of Chichester Cathedral in the 1080s and 1090s.[32]

At this time also, as Fred Aldsworth has noted,[33] five new round-headed windows (made of Quarr stone) were inserted into the earlier ground- and first-floor window openings in the tower, perhaps to enlarge the openings.

The other characteristic of the early Norman masonry, which is best seen on the south side of the chancel, is the use of counter-pitched (or herringbone) masonry. This is clearly seen above and below the projecting Quarr stone string course in the middle section of the south chancel wall (Fig. 4). It can also be seen on the internal wall-faces (including in the blocking of the original window), and on the north side of the chancel, above the boiler-house roof, where the string course (probably inserted here) is also visible. This suggests that the western part of the north wall may also have been partly rebuilt in the early Norman period, but more study of all the early chancel masonry (including that inside the boiler house) is necessary, before the sequence of buildings can be understood fully.

In about 1121, Bishop William Warelwast of Exeter (1107–37) formally established a college at Bosham with six prebends.[34] This would have required extra space for the canons of the college in the chancel, so 1121 is the latest probable date for the enlargement of the chancel. The enlargement of the chancel for extra priests must, however, have been carried out at the end of the eleventh century.

LATE TWELFTH CENTURY

During the twelfth and thirteenth centuries the population of England was increasing rapidly, and it was very common for parishioners to enlarge the floor area of the nave in their churches by building aisles during this time. The north aisle to Bosham church was probably built just before the end of the twelfth century (Fig. 7), and the aisle piers (with spurred bases) and outer north wall (with its four pilaster buttresses) were probably built at this time (Fig. 6). The large northern windows and the even wider window in the east wall (Fig. 2) are later insertions (*see* below), but the north doorway is an original feature, and its original threshold level was revealed once again when the area was excavated in August 1990, to allow a ramp for wheelchairs to be run down to this doorway.[35] The trench made at this time also revealed the rubble foundation beneath the doorway (about 18 inches or 0.5 m deep), and a pair of simple bases at the bottoms of the moulded jambs. Just above these, a large flagstone had been inserted much more recently into the doorway masonry after the ground level had been raised externally by the digging of graves. When this was removed in 1990 the moulded jambs were made good with new stone at the bottom. The floor level in the north aisle was lowered, along with that in the nave, in 1865 and as a result, new masonry had to be built around the square bases of the piers in the north arcade

(Fig. 7). It seems likely that the present ground level in the north aisle is lower than the original late-twelfth-century floor level.[36] In the east wall, at the south-east corner of the north aisle, is a trefoil-headed piscina with its drain on a column (set into the wall) which also probably dates from the late twelfth century (Fig. 3).[37] This indicates that there was an altar here from the beginning.

In the west wall of the north aisle is a single-light window, almost with a round head, but with a moulded rear arch. This is perhaps an inserted fourteenth-century window, though it could just be the late twelfth-century window rebuilt on the inside. Beneath its internal sill, however, can be seen the remains of the lowest internal jambs of the earlier west window which were no doubt re-exposed in 1865.

The font, now set into the western arch of the south nave arcade, also dates from the late twelfth century. The octagonal bowl is made of Purbeck marble, which has on it plain sunken round-headed panels. The bowl is set on five shafts (the central one quite thick) on a moulded base. The platform beneath it was presumably rebuilt in 1865.

On either side of the moulded piers of the chancel arch, a later chamfer was cut into the arisses on its western side. These are only in the middle sections and have bar stops at their bottoms, suggesting a late-twelfth-century date. Just above where the chamfers stop, the original masonry of the piers has been made good, suggesting that a horizontal timber beam had been put across the chancel arch at this level. This may have been for an early Rood beam (of *c.* 1200), on which would have been set figures of Christ on the cross, flanked by the Virgin Mary and St John. Unusually, there is no sign of a later Rood screen in Bosham church, so this relatively simple Rood beam may have survived until 1548.[38] Below the Rood beam, there must have been a screen, which was also removed at an unknown time. It was probably a simple structure made of wood.

EARLY 13TH CENTURY

During the thirteenth century many parish churches in England rebuilt and enlarged their eastern sanctuaries to create a larger chancel; the name 'chancel' comes from the screen (*cancelli* in Latin) that separated off this eastern part of the church for the exclusive use of the clergy. It also allowed a larger and more elaborate eastern altar to be built on a raised platform, with a reredos or screen behind it. This is exactly what happened at Bosham, and the whole of the eastern third of the chancel is a fine new structure of the early thirteenth century, built to contain a large new stone altar on a raised dais (the three existing steps, now hidden beneath a carpet may, however, only be a Victorian restoration). To the south of this altar a wide double piscina was built with trefoiled heads above the pair of openings in the south wall that contain the two *piscinae*.[39] A third of the way up the walls of the new eastern part of the chancel is a fine roll-moulding which lies immediately above the heads of the two *piscinae*. Beneath it on the south, and around the *piscinae*, only ashlar masonry is used. Just before the roll-moulding reaches the east wall, it steps up, and then forms the base of a very fine, five-light east window to the chancel. Although the five lancets are relatively plain externally, on the inside they are supplemented by extra internal arches sitting on free-standing capitals, shafts and bases made of Purbeck marble, with only the outer columns, on the north and south, in nook shafts in the jambs. At Bosham most of the original Purbeck marble survives, and the use of tall monolithic shafts set *en délit*, is a common feature, in more elaborate churches, in the early thirteenth century.[40] The most elaborate use of this technique is Salisbury Cathedral, where work started in 1220, but its use can be seen closer to Bosham at Chichester Cathedral, where Purbeck marble *en délit* shafting was first used in the rebuilding after the fire of 1187.[41] The use of an elaborate 5-light east window (Fig. 5), and of paired lancets in the side walls (Fig. 4) is, however, much closer to Salisbury Cathedral in style, so it is likely that the Bosham chancel was inspired by the work at Salisbury, and therefore dates from after 1220. Internally the paired lancets in the side-walls of the chancel also have fine moulded rere-arches and Purbeck marble shafting. These paired lancets can be seen in the new thirteenth-century work, on either side of the east window, as well as one pair inserted into the centre of the south wall. It is just possible that originally there was another inserted double lancet opposite it, in the north wall (where the organ opening is now situated), but if so, this was subsequently blocked up (and the carved work removed) when the vestry was built.

Outside the eastern corners of the chancel, angle buttresses were built as part of the early-thirteenth-century work, and at a slightly earlier date, as Bernard Worssam has shown from the building stones, two evenly-spaced buttresses were built against the eleventh-century south wall of the chancel (Fig. 4). The south buttresses have mainly Quarr stone weatherings and quoins, while in the eastern buttresses Caen stone ashlar work, as well as weatherings made of Quarr stone can be seen. Smaller amounts of the rougher Bembridge limestone are visible at the base of the central buttresses. This may have come from the early quoins. For the eastern chancel windows, Quarr stone sills, with Lavant stone and some Caen stone for the external jambs and tops of the lancets are used (Fig. 5). On the south side of the south-east buttress, one of the blocks had a mass-dial inscribed into it. This block was taken out in February 1973 (to protect it from the weather), and reset inside the church at the west end of the north aisle.

On the north side of the chancel, it has until now usually been assumed that the vestry (now the sacristy) was also first built in the early thirteenth century (Fig. 1), and hence that its east and west walls also acted, from the start, as buttresses to the north side of the chancel.[42] However, this is by no means certain, and it is perhaps more probable that the vestry was only first built in the late thirteenth or early fourteenth century, as suggested by the lower window on the north side with a shouldered head. The vestry was heavily rebuilt in the later nineteenth century, and again in 1903, when the internal floor was removed, and so it is difficult to be certain.[43] The external rubble masonry is for the most part of flints and Bembridge limestone fragments in roughly equal proportions; whereas the sanctuary walls contain a much higher proportion of flints.

After the enlargement of the chancel, a new roof must have been put on, but this was probably replaced in the late Middle Ages with another roof, the only evidence for which are the four carved heads on each side of the internal upper walls of the chancel, which may have supported wall-posts for a four-bay roof.[44] The present steeply-pitched chancel roof replaced the lower, probably late medieval roof in 1865.

On the south side of the chancel is a fine wooden chest, which may also date to the thirteenth century.

FOURTEENTH CENTURY

It is possible that a south aisle to the nave was first built at Bosham church in the twelfth or thirteenth centuries. At the moment, however, there is no evidence for this, and the present south aisle, with its contemporary eastern crypt, must date entirely from the fourteenth century (Fig. 1). At present it is difficult to be more precise than this, because the nave south arcade was heavily restored and rebuilt in the nineteenth century, though the moulding profiles of the capitals also suggest a fourteenth-century date. All the traceried windows (except the later east window) were also rebuilt and given tracery in 1845 (Figs 2 & 8). Earlier drawings and paintings of the south side of the church just show voids in the windows.[45] The main south doorway, and possibly the wooden doors themselves, were probably fourteenth-century, as is the fine new tomb (with a reused Purbeck marble altar slab on top of it) set into the wall immediately to the east of the door. Unfortunately, it is not known for whom this tomb was made, but its style would suggest an early- to mid-fourteenth-century date.[46] It must have been made for an important local person at this time. In the centre of the north wall of the chancel is another fine tomb, probably of an early-fourteenth-century date. This was perhaps for one of the priests of the College. The broken effigy on the tomb does not seem to go with it.[47]

The most striking thing about the south aisle is that its outer wall with buttresses and angle-buttresses (all with sloping offsets), is almost entirely made of roughly coursed stone from the Mixon reef, off Selsey Bill (Fig. 8). This unusual type of stone is found in quite a few later medieval buildings (for cut stone, as well as rubble) on or near the West Sussex littoral, and its later medieval use here suggests that quite a large source was available for the stone. Today, and for at least the last three centuries, it has been possible to collect rough stone from the Mixon reef for brief periods at low spring tides only.[48] Is it possible, therefore, that in the fourteenth century the Mixon reef was still attached, by shingle banks, to the mainland at Selsey Bill?[49]

The fourteenth-century buttresses to the south aisle are, however, made of Caen and Quarr stone ashlar (Fig. 8), and as Bernard Worssam points out, the amount of Caen stone used increases from about 50 per cent at the south-west corner to

about 95 per cent at the south-east corner. If the aisle was built from east to west (i.e. starting with the crypt), it would show the diminishing supply of Caen stone.

The masonry of the eastern third of the south aisle is contemporary with that of the crypt beneath it, and this is shown clearly in the outer wall, where two very small windows on the south and east are visible just above the ground level, with heads made of Caen stone (Figs 2 & 8). Inside the crypt large sloping splays to these windows are visible. The crypt itself has two bays of quadripartite rib-vaults (the ribs are also made of Caen stone), and on the south-west side of it is a doorway (also possibly with a partly original wooden door) leading to steps up into the south aisle, beside the fine tomb mentioned above (Fig. 1). There is no evidence for a former stone altar in the east wall of the crypt (or for a piscina) so it is unlikely that the crypt was used as a chapel (though it is today used as a small chapel). It is more likely that the crypt was first built as a treasury for the valuables (and muniments) of the College of Canons or the chantry priests (*see* below). It could also have been used as a charnel house. Above it, at the higher level, there was certainly a stone altar under the east window (no doubt destroyed in 1548) as is shown by the trefoil-headed piscina to the south. This upper chapel now has a nineteenth- and twentieth-century floor and staircase, leading up to it from the north-west. The three-light east window of this chapel also has renewed tracery, but it is, in part, medieval.

Above the south wall of the south aisle are a moulded cornice and a battlemented parapet. This was also originally fourteenth-century work, but it too has been completely restored in Caen stone, probably in 1845 when a new roof over the south aisle was also put in (Fig. 8).

In the royal records, a licence was granted in 1330 for the alienation in mortmain by Lawrence de Rustiton and James de Northstok of some 40 acres to Mr William de Fishbourne, Prebendary of Funtington (i.e. one of the canons in the College) to support a chaplain who was to celebrate daily a mass in the church of Bosham, for the good of Thomas, Earl of Norfolk, and for the soul of Alice, his wife.[50] This was Thomas of Brotherton (who died in 1338), the eldest son of King Edward I, by his second wife, Margaret of France (hence stepbrother to King Edward III). His descendants, the Mowbrays and Howards, became the Dukes of Norfolk. The chantry, founded in 1330 in Bosham church, was later called the 'Chantry of the Blessed Mary in the nave of Bosham church', and several other gifts were made to it by the prebendaries of Funtington in the 15th century.[51] The chantry was dissolved, with all the other chantries in England, in 1548, and it was referred to then as the 'Chantry of Fishbourne'. It was worth 40 shillings and its lands were granted to Henry Polsted.[52]

It seems quite likely that this chantry chapel of St Mary was the chapel above the crypt, at the east end of the south aisle, which could be described broadly as 'in the nave'. The chantry was clearly an important one, and the date of its foundation, 1330, fits well the architecture of the south aisle. It is possible that the Fishbourne chantry was at the east end of the north aisle, but as we have seen, this aisle was already in existence, and its new three-light east window, under a segmental arched head, is probably of late-fifteenth-century date. There are, however, also three inserted fourteenth-century windows in the north wall or the north aisle (restored in 1862), so the north aisle chapel cannot be completely ruled out (Fig. 6).

We also know that, in 1354, Bishop John Grandison of Exeter rededicated the high altar in Bosham church.[53] This bishop was one of the great building bishops of the middle years of the 14th century, and was responsible for the incomparable nave of Exeter Cathedral and the superb Devon church of Ottery St Mary. Is it too fanciful to think of this bishop as rededicating 'his' Bosham church after a major enlargement and rebuilding i.e. after the final completion of the new south aisle, and the refenestration of the other main windows in the church? The work may well have been completed before the Black Death killed off a third to a half of the population of the parish, in 1348–50, and then was finally dedicated after that. The most important new Collegiate foundations in England, at Ottery St. Mary and St George's, Windsor Castle, were being built around the time of the Black Death, in an era when the founding of prestigious colleges of Canons was quite common.

FIFTEENTH CENTURY

It seems likely that several of the church's roofs would have been rebuilt at this time, as happened at many other parish churches. Unfortunately, as

we have seen, all the church roofs were completely rebuilt in the nineteenth century. There is, however, one exception, the broach spire on top of the tower. This structure was drawn and closely studied by Fred Aldsworth in 1998,[54] and at the same time dendrochronological samples were taken from some of the original timbers by Dan Miles and Mike Worthington. As a result of this, Fred Aldsworth was able to show conclusively that the spire was made in a single phase with timbers felled in the winter of 1405–6 and the summer of 1406.[55] At that time the 'seasoning' of timber for a medieval timber-frame was not carried out (despite common myths to the contrary), and it is very likely that the spire was actually made in 1406 (or just possibly 1407).

The structure was carefully drawn and analysed by Fred Aldsworth, and his excellent publication contains a whole series of plans, elevations and axonometrics, which show all the details of the frame and the sequence of construction. It is therefore not necessary to repeat all this here. Fred Aldsworth also delineated the major repair to the upper part of the spire in 1841. (The upper part of the mast in the top of the spire is actually inscribed 'SPIRE RePd 1841-IB & RP CW', (i.e. the initials of the two churchwardens). Apart from the repairs of 1841, which also included some new wall plates, and new upper rafters and brackets, all the other surviving oak timbers are the original ones. The spire is covered in shingles, and these have been renewed at various dates, the earliest documented being in 1794,[56] while the most recent was in 1979. It is also worth noting that in 1837, there was a proposal to heighten the tower by 12 ft with a battlemented cornice; luckily this was never done, and hence no doubt the repairs that were then carried out to the top of the spire in 1841.[57] A record of the spire being hit by lighting and partly burnt on 14 January 1683,[58] is difficult to confirm in the structure, unless it was just at the top, which was then completely replaced again in 1841.

Almost certainly at the same time as the spire was being built in 1406, the top storey of the tower was also being refurbished as a new bell-chamber. On the north, south and east, new two-light trefoil-headed windows were inserted into the late-eleventh-century fabric (only on the west was the original double window left in place). The new windows were made with Caen stone and have squared heads, though without hood-moulds (probably because of the existing corbel-table above, and the eaves provided by the spire). These windows are very typical of late medieval belfry windows, and it is probable that a new ring of bells was also made at this time, and hung at this level in a timber frame (change-ringing did not, of course, come in until much later). Unfortunately, all the surviving bells are post-medieval,[59] and the present bell-frame was built in 1979, when the two north–south and three east–west steel girders that support the frame were also put in. Earlier, in 1903–5, the tower had been repaired and a new ringing chamber made by inserting a new floor below.[60] A new clock face, on the south side of the tower, was also put in at this time, and the cracked third bell (of 1665) was recast.[61]

Apart from the spire and belfry windows the only other late medieval features visible in the church are the three-light east window to the north aisle (already mentioned), and one carved bench end on the north side of the chancel (close to the organ console). This is perhaps the only surviving fragment from the canons' stalls. It is not, however, *in situ*, and is now part of the nineteenth-century choir stalls. The south porch may also have been first built in the fifteenth century (as its roof may indicate), but it was almost entirely rebuilt in the seventeenth and nineteenth centuries with brickwork (Fig. 8).

Most parish churches had a large new Rood screen put up in front of the chancel arch in the late fifteenth or early sixteenth century, with a Rood-loft over the screen, which was usually entered from a small side door at the top of a small stair.[62] At Bosham, as we have already seen, there is no trace of this, only the indication of a small late-twelfth-century chancel screen. In front of the chancel arch, at the east end of the nave, two stone coffins were found in 1865 and 1954.[63] Despite the speculations that these were the coffins of Cnut's daughter and King Harold Godwinson, stone coffins of this type are normally most commonly found after the Norman Conquest. The larger coffin on the north is apparently carefully worked, with a cut-out position for the head, and this type of coffin is normally most commonly found in the twelfth or thirteenth centuries. No detailed study of medieval stone coffins has yet been made in Sussex, but a pioneering study in Gloucestershire has attempted a provisional typology of Roman and medieval stone coffins.[64] Unfortunately, the

1954 photographs and plans of the Bosham coffins are not good enough to compare with other coffins, and only with re-excavation will one be able to examine the masonry of the coffins more closely to see the building stone type, tooling marks, setting out lines, etc. This should give some sort of date for them. Any re-excavation would also need to look at the stratigraphic context of the coffins, and to look much more carefully at any human skeleton remains found associated with them.[65]

POST-MEDIEVAL CHANGES

Because of the very major restorations in the nineteenth century, the evidence for almost all the sixteenth- to early-nineteenth-century refurbishments has been removed. In the early nineteenth century a west gallery, box pews, pulpit, etc. existed, but all traces of these have gone,[66] and we can only find out about most of the earlier furnishings and fittings from passing references.[67] Apart from the late-twelfth-century font, all the other furnishings are relatively recent. The pulpit, for example, only dates from 1905. Because all the floor levels in the nave and aisles were lowered, and then covered in red and white quarry tiles, we have no traces of earlier burials in the floor, and even the surviving wall-monuments, on the walls stripped of plaster, are a meagre group.

Despite the very large-scale nineteenth-century restorations under the Revd Henry Mitchell, the surviving documentation for them is also very meagre, and, as already mentioned, we only have main dates for the large-scale works, starting with the restorations of the windows on the south side in 1845 undertaken soon after Mitchell's arrival. The windows on the north side of the church were restored in 1862. In February 1863, agreement was reached to 'make a complete restoration of the chancel roof to its proper elevation, on condition that, the roof of the nave be simultaneously raised to its original height'. The results of this work are still plain to see, not only in the nave and chancel roofs, but also in the new masonry of the new eastern gables of both these roofs. This masonry, with its distinctive copings and carved crosses on the apexes, is typical of the later Victorian period, when stone dressings were made with Bath stone, brought in by railway. The doorway on the south side of the chancel is entirely of Bath Stone, showing that it was completely rebuilt in 1865.

The smaller-scale repairs of the twentieth century are better documented, and these got underway in 1903, just after the arrival of the new vicar, K. H. Macdermott. They have not been comprehensively studied here.

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NOTES

1 D. M. Wilson, *The Bayeux Tapestry* (London: Thames & Hudson, 1985), scene 3 and 174.

2 The later manor house, with a farm and a moated site is immediately to the north-east of the churchyard.

3 Bede, *A History of the English Church and People* (trans. L. Sherley-Price; Harmondsworth: Penguin 1968) 228. It is in Book IV, chapter 13.

4 F. G. Aldsworth, 'The mound at Church Norton, Selsey and the site of St Wilfrid's church', *Sussex Archaeological. Collections* (hereafter *SAC*) **117** (1979), 103–7 and F. G. Aldsworth & E. D. Garnett, 'Excavations on "The Mound" at Church Norton, Selsey in 1911 and 1965', *SAC* **119** (1981), 216–21. For the early topography of the whole area, see J.Munby, 'Saxon Chichester and its predecessors' in J. Haslam (ed.), *Anglo-Saxon Towns in Southern England* (Chichester: Phillimore, 1984), 315–30.

5 For a useful recent study of the documented Anglo-Saxon history of this area, *see* Susan Kelly's introduction in her *Charters of Selsey* (Oxford: British Academy, 1995). Also her 'The Bishopric of Selsey' in M. Hobbs (ed.), *Chichester Cathedral, an Historical Survey* (Chichester: Phillimore, 1994), 1–10.

6 H. Mitchell, 'On the early traditions of Bosham, and the discovery of the stone coffin containing the remains of a daughter of King Canute in the nave of Bosham church', *SAC* **18** (1886), 1–9.

7 The Roman basilica 'tradition' is repeated most recently in I. Nairn and N.Pevsner, *Buildings of England: Sussex* (Harmondsworth: Penguin, 1965), 110. *See* also the plan in the present church guide.

8 In 1776 the tradition was that the female effigy on the tomb on the north side of the chancel was 'the daughter of a Saxon prince'. By the early nineteenth century the 'Saxon prince' had become 'King Canute'. *See Victoria County History* (Sussex) **4** (1953), 186, note 94.

9 G. W. Marwood, *The Stone Coffins of Bosham Church*

(Chichester: Privately Published, 1974), 4, and the present church guide.

[10] Anglo-Saxon Chronicle (C and E) *sub anno* 1053, see G. N. Garmonsway's edition (London: Dent & Sons, 1953), 182–3.

[11] D. Bates, *William the Conqueror* (London: George Phillip, 1989), 69–70, and M. Duffy, *Royal Tombs of Medieval England* (Stroud: Tempus, 2003), 42–3. *See* also Professor James Campbell's most useful unpublished typescript entitled 'Could King Harold II have been buried at Bosham'? (2003) Copy in parish archive.

[12] Mitchell n. 6. In the *Ecclesiologist* **13** (1852), 302, it is noted that Bosham church 'has been for some years in course of gradual and careful restoration, in great measure at the sole cost of the vicar'.

[13] He went on to be Rector of Selsey (1915–25) and then Rector of Buxted (1925–44) and was also an honorary canon of Chichester (1934–56). He also published a most useful survey, *The Old Church Gallery Minstrels; An Account of the Church Bands and Singers in England from about 1660 to 1860* (London, 1948). See also his unpublished MS in the library of the Sussex Archaeological Society.

[14] K. H. Macdermott, *Bosham church; it History and Antiquities* (1911, 2nd ed. 1912) J. W. Moore, Chichester.

[15] K. H. Macdermott, *The Story of Holy Trinity Church, Bosham* (1906, but reprinted 1950s, with additions in 1971 and 1978; Chichester: Privately Published), 12.

[16] *The Archaeological Journal* **92** (1935), 411–12. The brief notes on the church are by A. W. Clapham.

[17] *Victoria County History* (Sussex) **4** (1953), 182–8. *See* also W. H. Godfrey, 'Sussex church plans: Parish church of Holy Trinity, Bosham' in *Sussex Notes and Queries* **13**, no. 5 (1951), 109–16.

[18] H. M. & J. Taylor, *Anglo-Saxon Architecture* I (Cambridge: CUP, 1965), 81–4. *See* also E. A. Fisher, *The Saxon Churches of Sussex* (Newton Abbot: David & Charles, 1970), 56–61, and M. Hare, 'Bosham church' in *Bosham Life* (Bosham: Privately Published, March, April and May 1973) — three parts.

[19] R. Gem, 'Holy Trinity church, Bosham', *Archaeological Journal* **142** (1985), 32–6.

[20] F. G. Aldsworth & A. McCann, 'Recent discoveries in Bosham church', *SAC* **122** (1984), 221–2. It is sad, as Fred Aldsworth tells me (letter, dated 18.1.04), that the archaeologists were only informed of this 'when the excavations were complete and the bones and charcoal had been loaded onto the back of the lorry'.

[21] F. G. Aldsworth, 'Recent observations on the tower of Holy Trinity church, Bosham', *SAC* **128** (1990), 55–72.

[22] F. G. Aldsworth, 'The spire of Holy Trinity church, Bosham', *SAC* **138** (2000), 115–34.

[23] Aldsworth, *SAC* **128,** 55.

[24] Aldsworth , *SAC* **138.**

[25] There was a single opening in each exterior face, at each level, except in the lower west face. The three windows in the first floor chamber are taller than those on the ground floor.

[26] The Ditrupa limestone comes from the Paris basin in France, but it was probably only imported to England in Roman times. *See* B. C Worssam & T. Tatton-Brown, 'The stone of the Reculver columns and the Reculver Cross', in D. Parsons (ed.), *Stone, Quarrying and Building in England* AD *43–1525* (Chichester: Phillimore, 1990), 51–69.

[27] *See* the discussion below, and in B. C. Worssam, 'Regional geology' in D. Tweddle, M. Biddle & B. Kjølbye-Biddle, *Corpus of Anglo-Saxon Stone sculpture* vol. IV, *South-East England* (Oxford: British Academy, 1995), 17. Some reused Roman bricks are also found in the rubble. The small fragment of sculpture, found reused in the north aisle wall in 1991 by Dominic Tweddle, and identified by him as Anglo-Saxon in style:*Corpus* (125–6) is made of Caen stone, so is perhaps more likely to have been made after 1066. However, at Sompting church, much reused 'Anglo-Saxon' sculpture in Caen stone can be seen. It is therefore possible that the Caen stone sculpture at Bosham was imported before 1066.

[28] *Domesday Book, Sussex*, I.I. *See* also the summary of the situation in Gem (note 19), 33–4.

[29] T. Tatton-Brown, 'Building stones of Winchester Cathedral', in J. Crook (ed.), *Winchester Cathedral, Nine Hundred Years, 1093–1993* (Chichester: Phillimore, 1993), 37–46.

[30] F. W. Anderson & R. N. Quirk, 'Appendix note on Quarr stone' in *Medieval Archaeology* **8** (1964), 115–17, and T. Tatton-Brown, 'The use of Quarr stone in London and east Kent', *Medieval Archaeology* **24** (1980), 213–15.

[31] T. Tatton-Brown, 'The medieval fabric', in M. Hobbs (ed.), *Chichester Cathedral, an Historical Survey* (Chichester: Phillimore, 1994), 25–46, esp. p. 27.

[32] See Kathryn Morrison's comments in Aldsworth (note 22), 117–24.

[33] Aldsworth *SAC* **128**, 68–9.

[34] 'The College of Bosham' in *Victoria County History* (Sussex) **2** (1907), 109–12.

[35] *See* brief report by J. Kenny in *The Archaeology of Chichester and District 1991,* 21–3.

[36] It is possible that in the twelfth century there was a step up, through the north doorway, from the churchyard to the north aisle floor level.

[37] This piscina is well illustrated in F. Bond, *The Chancel of English Churches* (London: OUP, 1916), 166.

[38] In 1548, at the beginning of the reign of Edward VI, all Roods had by law to be demolished, though the screens beneath them often survived. At the same time all stone altars were ordered to be 'plucked down', and this was when Bosham would have lost its three main altars.

[39] The *piscinae* at Bosham were the two small stone basins in the niches (with tiny drains in them) used by the officiating priests at the mass for the ablutions. They were almost always on the south side of the altar. The niche in the centre of the south wall of the chancel probably contained the piscina for the earlier high altar, though its pointed head suggest a post-Norman date.

[40] *En délit*, a French technical term, means shafts of marble (i.e. a polished limestone) set with their beds vertically.

[41] Tatton-Brown, 'The medieval fabric', 29.

[42] *See* note 17 above.

[43] Internally all the walls were replastered in the 19th century. The latest major changes to the vestry relate to the putting in of the organ in 1903–4.

[44] It is possible, however, these carved heads are thirteenth-century. They need a closer examination.

[45] Copies of these earlier views can be seen in the new first floor room of the tower. These include a painting of

1824 by J. Rouse, a sketch by R. H. C. Ulsdell in 1845, and a painting by George de Paris, made in 1851, six years after the restoration of the windows on the south side.

[46] In a nineteenth-century 'tradition' it is sometimes called 'Herbert's tomb' i.e. Herbert of Bosham, the friend and biographer of St Thomas Becket. This 'tradition' cannot be correct.

[47] *See* note 8 above. This tomb also needs a more detailed study.

[48] Hence it can be seen in post-medieval buildings at Selsey, and at West Wittering school (now at the Weald and Downland Museum at Singleton). *See* F. G. Aldsworth & C. Hallam, 'A nineteenth-century Dame School at West Wittering', *SAC* **125** (1987), 262–6.

[49] Mean sea-level was perhaps lower at this time, but much more work on the geomorphology of the Selsey area is needed to answer this. I am grateful to David and Anne Bone, who have had an interest in the geology of the Mixon reef for many years, for David Bone's comments (letter to the writer, 25.9.03). See also A. E. Bone, 'The shaping of the Sussex coastline: a review of the geomorphology, archaeology and history', *Tertiary Research* **16** (1996) nos 1–4, 5–14.

[50] *Cal. Pat. Rolls*. (1330–4), 11 and 280. *See* also Peckham *VCH* (1953), 188.

[51] Peckham *VCH* (1953), 188 and also the Register of Bishop Robert Rede, Sussex Record Society (hereafter SRS), **11**.

[52] SRS **11** and. **36**, 75 and *Cal. Pat. Rolls*. (1547–8), 280.

[53] *Victoria County History* (Sussex) **2** (1907), 111.

[54] Aldsworth, *SAC* **138**. The report on the dendrochonology is by Dan Miles and Michael Worthington of the Oxford Dendrochronology Laboratory.

[55] Aldsworth, *SAC* **138,** 124–34.

[56] A weathercock had apparently been added in 1786. It seems likely that shingles were always used for the covering.

[57] Macdermott, *The Story of Holy Trinity*, 20–21.

[58] Macdermott *The Story of Holy Trinity*, 20, and J. Dallaway, *A History of the Western Division of the County of Sussex*, **1** (1815), 94.

[59] For a list of the seventeenth- and eighteenth-century bells and their inscriptions in 1864, see A. Daniel-Tyssen, 'The church bells of Sussex', *SAC* **16** (1864), 201.

[60] Aldsworth, *SAC* **128**, 55.

[61] Peckham *VCH* (1953), 187 footnote 96.

[62] For a general survey of these, *see* F. Bond, *Screens and Galleries in English Churches* (London: OUP, 1908).

[63] Mitchell (note 6), 5–9, and G. W. Marwood, *The Stone Coffins of Bosham Church* (Chichester: Privately Published, 1974).

[64] H. H. Willmore, 'Stone coffins, Gloucestershire', *Trans. Bristol and Glos. Archaeol. Soc.* **61** (1939), 135–71. I am most grateful to Brian and Moira Gittos for their help with these coffins.

[65] However, the earlier reports suggest that any bones have been very disturbed, and DNA sampling, and certainly Radiocarbon dating, would not be worth doing.

[66] One of the internal views of the chancel hanging in the tower, does indicate a few of the earlier furnishings.

[67] We know, for example, that Bosham church had a six-to-eight instrument band playing in the west gallery in the early nineteenth century before it was replaced by a harmonium. *See* D. Reeves, R. Marks & J. Roles, *Sussex Churches and Chapels* (Brighton: Brighton Museum, 1989), 135.

THE BUILDING STONES OF THE CHURCH OF THE HOLY TRINITY, BOSHAM

by B. C. Worssam

Some 20 different types of stone are to be seen in the fabric of Bosham church. In Table 1 they are listed in stratigraphical order, so as to show their relative geological ages; and they are described here in the order of their first appearance in the building.

STONES FIRST USED IN THE LATE ANGLO-SAXON PERIOD

The lower three stages of the tower comprise the principal remaining work of this period, and the ashlar (i.e. squared) stones used for quoins, string courses and window surrounds are shown, identified as to type, in Fred Aldsworth's drawings (Aldsworth 1990, figs 3 & 4).

Bembridge limestone

Bembridge limestone was the principal stone used for the Anglo-Saxon tower quoins. It is a hard, fine-grained whitish limestone of freshwater origin and of Tertiary age, from the Isle of Wight. It includes fossil casts of freshwater and land snails, while a distinctive feature of the stone is the presence of what appear at first sight to be small perforations of about 1 to 2 mm diameter but which under a hand-lens are seen to be calcite-lined spherical hollows with a spiral ornament. These are the casts of nucules (or seed-bodies) of the lime-secreting aquatic plant *Chara*. The limestone is exposed in many places on the Isle of Wight, most prominently as a wave-cut platform at Bembridge. In the past the stone was probably quarried from shoreline outcrops such as this, and Aldsworth (1990, 70) has suggested that some larger holes in blocks of the stone may result from boring by marine organisms, an activity still occurring at Bembridge.

The south exterior wall of the westernmost third of the chancel is, after the tower, the next most extensive area of Anglo-Saxon stonework of Bosham church (Fig. 4). Up to the sill level of the much later three-light window the wall is of coursed rubble of small blocks mainly of Bembridge limestone with some London Clay septarian nodules (*see* below); above sill level the stone is less regularly coursed, and includes roughly 30 per cent of flint.

In the early Norman period Bembridge limestone was the main constituent (say 60 per cent) of the counter-pitched rubble masonry seen on the exterior south wall of the middle bay of the chancel (Fig. 4), occurring together with flints, some Quarr stone and some septarian nodules. Some was also used for quoins in the top stage of the tower.

A number of stones in the south-west quoin of the tower were tentatively identified by Fred Aldsworth as of a yellow, fine-grained variety of Bembridge limestone, with some possible gastro-

Table 1. Building stones of Bosham Church, classified geologically.

Era	Period	Stratigraphical unit	Building stone
QUATERNARY	RECENT		Roman bricks
TERTIARY (2–65 my)	EOCENE (35–56 my)	Bembridge Fmn Calcaire Grossier Bracklesham Group London Clay	Bembridge limestone Quarr Stone Ditrupa limestone Mixen Rock Septaria
MESOZOIC (65–245 my)	CRETACEOUS (65–142 my)	Chalk Upper Greensand Lower Greensand Purbeck Group	Chalk, Flints Lavant Stone sandstone (IOW) malmstone sandstone (W. Sussex) Purbeck Marble Purbeck stone
	JURASSIC	Portland Group Great Oolite Inferior Oolite	Portland stone Lepine stone Bath stone Caen stone Doulting stone Pierre de Jaumont
PALEOZOIC (245–750 my)	CARBONIFEROUS (354–417 my)	Coal measures	York stone

my = age in millions of years before present Fmn = formation

pod casts (his Bembridge limestone 2) occurring together with more normal Bembridge limestone. The quoin was evidently rebuilt after the tower had been heightened, but at some unknown date (Aldsworth 1990, 69, 70, figs 7 & 8). This fine-grained variety has not been separately identified in the body of the church. Bembridge limestone ashlar of later than early Norman date there appears externally as scattered blocks in quoins, buttresses, etc., while smaller pieces of the stone (reused?) make up a high proportion of the rubble walling of the north aisle (late-twelfth-century) and of the sanctuary and vestry (thirteenth-century). Internally, the columns and arches of the late-twelfth-century nave north arcade (Fig. 7) are of approximately 50 per cent Bembridge limestone and 50 per cent Quarr stone in random order, except that the column capitals are of Quarr stone and their abaci Bembridge limestone.

Quarr stone

Quarr stone, also from the Isle of Wight, and a local variant of Bembridge limestone, is formed from closely-packed small broken fragments of gastropod shells, and probably originated as a bank of shell detritus perhaps only a few kilometres in extent. In the course of transformation of this shell bank into rock, the tiny shell fragments, around 3 to 5 mm long, were dissolved out and their carbonate redeposited in what had been pore spaces between shell fragments. The resultant limestone thus consists of arcuate shell-fragment-shaped voids in a matrix of crystalline calcite. It was quarried by the Romans, and then from late Anglo-Saxon times (although some Anglo-Saxon stone was probably reused from Roman buildings) until worked out, apparently in the fourteenth century.

Aldsworth (1990, 70) distinguished at Bosham between a coarse-grained variety of Quarr stone (Quarr 1), occurring in large blocks and found in pre-Conquest as well as in later contexts, and a finer-grained variety (Quarr 2), in smaller blocks and associated with the construction of the early Norman belfry stage of the tower and later contexts. The distinction between two types of Quarr has not, however, been followed in the stonework diagrams accompanying this account.

The principal early Norman use of Quarr stone was for the great chancel arch (Figs 2 & 3). This stone is of the coarse variety, with shell fragments 3 to 5 mm across. Coarse-grained Quarr stone also forms the projecting string course seen in the middle section of the south chancel wall (Fig. 4) and in the western section of the north chancel wall.

Quarr ashlar is the predominant stone of the late-twelfth-century north aisle buttresses (Fig. 6). Internally, as already mentioned, Quarr stone was used together with Bembridge limestone for the north aisle arcade. The two are also found together in the rere-arch jambs and sills of the three windows in the north wall of this aisle (Fig.7), and in the piscina in its east wall. The jambs of the rere-arch of the north doorway are mostly of Quarr (coarse-grained).

The corner buttresses of the early-thirteenth-century sanctuary (figs 4 and 5) make use of Quarr stone for the sloping tops of offsets, while Caen ashlar is used for their vertical surfaces — a tribute to the superior weathering quality of Quarr stone. The two buttresses on the south chancel wall (Fig. 4) differ from those of the sanctuary in having quoins in part of Quarr (a fine-grained variety of the stone, with shell fragments 2 to 3 mm across) and in part of Lavant stone, with a flint/Bembridge limestone rubble infill. This difference in design from the sanctuary buttresses tends to suggest a slightly earlier date of construction.

Within the church, the walls of the sanctuary are mainly of rubble stonework, but there is an internal quoin of Quarr ashlar (with some Bembridge limestone) in the sanctuary's north-east corner. In the corresponding feature in the south-east corner Quarr stone was used only for its west-facing surface and for part of the double piscinae on the south wall, Caen for the roll moulding and ashlar wall surface beneath the twin-lancet window in the south wall.

The diminishing role of Quarr stone as opposed to Caen that seems to be suggested by the thirteenth-century chancel and sanctuary stonework may help to date the vestry (Fig. 5) as of the late thirteenth or early fourteenth century, for its quoins are mainly of Caen stone and its door and window surrounds entirely of Caen except for a Quarr stone head and sill to the small upper window in its east wall, while no Lavant stone appears either in quoins or windows. Its rubble walls also differ slightly in composition from those of the sanctuary, in including a higher proportion of Bembridge limestone fragments relative to flints.

The latest Quarr stone is that of the six buttresses of the fourteenth-century south aisle (Fig. 8).

All except the easternmost have Quarr offsets, but on their vertical surfaces Quarr ashlar diminishes in proportion relative to Caen from 50 per cent at the south-west to 5 per cent or less at the south-east corner of the aisle.

Caen stone

Caen stone is a fine-grained, soft, pale yellow limestone, quarried in the vicinity of Caen in northern France. Although of approximately the same Middle Jurassic age as Bath stone it is not oolitic, and its particles are too small to be distinguishable with a hand lens. Fossils are absent except for very occasional thin shell fragments. Weathered surfaces of the stone may be pitted by small hollows of 10 to 20 mm diameter.

Caen stone would merit description as a late Anglo-Saxon introduction at Bosham if a small fragment of low-relief carved stone discovered in 1991 by Dominic Tweddle, built into the internal rubble walling near the west end of the north wall of the north aisle (Fig. 7) is of this age. Dr Tweddle *(in* Tweddle *et al.* 1995, 125–6, illus. 3) described the fragment as showing a plant spray beside a reeded pilaster, and commented that the lack of weathering might suggest it had been located inside a building. This fragment may therefore be a relic of a whole finely carved interior decorative scheme, like that of Sompting church. If originating at Bosham, and not reused from elsewhere in the vicinity, it may have come from the Anglo-Saxon north nave wall, demolished to make way for the north aisle arcade.

Caen stone otherwise appears at Bosham only from the late twelfth century onwards. In the north aisle it was used to only a minor extent, in the jambs and sill of the west window and partly with Quarr for the north doorway hood, while a few blocks of it occur in the north wall buttresses (Fig. 6). The three traceried north windows of the aisle (Figs 6 & 7) are of Caen stone, but are Victorian replacements of fourteenth-century originals.

The gradual increase in reliance on Caen stone in place of Quarr for the sanctuary, the vestry and the south aisle through the thirteenth and into the fourteenth century has been described above, and Caen stone continued in use to the end of the medieval period for minor works such as the east window of the north aisle and replacement belfry windows. Finally, Caen stone was brought in for major early to mid-Victorian restoration of the south aisle arcade, windows, and battlemented parapet (Fig. 8), as well as for the westernmost windows on the south (Fig. 4) and north sides of the chancel.

Ditrupa limestone

Ditrupa limestone is the most remarkable of the Anglo-Saxon building stones. It is a greyish white, rather soft, finely granular limestone that includes numerous fossils, including foraminifera like those in the Mixen Rock and conspicuous matchstick-sized tubes of a Serpulid worm of the genus *Ditrupa*. In cross-section these tubes are of 1 to 1.5 mm diameter, with a lining of radially arranged crystalline calcite.There can be no doubt that the stone is of Tertiary age, comes from the Calcaire Grossier formation of the Paris Basin, and was imported by the Romans in the early years of their occupation of Britain for important building works at Richborough in Kent and Fishbourne 'Palace' and possibly other villas in Sussex (Worssam & Tatton-Brown 1990; Worssam, in Tweddle *et al.* 1995, 18–19).

Fishbourne is the most obvious source of the stone at Bosham, where it is used in the window jambs of the pre-Conquest belfry windows of the west and south elevations of the tower and is possibly the unidentified stone used with chalk in the head of the now blocked-up north belfry window. It also occurs as quoin stones in the top (post-Conquest) stage of the tower (Aldsworth 1990, 71, figs 3, 4, 7, 8). In addition to pieces previously recorded in rubble infill of the tower and of the south chancel wall (Fig. 4) a block of it occurs in the former quoin exposed in the angle between the south aisle and chancel walls (Fig. 2) — much of the stone in this quoin looks like reused ashlar. Another piece occurs in the eastern jamb of the north aisle doorway.

Septarian nodules

Septarian nodules**,** with little doubt from the London Clay outcrop that crosses Chichester Harbour from east to west just south of Itchenor (2.5 km south of Bosham), have provided stone for rubble walling. The nodules *in situ* are ovoid in shape and up to about 500 mm in length. They are composed of hard, pale grey to pale yellowish fine-grained argillaceous limestone or 'cementstone', and are commonly traversed by thin calcite veins, which are the 'septa'. Weathered-out nodules are exposed at outcrop on the shores of Chichester Harbour at low tide; David Bone (1985) has listed

numerous localities where they can be seen at the present day.

Fragments from broken-up septaria have been noted in the exterior rubble walling of the tower, the chancel and the north aisle. The calcite veins are rarely seen — they would be planes of weakness along which the nodules break. The stone in small pieces is not very distinctive, and as a fine-grained limestone could possibly be confused with Bembridge limestone in rubble walls. In coastal parts of Essex, London Clay septaria were formerly used extensively for building. Large nodules from foreshore outcrops form the principal facing stone of Colchester Castle, an early Norman castle that rivals the White Tower of the Tower of London in size.

Chalk

Chalk was formerly widely used as a building stone in south-eastern England (Clifton-Taylor 1987, 61–5). At Bosham it appears in the Anglo-Saxon belfry window surrounds and corbel table. This chalk may have come from the South Downs north of Chichester, though as an alternative source large blocks of chalk as well as fresh flint nodules could have been obtained without the need of quarrying, from debris at the foot of sea cliffs of the Isle of Wight. Some chalk blocks occur in the rubble of the west wall of the north aisle.

Flint

Flints are common in rubble walling of all periods. Some are fresh unweathered nodules, others are beach cobbles. The blue-black freshly-broken flint facing of the top 500 mm of the south wall of the chancel and sanctuary (Fig. 4) presumably dates from the raising of the roof in 1863.

Sandstone

A few glauconitic sandstone ('greensand') and some ferruginous sandstone blocks occur in the Anglo-Saxon and early Norman parts of the tower. Greensand blocks are to be seen externally in the rebuilt former quoins at both west and east (Fig. 2) ends of the south nave arcade and at the west end of the north nave arcade. An isolated sandstone block occurs in the south aisle parapet (Fig. 8).

Two possible sources of the stone are the Lower Greensand outcrop north of Chichester, and the Upper Greensand of the Isle of Wight (Green Ventnor stone). Some blocks may have come from Roman ruins.

LATE TWELFTH CENTURY

In construction of the north aisle, Quarr stone and Bembridge limestone were of major importance, as already mentioned. A remarkable introduction in this period is Lavant stone. This was quite unknown until recognised by David and Ann Bone in 1991, and named by them after the village near the original quarry site. They showed that it was in use from the twelfth to the fourteenth century within a 14 km (9 miles) radius of Chichester, and also recognised it in third- to fourth-century Roman masonry. The stone is a form of Chalk, unusually rich in siliceous sponge spicules and grains of brown phosphatic minerals, and locally in small sharks' teeth. An aid to its recognition in buildings is that surfaces exposed to the weather tend to be colonized by a grey-red lichen, perhaps due to the slow release of phosphate (Bone & Bone 2000; 2004).

At Bosham, Lavant stone forms the semicircular head of the small west window of the north aisle, and squared blocks of the stone occur at random in the north aisle buttresses and in an area of ashlar walling beside the north door. Its principal use, however, is for the five-light thirteenth-century window at the east end of the sanctuary, which is externally largely of Lavant stone (Fig. 5), while Lavant occurs together with Caen stone in the three double-lancet windows in the north and south (Fig. 4) walls of the sanctuary. Their sills are of more weather-resistant Quarr stone.

Some Lavant stone can be seen externally in the quoins at the north-west, south-west and south-east corners of the nave, that were rebuilt when the original nave walls were demolished and replaced by internal arcades. Some of the stone in these quoins, e.g. Ditrupa limestone, probably comes from the former nave walls, but the introduction of Lavant stone in the late twelfth century would be in accord with the twelfth-century date of the north arcade.

EARLY THIRTEENTH CENTURY

Purbeck marble

Purbeck Marble is a freshwater limestone composed of small gastropod shells of the genus *Viviparus,* closely packed in a fine-grained matrix. It is classed as a marble because it takes a good polish. It occurs in the Durlston Formation, of Lower Cretaceous age, in the Isle of Purbeck, where the outcrop extends as a narrow band for some 14 km (9 miles) westward from Swanage.

At Bosham, the most conspicuous use of Purbeck Marble is for the slender internal columns

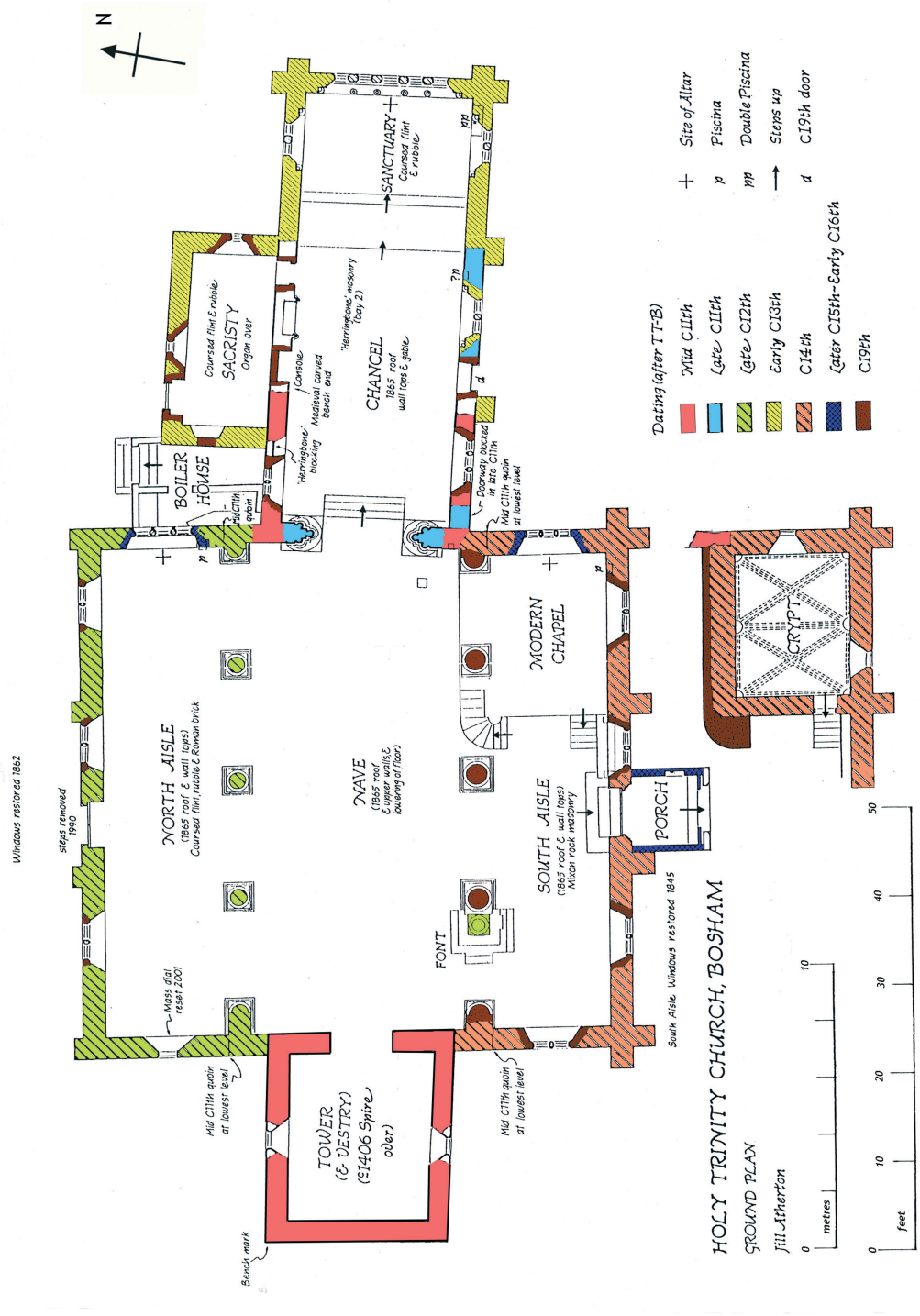

Fig. 1. Holy Trinity Church, Bosham — ground plan.

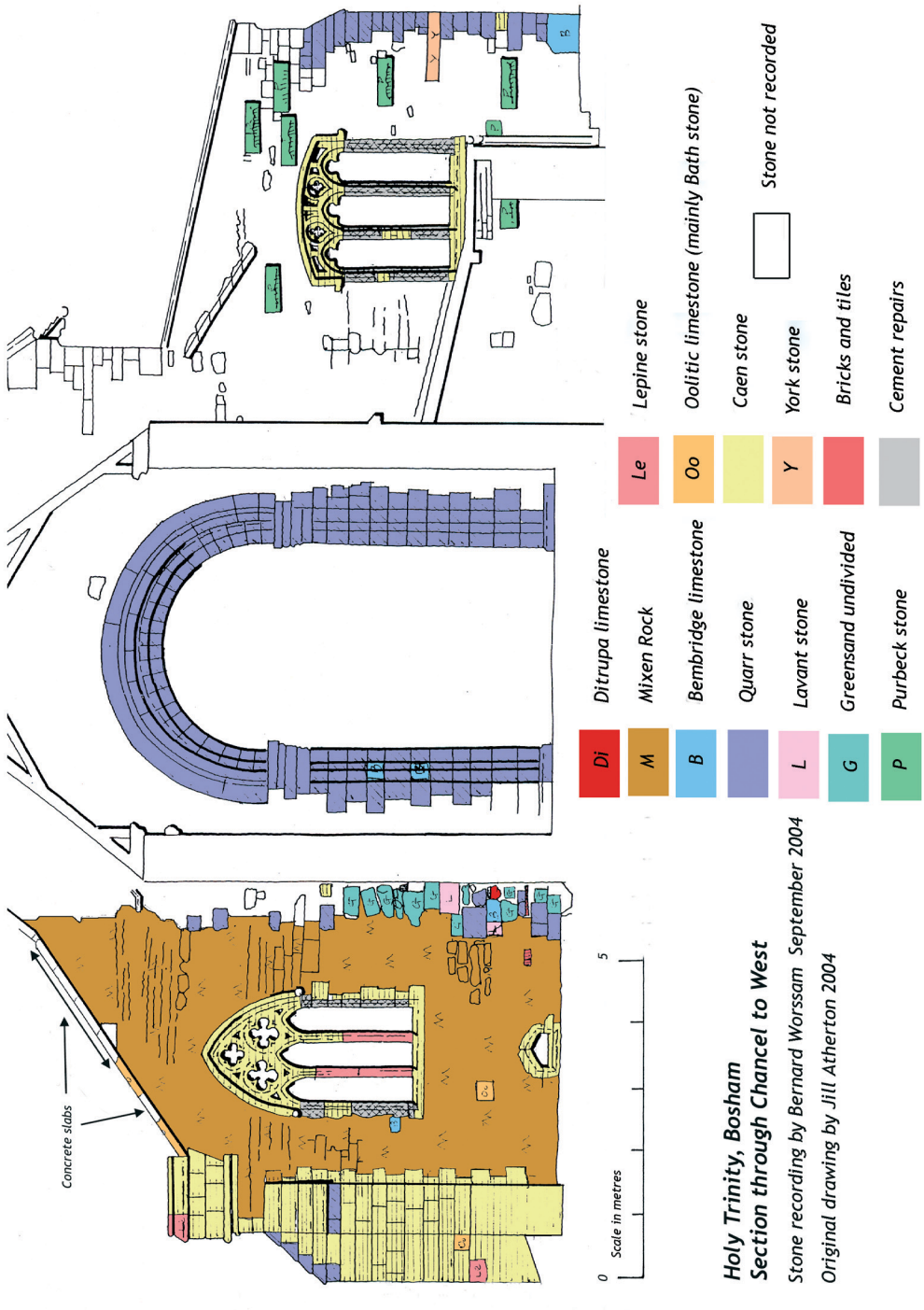

Fig. 2. Holy Trinity Church, Bosham — section through chancel to west.

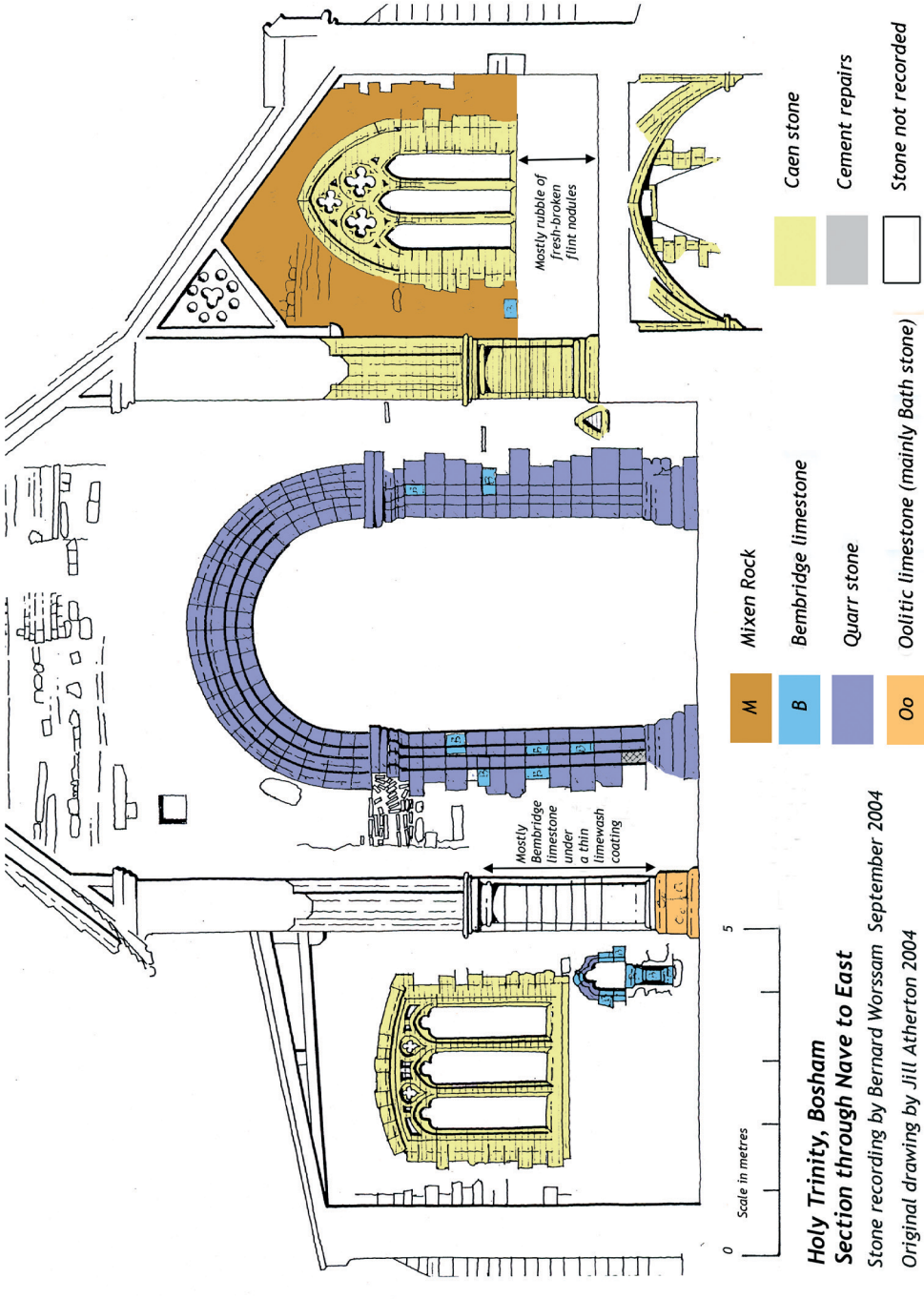

Fig. 3. Holy Trinity Church, Bosham — section through nave to east.

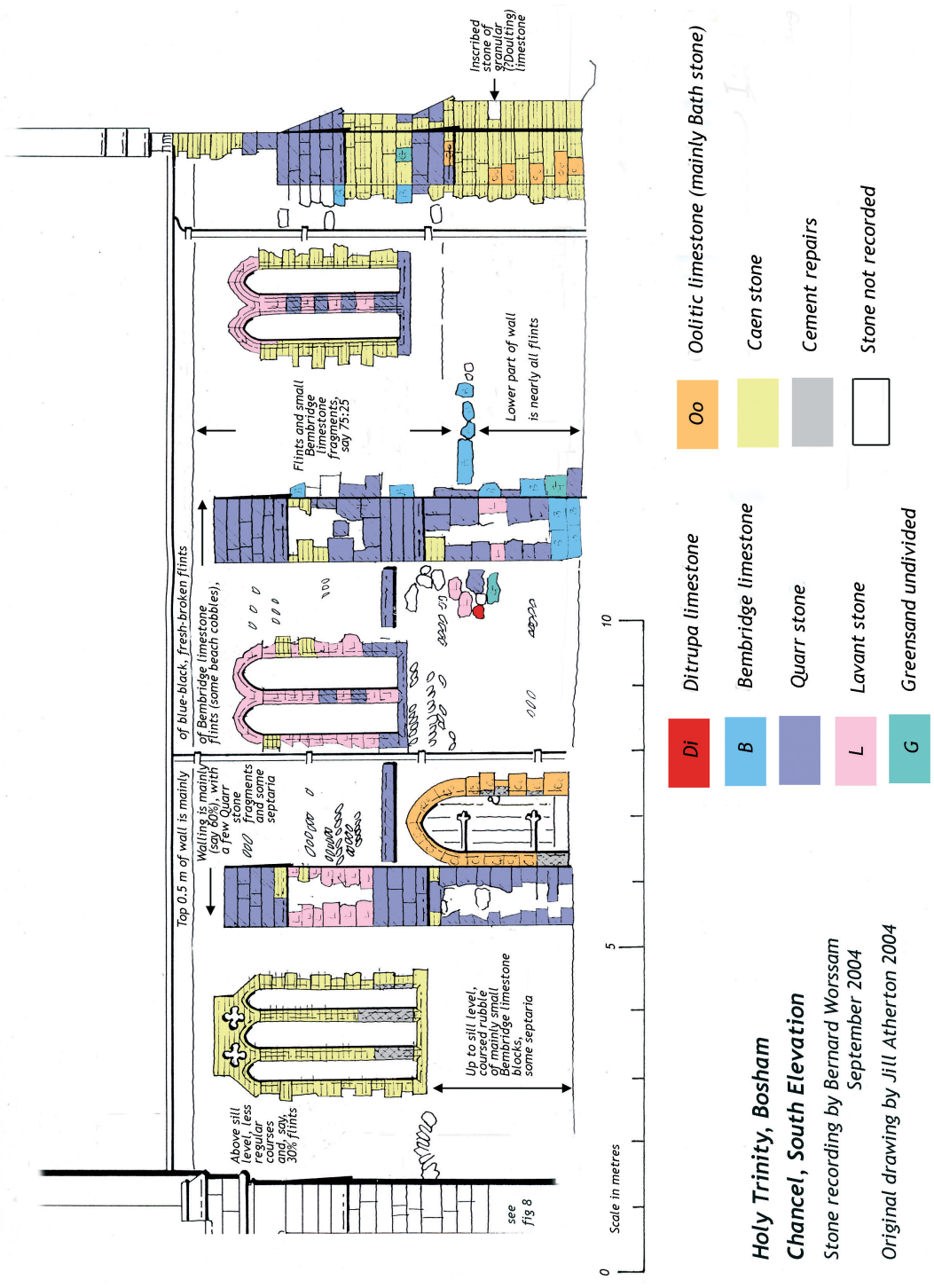

Fig. 4. Holy Trinity Church, Bosham — chancel south elevation.

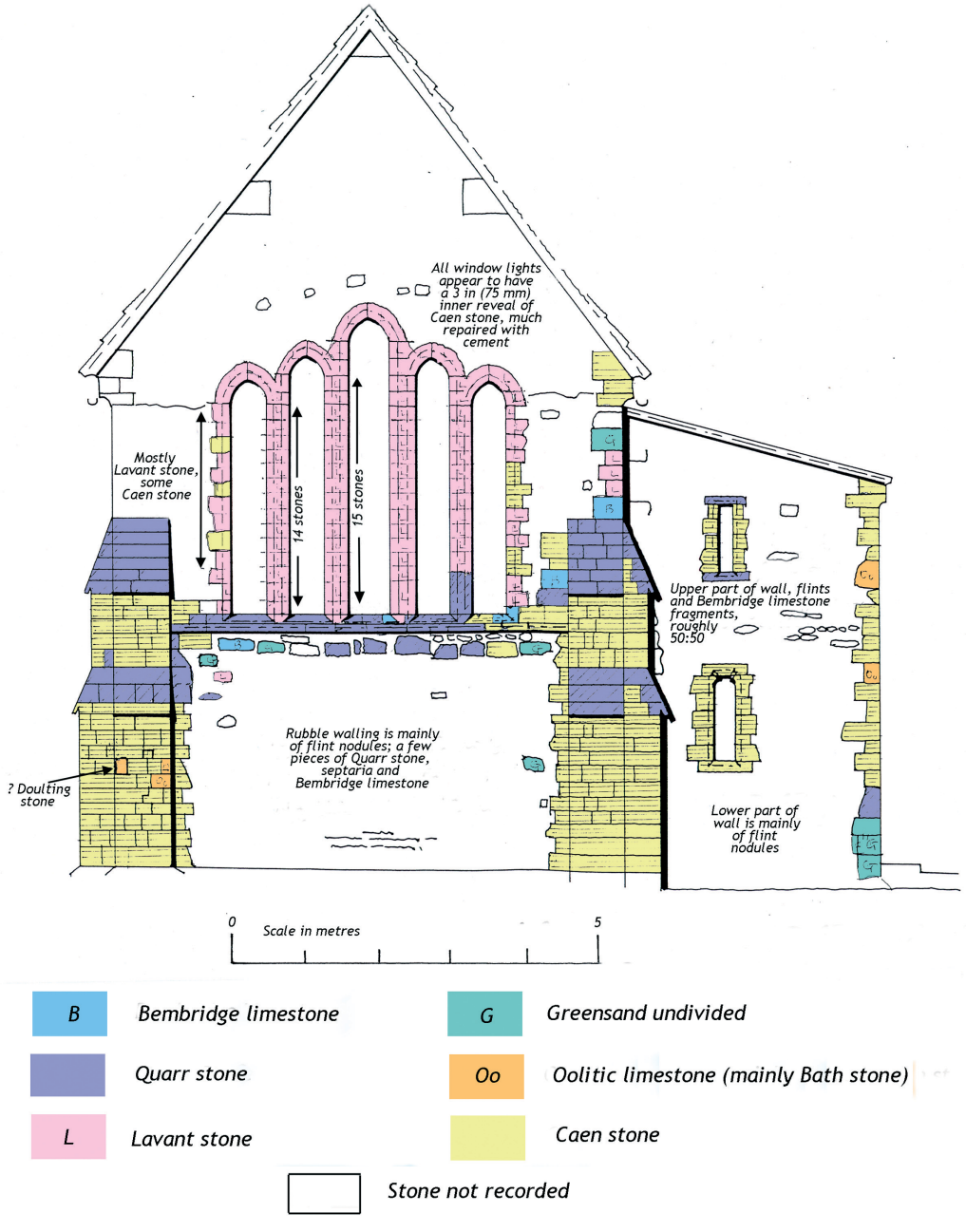

Fig. 5. Holy Trinity Church, Bosham — chancel east elevation.

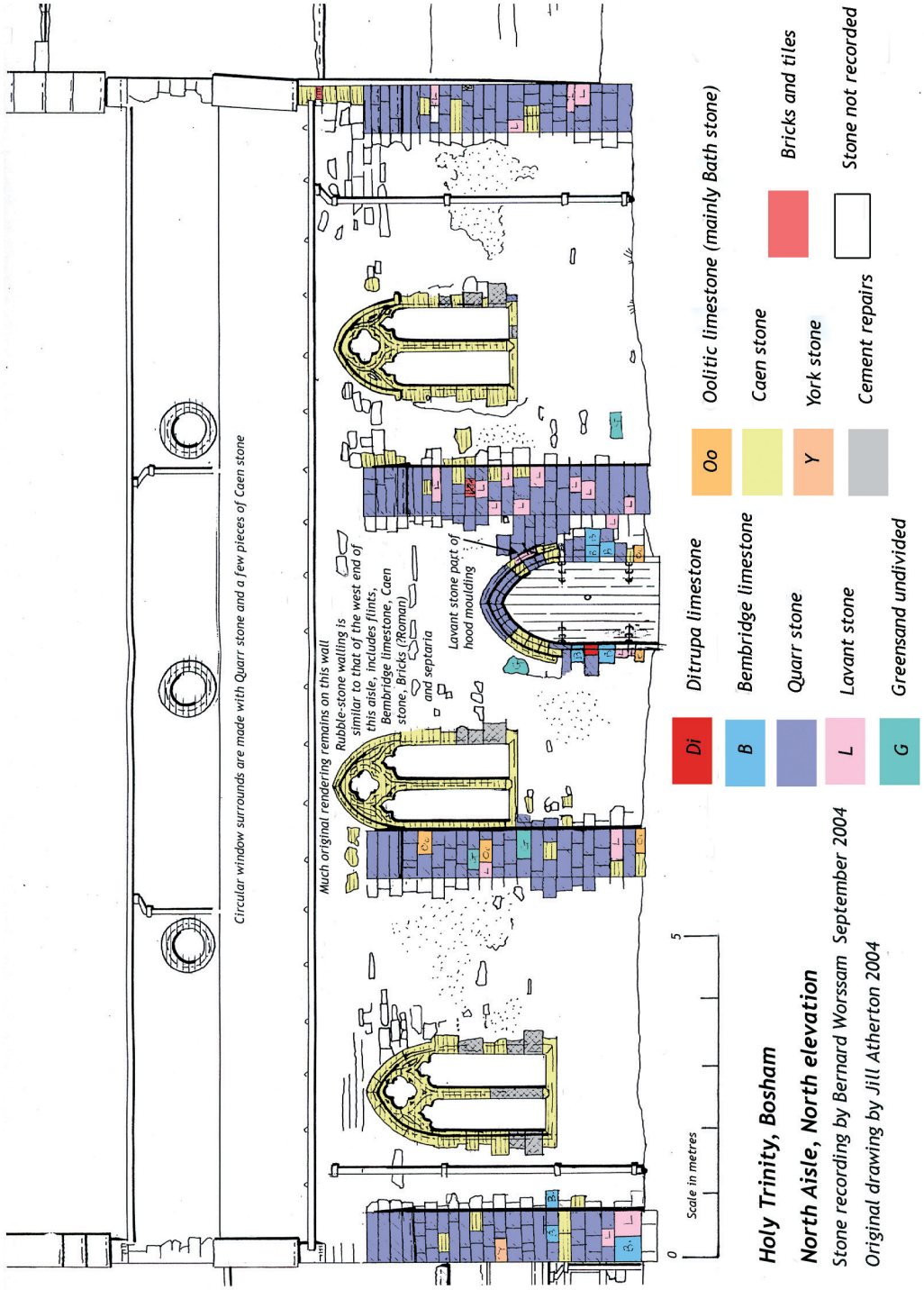

Fig. 6. Holy Trinity Church, Bosham — nave aisle, north elevation.

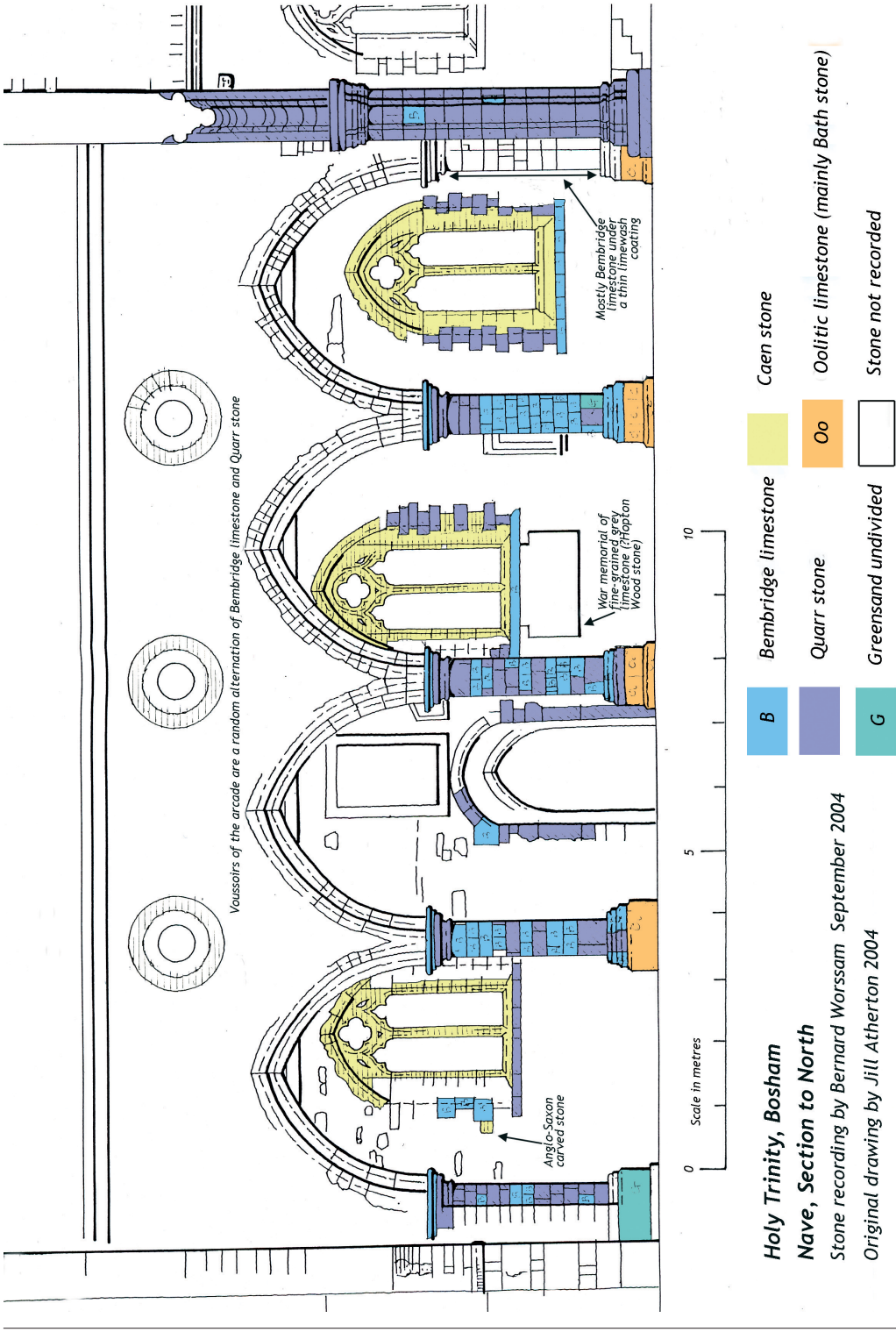

Fig. 7. Holy Trinity Church, Bosham — nave section to north.

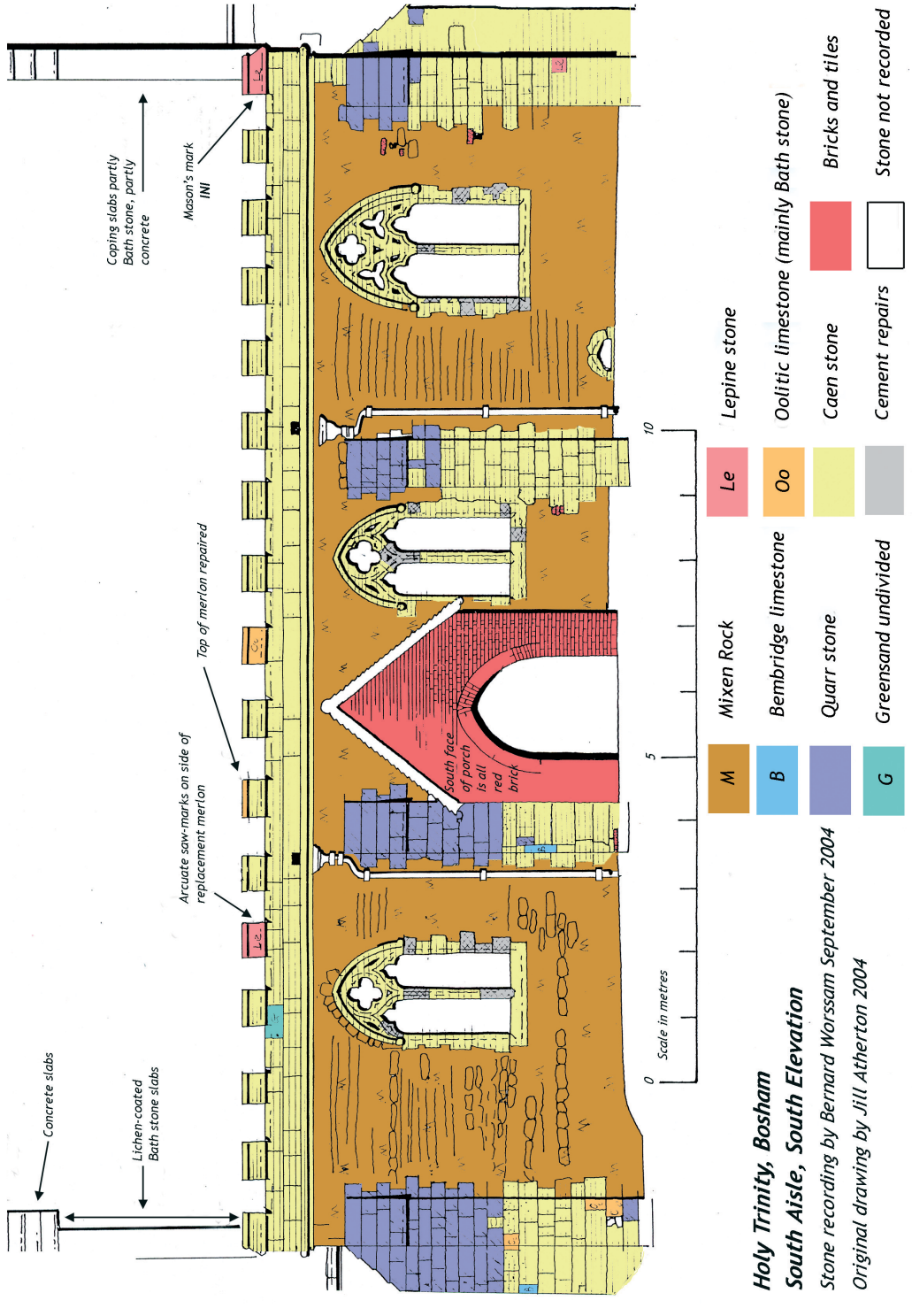

Fig. 8. Holy Trinity Church, Bosham — south aisle, south elevation.

of the chancel and sanctuary windows. The slab of Purbeck Marble within the fourteenth-century tomb in the south aisle, immediately east of the main south door of the church, formerly formed an altar-top; consecration crosses were found on its underside when the tomb was opened in 1911.

FOURTEENTH CENTURY

Mixen rock

The most unexpected discovery of the present investigation was that the walls of the south aisle of Bosham church, except for their buttresses, are almost wholly built of Mixen Rock. This is a hard, grey to pale brownish yellow sandy limestone, of Tertiary age, and distinctive in being crowded with the fossil remains of tiny single-celled creatures known as foraminifera. These fossils are mostly of microscopic size but some in the Mixen limestone are exceptionally large, though a hand-lens is still needed for their detailed structure to be visible. The most conspicuous is the ovoid, 5 mm long *Fasciolites* (formerly *Alveolina) fusiformis*. Its presence incidentally shows that the rock was deposited at about the same time as the quite different Ditrupa limestone (Calcaire Grossier) of the Paris Basin.

Mixen Rock is further exceptional in that it crops out exclusively on an offshore reef about 1.5 km (one mile) south of Selsey Bill and shown on Admiralty charts as The Mixon. The reef is exposed only at low spring tides. Of the two spellings, 'Mixen', as Ann Bone (1996) has pointed out, has become adopted generally by geologists. Mixen Rock was taken from the reef until the early nineteenth century, when it was recognized that the practice might lead to excessive coast erosion at Selsey. The stone is to be seen in many older buildings on the peninsula (e.g. the former West Wittering School, which originated as an eighteenth-century farm building and is now at the Weald and Downland Museum at Singleton); farther inland it occurs for instance in walls of the guest range (*c.* AD 1300) of Boxgrove Priory.

A visit to The Mixon at a low tide in August 2003 by the writer with Tim Tatton-Brown and Richard Meynell showed that the reef, rising at that state of tide to about 1.5 m above the sea surface, was composed solely of flat-ovoid boulders of limestone, mostly about 0.5 m in length and 200 mm in thickness, the latter measurement possibly governed by bed thickness. All the boulders had a covering of light green seaweed, and were to some extent encrusted with and showed borings by marine organisms. No stone was seen *in situ*, and the uniformly large size of the boulders may indicate that all smaller stones get carried away by a combination of breaking waves and strong tidal currents. The stone of the boulders was quite soft, breaking readily under the hammer. Samples transported to land soon hardened on drying out, however.

The stone of the south aisle of Bosham church is of a light grey colour, and fairly uniformly-sized blocks are laid in coursed-rubble style. Most of the blocks are 150 to 200 mm in vertical thickness and about 300 mm (though rarely up to 0.6 m) in length — dimensions which tend to suggest that boulders were used with minimal trimming. Some stones on the interior of the south wall show recent mollusc borings, of about 10 mm diameter. Some of these even contain the shells of the small bivalve, *Hiatella,*that made them.

Malmstone (Upper Greensand)

The probably early-fourteenth-century tomb recess in the centre of the north wall of the chancel is of Caen stone. The fourteenth-century but unrelated effigy of a lady positioned on it is of a very finely glauconitic and micaceous, fine-grained limestone, a lithology similar to that of Reigate stone though more calcareous than would be expected of the latter. The stone may be malmstone, from the Upper Greensand outcrop of the western end of the Weald, between Farnham in the north and Harting near Petersfield in the south.

POST-MEDIEVAL

The early to mid-Victorian use of Caen stone for the restoration of windows has already been mentioned; this may date from before the railways (which arrived at Chichester in 1847) made Bath stone in particular widely available for church restoration.

Bath stone

Bath stone is a greyish-yellow oolitic limestone, characteristically taking on a gingery colour in sheltered exterior situations such as the heads of doorways and windows. Its main use is for the surround of the pointed doorway in the south chancel wall and internally for the niche with segmental head housing the organ console in the north chancel wall. It was also used in the nineteenth century for the square bases of the north arcade columns and then or later internally for repairs to the Caen stone string course beneath the sacristy windows and externally to the south

aisle parapet. A number of blocks of fresh-looking oolite, not certainly Bath stone, inserted as repairs to some buttresses and quoins, are included with Bath stone under the heading 'Oolitic limestone' in the stonework drawings.

Doulting stone

Aldsworth (1990, 71) recorded that at the top of the south-east quoin of the tower are three blocks of a quite coarse detrital-shell limestone, with echinoid fragments. This accords with observations made by the writer at the time, and there can be little doubt that the blocks are of Doulting stone, from Somerset (the building stone of Wells Cathedral), probably brought in for a late-nineteenth-century repair. An inscribed stone in a buttress at the south-east corner of the sanctuary, marking the position of a mass dial moved into the church, may also be of Doulting stone.

Purbeck stone

In the exterior east wall of the north aisle are several randomly placed massive blocks of stone, up to 0.5 m long and from a bed 150 mm or so in thickness (Fig. 2). The stone is a grey, finely shelly, crystalline Purbeck limestone from the Swanage vicinity. Stones of this size are more usually found as paving and kerb stones.

Portland stone

This well-known white oolitic limestone was used for the face of the 1939–45 War Memorial clock on the south side of the tower, also for steps inside the church, for instance those in the chancel.

York stone

As well as used as a paving stone internally, a block of this brownish-grey laminated sandstone forms a replacement quoin stone at the north-east corner of the north aisle, and others have been used in walling of the adjacent boiler house.

Pierre de Jaumont

Pierre de Jaumont was used to replace many of the quoin stones of the tower in its 1988 renovation (*see* Aldsworth 1990, figs 1 & 2). It is described (Le Roux 1983; Cargi 1998) as a yellow, medium-grained, cross-bedded oolitic and shelly limestone, of Bajocian (Inferior Oolite) age, from near Metz in eastern France. It has been used for the cathedral in Metz and numerous other buildings in France.

Lepine stone

Lepine stone is a fine-grained white limestone of Middle Jurassic (Callovian to Oxfordian) age, from near Poitiers in France. It has been much used in southern England from the 1960s onwards as a replacement for decayed Caen stone, for instance in Chichester and Canterbury cathedrals. The stone resembles Caen stone in being very finely granular (grains less than 0.2 mm in diameter), but differs in being white rather than yellow and in including sparse thin shell fragments. These characters are shown by some fresh-looking replacement stone in Bosham church, notably by two merlons of the south aisle battlements, and (more accessibly) by a corner block in the easternmost buttress on the south face of the south aisle. The two mullions of the east window of the south aisle (Fig. 2) are in part apparently of the same stone, and the single mullion of the window in the north wall of the chancel may also be of Lepine replacing Caen stone.

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