

A Middle Anglo-Saxon Cemetery and Medieval Occupation at the Church of the Immaculate Conception, Bicester

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Planning consent granted by Cherwell District Council for the construction of new parish rooms at The Church of the Immaculate Conception, The Causeway, Bicester (NGR SP 5835 2237) (Fig. 1), was subject to a condition requiring archaeological investigation. Evaluation trenching demonstrated the presence of archaeological features on the site, and therefore further fieldwork was required. An archaeological watching brief was carried out by TVAS between April and November 2010.

The site is located in the historic core of Bicester, around 100 metres north-east of St Edburg's Church, and is surrounded by residential and commercial buildings. It was in use as a car park for the Church of the Immaculate Conception (Fig. 2). The underlying geology is cornbrash, with Forest Marble formation in the east of the site. The site lies at a height of 69.8 metres OD in the south rising to 71.5 metres OD in the north. The ground also dips markedly towards the River Bure to the east.

ARCHAEOLOGICAL BACKGROUND

The general archaeological background for Bicester has been rehearsed in a recent volume of *Oxoniensia* and is only very briefly revisited here. The archaeological potential of the site itself was highlighted in a desk-based assessment and confirmed by a field evaluation.¹

The Church of St Edburg (originally spelt Eadburh) is thought to stand on the site of an earlier minster. The two medieval manors of King's End and Market End developed at opposite ends of a causeway across boggy land on the line of the River Bure, which is immediately east of the current site. During the twelfth and thirteenth centuries Bicester developed as a market town with the Priory of St Edburg founded south-east of the church in 1185 and suppressed in 1536.²

A small number of excavations have recently taken place in the town.³ At 61 Priory Road, evidence was found for Roman and late Anglo-Saxon activity. Excavations at Chapel Street uncovered sunken-featured buildings, timber halls and ditches dating from the early and middle Anglo-Saxon and early Norman periods. A ditch possibly marking the edge of the precinct of St Edburg's was excavated at Proctor's Yard, while evaluation trenching south of

¹ J. Blair, 'Anglo-Saxon Bicester: The Minster and the Town', *Oxoniensia*, 67 (2002), pp. 133–40; M. Smith, 'The Church of the Immaculate Conception, Archaeological Desk-Based Assessment', CgMs Consulting, report MS 11365 (2009); J. McNicoll-Norbury, 'New Parish Rooms, The Causeway, Bicester, Oxfordshire, An Archaeological Evaluation', unpublished TVAS report 09/105 (2010).

² J. Blair, *Anglo-Saxon Oxfordshire* (1994).

³ S. Wallis, 'Roman and Late Saxon Occupation at 61 Priory Road, Bicester, Oxfordshire', *Oxoniensia*, 74 (2009), pp. 127–36; P.A. Harding and P. Andrews, 'Anglo-Saxon and Medieval Settlement at Chapel Street, Bicester: Excavations 1999–2000', *Oxoniensia*, 67 (2002), pp. 141–79; G. Hull and S. Preston, 'Excavation of Late Saxon, Medieval and Post-Medieval Deposits at Proctor's Yard, Bicester', *Oxoniensia*, 67 (2002), pp. 181–98; R. Oram, 'Land off Priory Road, Bicester, Oxfordshire; An Archaeological Evaluation, Phase 1', unpublished TVAS report 05/135 (2005).

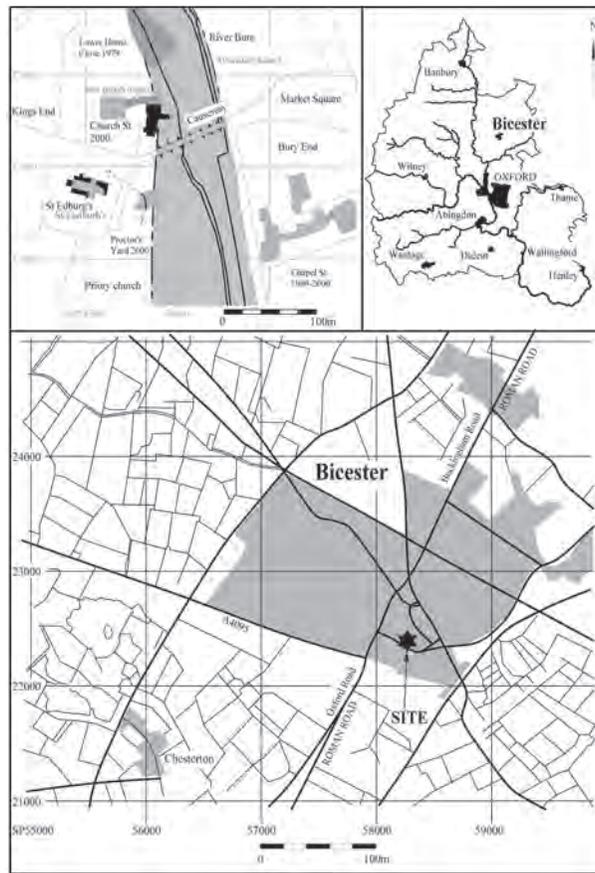


Fig. 1. Site location within Oxfordshire, Bicester and local environs, also showing locations of recent excavations (partly based on Blair 2002, fig. 1).

the priory site revealed further medieval ditches which might mark the southern limit of settlement.

On the site itself, at least twenty-eight human burials, presumed Anglo-Saxon, were uncovered during construction of the car park in 2000 and were reburied without excavation (Fig. 2).⁴ A stone wall and a possible well were also noted along with an unstratified sherd of Anglo-Saxon pottery. It was considered likely the graves were related to the minster, although that was not unequivocally demonstrated as they remained undated. The evaluation carried out in advance of the present development revealed a small number of possible archaeological deposits dated from the early to mid Anglo-Saxon period, but no human burials.

Construction of the Church of the Immaculate Conception began in 1961 and the church was blessed in 1963.

DISCUSSION

Archaeological investigations at the Church of the Immaculate Conception have shed light on two aspects of Bicester's development. An eastwards extension of a previously known,

⁴ Blair, 'Anglo-Saxon Bicester'.



Fig. 2. Plan of investigated, and all excavated features.

but unexcavated, cemetery has been exposed, and positive dating evidence obtained for the first time. At least two of the burials were of middle Anglo-Saxon date and there is no reason to suppose the others are not broadly of the same period, although time depth is indicated by intercutting of some graves. It had previously been considered that this was probably an Anglo-Saxon cemetery, associated with the minster, whose location is assumed to have been around 100 metres to the south-west, where the medieval parish church still stands. Radiocarbon assays from two skeletons produced dates of cal AD 640–685 (95.4 per cent probability) and cal AD 655–721 (72.5 per cent) or 741–770 (22.9 per cent). While an Anglo-Saxon date for the cemetery has now been established, any link with the minster remains unproven, given the physical distance between the two, assuming the minster was on the site of St Edburg's Church, and the conceptual distance would be increased with the expectation that there would have been a street between the two (although The Causeway (Fig. 1) cannot be traced back before the twelfth or thirteenth century). The minster is thought to date from as early as the 660s, though written sources are much later.⁵

While the cemetery is at least partly contemporary with the occupation excavated to the south-east at Chapel Street,⁶ it is unclear how long the cemetery would have remained in use. At least three phases of burial appear to be represented. The radiocarbon dates could be contemporary, or a century apart. Both dates came from graves assigned to Phase 2 (one only tentatively): the earliest part of the radiocarbon date ranges could coincide with the minster's

⁵ Blair, *Anglo-Saxon Oxfordshire*, p. 61.

⁶ Harding and Andrews, 'Anglo-Saxon and Medieval Settlement'.

foundation, and even if the middle of the range is preferred, Phase 1 could still potentially date to the very earliest years of the minster's existence. As some graves clearly cut into earlier graves, this implies both that the cemetery was in use over a period at least long enough for the memory of the locations of earlier graves to have been lost, and also that the early graves were not marked by headstones. This intercutting is unusual in a middle Anglo-Saxon cemetery, which are usually more orderly,⁷ and indeed the previous plan of this cemetery indicates that for the most part it was.⁸ Later Anglo-Saxon cemeteries, or those which continued in use for longer, into the ninth century, can often display sequences of intercutting.⁹ Here, there are two distinct orientations to the graves: those within a few degrees of due west–east; and those 15 degrees or more off that line, which suggests two distinct phases of interments. This was also reflected in the previously published plan of the graves further west, although there the different alignments did not overlap. It is tempting to associate the due west–east burials with a Christian phase, and those slightly off line as earlier pagan burials, but this is not necessarily the case: pagan Anglo-Saxon burials were also frequently aligned west–east, and here, St Edburg's Church itself is not aligned even close to west–east. It is likely that, theological questions aside, the prevailing west–east orientation of churchyard graves was as much to do with taking the alignment from a nearby church wall as wishing to face head on to the Second Coming (expected from the east). Graves in cemeteries not directly associated with a church might be orientated in any direction but still seem mainly to have been basically west–east, or close to that line, perhaps for no better reason than that they were dug in the morning and aligned on the rising sun. The west–east alignment is overwhelmingly preferred, but local variations abound.¹⁰ There is little evidence that the early English Church was especially concerned with regulating the layout or manner of burial, so orientation may have been designed to maximize space as much as anything.¹¹ Further, the stratigraphy of the site is also at odds with the suggestion that the east–west graves are later: of the excavated burials, grave 44 (SK168), for example, cut into grave 102 (SK178), and it was the latter which was closer to due west–east, and grave 45 (SK174) which was almost precisely west–east, had disturbed an earlier burial but was also overlain by a later one. No later features encroached onto the graves, however, until modern times, suggesting that the cemetery as a whole may have been marked out and respected into the medieval period even if individual graves were not.

None of the graves contained any grave goods: the few tiny scraps of pottery (all early or middle Anglo-Saxon or even Roman) present in some were clearly incidental inclusions in the backfill. A lack of grave goods may again be an indication that the burials were Christian, but again, need not be definitive. The diversity of practice has recently been highlighted:¹² deposition of grave goods was already tailing off in all but the richest pagan graves by AD 600, while the richest Anglo-Saxon lords and ladies continued to be buried with grave goods well after the Conversion, as did their contemporaries, the Vikings, who also settled in the region.

There must have been some Christian survival from Roman times before Augustine's mission in AD 597 (as he met with established bishops) but conversion of this region only began in earnest c.660 and was more or less complete by 750. The decades after 660 saw an

⁷ S.C. Hawkes, 'Introduction', in S.C. Hawkes and G. Grainger, *The Anglo-Saxon Cemetery at Worthy Park, Kingsworthy near Winchester, Hampshire*, Oxford University School of Archaeology Monograph, 59 (2003), p. 11.

⁸ Weaver's sketch plan, published in J. Blair, 'Anglo-Saxon Bicester'.

⁹ P. Booth et al., *The Thames through Time...The Early Historical Period AD 1–1000*, Thames Valley Landscapes Monograph, 27 (2007), pp. 263–9.

¹⁰ N. Stoodley, *The Spindle and the Spear: A Critical Enquiry into the Construction and Meaning of Gender in the Early Anglo-Saxon Burial Rite*, BAR BS, 288 (1999), pp. 63–7.

¹¹ J. Buckberry, 'Cemetery Diversity in the Mid to Late Anglo-Saxon Period in Lincolnshire and Yorkshire', in J. Buckberry and A. Cherryson (eds.), *Burial in Later Anglo-Saxon England c.650–1100 AD* (2010), pp. 1–25; D. Bullough, 'Burial Community and Belief in the Early Medieval West', in P. Wormald (ed.), *Ideal and Reality in Frankish and Anglo-Saxon Society* (1983), pp. 177–201.

¹² Buckberry, 'Cemetery Diversity'.

explosion of church building, land donation, and a huge expansion of the English church.¹³ The radiocarbon dating places two of the burials here into that early time frame: if these were Christians, at this date their burial place must surely be related to the putative minster, as already suspected for this cemetery as a whole.¹⁴ The distance of almost 100 metres that separates these burials from the present church (an eleventh or twelfth-century foundation) must, however, raise the question of whether the latter really is located on the site of the early minster. The evidence of occupation features and boundaries, which may be as early as the eleventh or even tenth century, south of the cemetery, especially given that no medieval features were cut across the cemetery, may further call into question the position of the minster. While the area examined was not directly between the cemetery and the medieval church, the nature of the medieval features suggests they would continue into that zone. It is possible that an earlier minster may have been set within a very much larger enclosure than its medieval successor (for example, Bampton's minster precinct may have been over 200 metres across),¹⁵ and even possible that any cemetery was outside the precinct, but the possibility must exist that St Edburg's is not on the site of the Anglo-Saxon minster, which may have been further north. It seems less likely that there was a cemetery of the right date which was not closely associated with the minster. Such an alternative would benefit from any evidence for the presence of another ecclesiastical institution, perhaps monastic.

Combined with the previous observations, at least fifty-five graves are now known and there are certainly more. The gender and age imbalance of the population (seven certain or probable females, all thirty-five years or older, to just one male, and one infant) is based on much too small a sample, even of the known graves, to be the basis for any meaningful conclusion, but if repeated across the rest of the cemetery could suggest a community of nuns: the presence of an infant need not count against this possibility. The nuns of Markyate Priory were well established in Bicester in the twelfth century, but much further away, to the north-west, and there is no previous evidence for an Anglo-Saxon nunnery. It may be that there was a form of gender separation within the cemetery, but this would have been hard to sustain if the graves themselves were not marked, and is not often noted in other Anglo-Saxon cemeteries, although parallels can be cited, as from Dover and Abingdon.¹⁶ A cemetery at Wallingford, where all the graves for which any identification was reported were of women and children, cannot be confirmed, as sexing from excavations in the 1930s was probably based on accompanying grave goods rather than skeletal evidence and in any case only seven were assigned a gender, with eight undetermined.¹⁷ At Christ Church in Oxford, the earliest burial (around the same date as the earliest here, and which may predate St Frideswide's minster) was also of an older adult female.¹⁸

Isotope study suggests those buried here were not foreigners. They might have had a diet slightly richer in fish than the Anglo-Saxon norm, which could have come from the River Bure, although the evidence is also open to other interpretations. The location of minsters adjacent to rivers has been recognized as a regional trend,¹⁹ and the ability to exploit riverine resources (not just fish but also water power for milling, and transport) will certainly have been one factor in this.

¹³ Blair, *Anglo-Saxon Oxfordshire*, p. 61.

¹⁴ Blair, 'Anglo-Saxon Bicester'.

¹⁵ Blair, *Anglo-Saxon Oxfordshire*, fig. 44.

¹⁶ Stoodley, *The Spindle and the Spear*, pp. 126–35.

¹⁷ E.T. Leeds, 'An Anglo-Saxon Cemetery at Wallingford, Berkshire', *Berkshire Archaeological Journal*, 42 (1938), pp. 93–101; S. Anthony and S. Ford, 'An Early Anglo-Saxon Urned Cremation Burial and an Infant Grave in a Medieval Ditch at St John's Primary School', in S. Preston (ed.), *Archaeological Investigations in Wallingford, Oxfordshire, 1992–2010*, TVAS Monograph, 10 (2004), pp. 39–48.

¹⁸ A. Boyle, 'Excavations in Christ Church Cathedral Graveyard, Oxford', *Oxoniensia*, 66 (2001) pp. 337–68.

¹⁹ J. Blair, 'The Minsters of the Thames', in J. Blair and B. Golding (eds.), *The Cloister and the World: Essays in Honour of Barbara Harvey* (1996), pp. 5–28.

The second aspect of the site is the early medieval occupation features, demonstrating settlement on this side of the River Bure possibly from as early as the tenth century. Ditch 202 at the eastern margin of the site may have been dug as a protection against flooding of the Bure, a concern that has been shown in other excavations in the area and in the existence of the Causeway itself. The general alignment of features here also suggests the Causeway was already in place. There was no clear indication of early or middle Anglo-Saxon occupation, although a handful of pottery of this date was recovered, and one feature only partially revealed does resemble a sunken-featured building. No certain buildings were identified, such as those at Chapel Street, although this may be more to do with the small areas investigated.

The alluvial deposits at the eastern edge of the site confirm the width of the area liable to flooding by former channels of the Bure,²⁰ but again shed little light on the date of this alluviation, the ditch along this edge being no more closely dated than tenth to fourteenth century. A few sherds of Roman pottery continue the trend for finding little substantial evidence from this period within the town.

Should any further opportunity arise to study the remainder of the cemetery, it will undoubtedly add substantially to our understanding of this crucial period in Oxfordshire's development. Further radiocarbon dating will be essential for these unaccompanied burials; how long the cemetery remained in use is a critical question, as it has been suggested that few pre-eighth century cemeteries continue in use beyond the ninth century, but this could be because eighth- and ninth-century burials have not been recognized or remain undated. Locating any trace of the minster church itself of course remains a pivotal research aim for Bicester.

EXCAVATION

Details of the somewhat difficult circumstances of the investigation are in the archive report and are noted below only where relevant to explaining limitations on what was observed and excavated. Modern features are not discussed and have been removed from plans for clarity. The work focussed on three areas (Fig. 2): a trench for a retaining wall along the south-west border of the site; the building footprint of the new parish rooms north of the church; and service trenches throughout the area. All are discussed together below. The trenches were rarely above 1.5 m wide and normally around 1 m deep. Collapse of the trench sections sometimes made recording these unsafe, however, so some could only be recorded from the surface. Features are described only very selectively below, full descriptions are in the archive report. Stratigraphy was typically late twentieth-century made ground above compact brown clay subsoil, 0.38 m deep over a 0.29 m thick redeposited stoney cornbrash made ground layer (not always present), above undisturbed cornbrash.

The Cemetery (Fig. 3)

An area of the cemetery of around 11 m by 7 m lay within the western end of the development area and was partly disturbed by the digging of the footing trenches. The most easterly grave observed (36) was located just 1.6 m west of ditch 201. The previously recorded graves were all to the west of the area examined here, giving an overall extent of at least 25 m east–west by 17 m north–south (Fig. 3). The eastern limit of the cemetery appears to have been established but it is possible it may extend further in all other directions. Unfortunately the initial stages of ground reduction here were not observed, and several graves (36–43) could only be recorded in section; the remainder were excavated as fully as possible.

²⁰ Blair, 'Anglo-Saxon Bicester'.

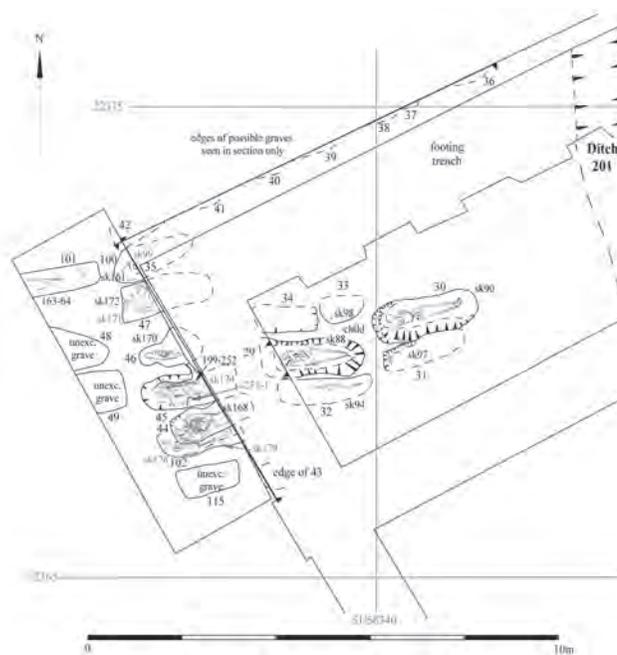


Fig. 3. The cemetery.

Three phases of interment can be inferred in the cemetery, although most graves are unphased. Phase 1 is represented only by disarticulated bone from graves that had been disturbed in order to accommodate new burials. Phase 2 comprised burials which contained disarticulated bone from disturbed graves, and also graves which had themselves been disturbed by Phase 3. Phase 3 consisted of two (possibly three) burials which had clearly cut into earlier graves. All those graves for which no relationship to other graves was established can belong to any of the phases; all of these also suffered various degrees of truncation. The alignments of graves are given below with the location of the head first and the degrees of deviation from due west–east where enough of the grave survived to establish this. Unless noted otherwise, all the grave fills were very similar, brown or grey-brown silty clay.

Phase 1

The earliest phase of the cemetery is represented by disarticulated bones, which can be assumed to have come from earlier burials disturbed by, and perhaps only accidentally incorporated into, later graves, although it is possible that disturbed bones were deliberately re-interred. Disarticulated bone was recovered from the backfills of Phase 2 graves 45, 47 and 102 and Phase 3 grave 44.

Phase 2

Grave 35. Grave 35 was heavily truncated and survived only to 0.3 m north–south, 0.2 m east–west and 0.3 m deep. It appears to have been aligned 26 degrees off west–east. Only the top of the cranium of skeleton (SK) 99 was recovered. Grave 35 was disturbed by later grave 100.

Grave 45. Grave 45 was aligned almost due west–east (4 degrees), irregular in plan with a flattish base, and the eastern end of the grave was truncated. It survived to 1.2 m long, 0.8 m wide and 0.16 m deep. The grave contained a single articulated burial (174). Disarticulated remains (254 and 253) located on the south side of the grave are probably the remains of a

single original burial disturbed by the interment of 174. Further disarticulated human remains (255) overlay SK174. A single sherd of Roman pottery was clearly an accidental inclusion. Skeleton 174 was supine, west–east with the skull lying on its right side facing south and the arms parallel with the cut.

Grave 47. Grave 47 was aligned west-south-west to east-north-east (16 degrees), was rectangular in plan with a flat base and the eastern end was heavily truncated. It was 0.7 m long, 0.8 m wide and 0.15 m deep. The grave backfill contained a single tiny sherd of Roman pottery, a flint flake and the remains of two individuals (171 and 172). Skeleton 172 comprised a number of disarticulated bones including cranium, femur, vertebra and ribs, located in the north-western corner of the grave and appearing to be the remains of the original burial which was disturbed by the deposition of a later burial 171. Only approximately a third of SK171 remained. It was supine and aligned west–east and its skull was lying on its right side, facing south. The arms were parallel to the body and were both truncated approximately mid-humerus.

Grave 102. Grave 102 is the primary basis for recognizing three phases in the cemetery. This grave contained disarticulated bone (Phase 1) and a single articulated skeleton (SK178) buried during phase 2, before being cut into by later grave 44. On the south side of the grave were a number of disarticulated bones (179, 180, 188 and 189) which are probably the remains of original burials disturbed by the new burial (178) which was in turn overlain by more disarticulated remains (181, 186 and 190–2). The disarticulated bone belongs to a minimum of two earlier skeletons. Skeleton 178 was supine, 10 degrees off west–east, the skull on its right side facing south–west. The upper arms were parallel and the lower arms flexed over the pelvis. Grave 102 was aligned west-south-west to east-north-east, irregular in plan with a flattish base. The grave measured 1.54 m long, 0.5 m wide and 0.08 m deep and was truncated at the eastern end. The left femur of SK178 has been radiocarbon dated to cal AD 655–721 or 741–770 (KIA 44191, Table 4), the earlier range being more likely. The grave fill (187) contained three tiny sherds (15 g in total) of early/middle Anglo-Saxon pottery and a single flint, but these were not grave goods, simply part of the soil matrix, and could easily have come from the earlier disturbed burial.

Grave 30. Grave 30 was aligned close to west–east (10 degrees), was sub-rectangular with a slightly undulating base and almost vertical sides. It was 2 m long, 0.7 m wide and 0.3 m deep and filled with brown sandy clay (91). The grave contained a single skeleton (90) which was supine, aligned west–east with its head lying on its left side. A radiocarbon determination of cal AD 640–685 (KIA44190, Table 4) was obtained from the left femur. Some disturbance of the top of the grave had taken place and a fragment of animal bone and three sherds of Cotswolds type pottery were presumed intrusive. Because of this disturbance, it was not possible to establish whether this grave cut or was cut by grave 31; in plan it appeared 31 was later. Grave 30 has therefore been placed in Phase 2 but only tentatively so.

Phase 3

Grave 44. Grave 44 was aligned south-south-west to north-north-east (27 degrees), was irregular in plan and had a flattish base. The south end of the grave was truncated. It contained SK168, which was supine with the head on its right side facing south. The left arm was lying parallel to the torso and the right was flexed at the elbow across the pelvis. Below 168 was found disarticulated bone (176). A single sherd of Roman pottery was an incidental inclusion in the grave backfill. This grave appeared to have been cut into the top of grave 102, on a slightly different alignment.

Grave 100. Grave 100 was aligned west-south-west to east-north-east (26 degrees) and was heavily truncated. The remaining measurements were 0.5 m long, 0.9 m wide and 0.3 m deep.

The grave contained dark brown clay (162) and the remains of SK161. Only the left humerus and right radius were recovered and it is not clear if this was the remains of an articulated burial or disarticulated skeleton. Grave 100 was cut into grave 35.

Grave 31. Cut 31 was just the north-west corner of a grave. It was probably aligned south-south-west to north-north-east (20 degrees?) and contained only two pieces of in situ cranium (SK92). The grave's surviving measurements were 0.38 m long, 0.24 m wide and 0.23 m deep. Grave 31 appeared to have been cut into grave 30, but this was uncertain and the phasing is tentative.

Unphased Graves

Grave 29. Grave 29 was aligned west-east (3 degrees), was sub-rectangular with a flat base and almost vertical sides. It measured 1.86 m long, but may originally have been longer, 0.9 m wide and between 0.2–0.28 m deep and was filled with brown sandy clay (89) and SK88. The skeleton was supine with its head facing north and legs straight. The right arm was lying extended alongside the body, the left arm flexed to place the hand across the pelvis and the feet were orientated south-east. No finds were included in the backfill.

Grave 32. Grave 32 was heavily truncated; what was left contained the remains of SK94. The grave survived to 1 m long, 0.3 m wide and 0.1 m deep. Only part of the lower left arm and pelvis, left leg and the lower right leg were present. The individual was supine and lying west-east (4 degrees).

Grave 33. Grave 33 was another truncated grave and only two fragments of a child's cranium (SK96) were recovered. The surviving measurements of the cut were 0.8 m long, 0.35 m wide and 0.1 m deep. A single tiny (1g) sherd of Brill-Boarstall ware is assumed to be intrusive into this badly disturbed grave.

Grave 46. Grave 46 was aligned west-east (3 degrees), irregular in plan with a flattish base and the eastern end of the grave was truncated. It contained a single sherd of early/middle Anglo-Saxon pottery and SK170. The grave's available measurements were 0.87 m in length, 0.5 m wide and 0.05 m deep. The body was aligned west-east and the skull was lying on its right side facing south. The right arm lay parallel to the side of the grave but the left arm was missing, as were both legs. Given the amount of disturbance and residuality on the site, the Anglo-Saxon pottery sherd can only provide the most general of *terminus post quem* for the burial.

Grave 101. Grave 101 was aligned west-south-west to east-north-east (10 degrees) and extended beyond the western limit of excavation. It measured 1.5 m in length, 0.5 m wide and 0.15 m deep. It contained dark brown clay (165) and two skeletons (163 and 164). Skeleton 163 was the remains of a child and it was supine and aligned west-east. Only the left and right femurs and fragments of tibia and fibula were present. Lying directly to the north of this was SK164, which appeared to be an adult however it extended beyond the western limit of excavation and was not excavated. The body was supine and aligned west-east. Both the adult and the child were laid in the same cut which suggests a family relationship.

Graves and Possible Graves Observed but not Excavated

A number of probable grave cuts were observed in plan or section extending outside the development area, but were not excavated. Those observed in plan were covered with geotextile and preserved in situ.

Orientations of Burials (where Established)

All were basically west–east, with the head to the west, but within that broad agreement, there are two distinct groups of orientations: Graves 29, 30, 32, 33, 34, 45, 46, 48, 101 and 115 were all within 11 degrees of due west–east, and graves 31, 35, 44, 47 and 100, were between 16 and 26 degrees off. The same grouping of orientations is apparent in the plan of the previously recorded graves, where, however, the two alignments also form geographically discrete groups. Most of those with the largest angle of deviation (31, 44, 100) are in Phase 3 but one with a large deviation is in Phase 2 (35): all of those that approach most closely to due west–east (under 4 degrees off) are unphased as they had no relationship to other graves. None of the cuts was aligned anywhere close to the same orientation of St Edburg’s Church to the south but it is arguable that those furthest off the west–east line are roughly on the orientation of The Causeway.

Other Features (Fig. 2)

Beyond the cemetery, most of the features appear to be high medieval, although one or two could be Anglo-Saxon.

Ditch 200 (Figs. 2 and 4). Cuts 14 and 109 formed an east–west aligned ditch (200), 2.20 m wide and 0.95 m deep, with four fills, which produced small amounts of St Neots and Wiltshire wares, Cotswolds-type ware, slightly more medieval Oxford ware, but is dated by a substantial assemblage (55 sherds) of Brill-Boarstall ware which is not earlier than the thirteenth century and could be up to two centuries later.

Ditch 201 (cuts 21, 28, 103) was aligned north–north–west to south–south–east, was at least 15 m long, 1.06–1.25 m wide and 0.41–0.45 m deep and showed a variety of different filling sequences (Figs. 2 and 4). Its finds included one tiny sherd of St Neots-type ware and medieval shelly coarseware dating very broadly from the late eleventh to mid fourteenth century, as well as a residual sherd of Roman pottery. It cut through earlier (but otherwise undated) features. It was originally considered that this ditch marked the eastern boundary of the cemetery, and all the features east of it represent settlement. However, the ditch was clearly backfilled much later than the dated burials. Nonetheless, the cemetery must have been bounded somehow, since no later features encroached upon this area, so it is possible that an earlier boundary existed here. Feature 27 was possibly the terminal of such an earlier ditch. It contained brown grey clayey silt (85), which overlay a deposit of large flat stones in grey clayey silt (86) and measured at least 0.94 m long, 2.21 m wide and 0.96 m deep. It contained no finds but was truncated on its south–western side by ditch 201.

Ditch 203. Feature 105 appeared to be the western edge of a north–south aligned ditch (203) which continued north (1) and possibly curved slightly eastwards before terminating (19). Its eastern edge was seen only at 1 (possibly) and 19, where it was ‘v’-shaped in profile. If all of these are part of the same ditch, then this was at least 16 m long, probably continuing to the south–east. It was 1.6–1.8 m wide and at least 0.85 m deep. Single sherds of St Neots ware, medieval Oxford ware and Brill-Boarstall ware were found in the fills of cut 105, along with animal bone. Slot 1 contained only a single Anglo-Saxon sherd and there were no finds from 19.

Features 106 and 108 (Figs. 2 and 4). It is not clear if these features were ditch termini or pits. The service trench destroyed any relationship but 108 contained medieval pottery and 106 three tiny early/mid Anglo-Saxon sherds. Feature 106 had steep sides with a flat base and was 3.6 m wide and 0.88 m deep. It contained three fills. Compact brown silty clay (263) with frequent limestone inclusions overlay compact brown silty clay (264) with significant charcoal inclusions. The base layer comprised loose brown–grey clayey silt (265). It is possible that 106

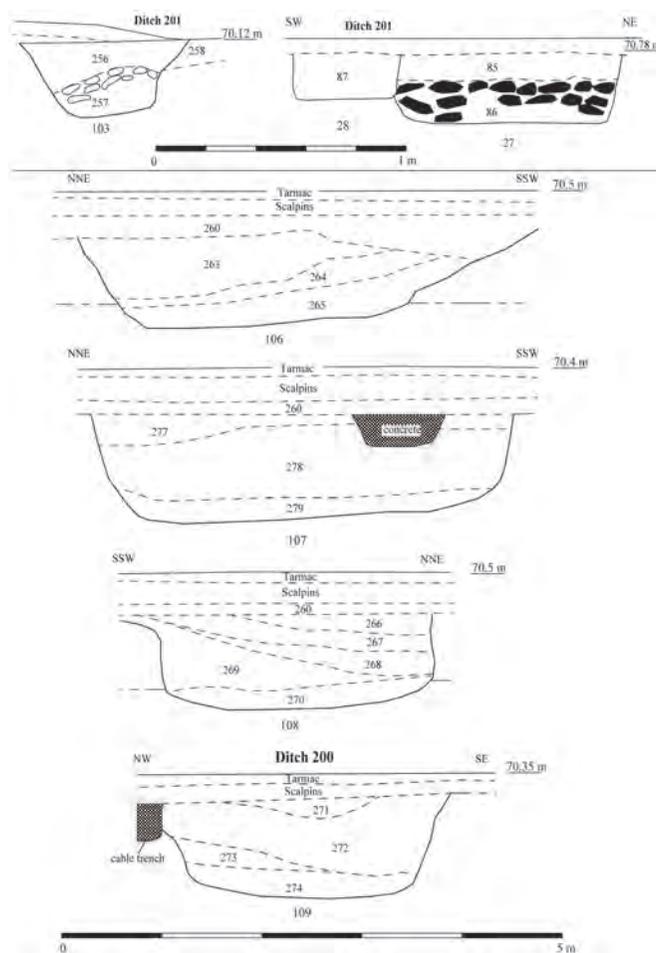


Fig. 4. Selected sections.

might be the end of a sunken-featured building. Feature 108 was 3 m wide (north–south) but only extended 0.85 m into the trench. It had a sequence of five fills, silty clay fills 266–9 all slumping in from the south but basal fill 270 laid flat. Fill 269 contained approximately 40 per cent limestone rubble and fill 268 had significant charcoal inclusions. Fill 269 may represent a bank slighted back into a ditch. In the bottom fill (270) were animal bone and a residual sherd of late Iron-Age pottery, five sherds of St Neots-type ware and a sherd of Cotswold-type ware, but it is dated by two sherds of medieval Oxford ware to the late eleventh century or later.

Ditch/Pit 107 (Figs. 2 and 4). Ditch or large pit 107 was aligned east–west and at least 1 m long: as it did not extend into the next trench to the west, it is more probably a pit. It was 3.4 m wide and 0.8 m deep. It contained three fills and a single piece each of St Neots- and Cotswold-type wares.

Gully 110, Ditch 111 and Pit 112. Ditch 111 and pit 112 were located at the southern end of the site. Cut 111 was possibly observed at an oblique angle. The surviving dimensions were 3.6 m wide and 0.7 m deep and its single fill contained ten sherds, mostly medieval Oxford ware but including late-medieval to early post-medieval Potterspurty ware. It was not clear in

section if ditch 111 cut or was cut by pit 112. The pit was 1 m wide and 0.7 m deep with no finds. Gully 110 was at least 1.1 m long, 0.23 m wide and 0.25 m deep. Its brown silty clay fill (275) contained no dating evidence but as it cut the north edge of ditch 111, it probably dates from the post-medieval period.

Ditches 113 and 114. Ditch, or very large pit 113 was approximately 8.5 m wide and at least 0.95 m deep but not was bottomed. It contained a single fill, which yielded three sherds of St Neots ware pottery, a sherd of Cotswold-type ware, four sherds of medieval Oxford ware, and animal bone. Ditch 114 was cut across the top of ditch 113, aligned east–west, 0.9 m wide and 0.7 m deep. From the fill were recovered animal bone and Cistercian and post-medieval red earthenware pottery which dates from the late fifteenth century onwards.

Ditch 202 and palaeochannel. The ground level immediately north of the church dips off markedly towards the east, towards the course of the River Bure (now culverted and little more than a drain), with a drop of some 0.55 m between the north-west and north-east corners of the church building. Ditch 202 (3/17) was aligned north–south and extended beyond the northern boundary of the site and below the modern church to the south. It was at least 5 m long, 3.07 m wide and 0.85 m deep. Various modern drains cut across this area, affecting the ditch and also obscuring the natural geology in places; the footings became waterlogged here and had to be shored, also restricting recording. It appears that the easternmost 5 m of the foundations were dug into an alluviated channel of the pre-culverted Bure, as also observed to the south at Proctor's Yard.²¹ The ditch contained dark grey silty clay (67) which overlay redeposited natural of yellow grey clay (69) below which was grey-brown silty clay (68). Fill 67 contained animal bone and pottery only broadly dated between the tenth to fourteenth centuries. The ditch was cut through layers of orange silty clay and red-grey clay (258), which could have been stream bank or channel fill but which could not be adequately explored.

Pits. A single sherd of early/middle Anglo-Saxon pottery came from feature 2 (fill 54) in the evaluation; this feature, probably a pit, was outside the area observed in the watching brief. Pit 104 was only partially observed. It contained small pieces of limestone and a single sherd of Anglo-Saxon or early medieval Cotswold-type ware.

Pits 10, 11, 12, 18 and all contained small amounts of broadly medieval pottery, mostly suggesting dates in the thirteenth–fourteenth century. Pit 10 also contained fragments of animal bone and a single piece of slag.

Five inter-cutting features which may be either shallow ditches or pits (22–26) in the section of trenches east of ditch 201 produced only five sherds of pottery in total. Stratigraphically the latest feature, 22, contained tenth- to fourteenth-century pottery. It cut feature 23 which contained pottery dating from the twelfth to thirteenth century. None of the lower features in this sequence (24, 25, 26) contained any finds.

POTTERY by PAUL BLINKHORN

The pottery assemblage comprised 213 sherds with a total weight of 2,182 g. It included a mixture of late Iron-Age, Roman, Anglo-Saxon, medieval and post-medieval material. Where appropriate, it was recorded utilizing the coding system and chronology of the Oxfordshire County type-series,²² as follows:

²¹ Hull and Preston, 'Excavation...at Proctor's Yard, Bicester'.

²² M. Mellor and G. Oakley, 'A Summary of the Key Assemblages. A Study of the Pottery, Clay Pipes, Glass and Other Finds from Fourteen Pits, dating from the 16th to the mid 19th Century', in T.G. Hassall et al., 'Excavations in St Ebbe's, Oxford, 1967–1976: Part II: Post-Medieval Domestic Tenements and the Post-Dissolution Site of the Greyfriars', *Oxoniensia*, 49 (1984), pp. 181–211; M. Mellor, 'Oxford Pottery: A Synthesis

- OXR: St Neots ware type T1(1), AD 850–1100. 16 sherds, 134 g.
 OXAC: Cotswold-type ware, AD 975–1350. 17 sherds, 127 g.
 OXBF: North-East Wiltshire ware, AD 1050–1400. 1 sherd, 7 g.
 OXY: Medieval Oxford ware, AD 1075–1350. 54 sherds, 508 g.
 OX234: Banbury ware, late eleventh to late fourteenth century. 12 sherds, 131 g.
 OXBK: Medieval shelly coarseware, AD 1100–1350. 9 sherds, 93 g.
 OXAW: Early Brill coarseware, late twelfth to thirteenth century. 6 sherds, 116 g.
 OXAM: Brill/Boarstall ware, AD 1200–1600. 81 sherds, 906 g.
 OX68: Potterspury ware, late thirteenth to seventeenth century. 3 sherds, 83 g.
 OXCL: Cistercian ware, AD 1475–1700. 1 sherd, 4 g.
 OXDR: Red earthenwares, AD 1550 onwards. 6 sherds, 60 g.

In addition, the following wares were noted:

Late Iron Age. 1 sherd, 25 g.

Miscellaneous Roman wares. 4 sherds, 25 g.

Early/Middle Anglo-Saxon handmade wares, c.AD 450–850. 8 sherds, 36 g.

The pottery occurrence by number and weight of sherds per context by fabric type is shown in Table 1 (Iron-Age, Roman and post-medieval excluded). The range of post-Roman fabric types is typical of sites in Bicester, comprising wares from a number of sources to the north and south of the town. It suggests that there was more or less continuous occupation at the site from the late Anglo-Saxon period, possibly as early as the tenth century, to the late thirteenth or fourteenth century, after which time pottery deposition all but ceased.

Each context-specific pottery assemblage has been given a ceramic phase (CP) based on the range of ware and vessel types present. The chronology, defining wares and the amount of pottery per phase are shown in Table 2. The bulk of the assemblage occurred in medieval features, particularly those dating to the thirteenth or fourteenth century (CP4). The occurrence of the major fabrics per ceramic phase is shown in Table 3.

Residuality is generally fairly low, with the exception of CP3 (late eleventh to twelfth century). Over 35 per cent of the pottery from CP3 is residual, which is reflected in the low mean sherd weight for the phase. The re-deposited material comprises Iron-Age, Roman and Anglo-Saxon wares, suggesting that there was disturbance of underlying strata at that time. In CP4, residuality falls dramatically to just 2.5 per cent, so it would appear that there was a major phase of activity at the site in the post-Conquest period.

Chronology and Discussion

The earliest pottery at the site consists of sherds of late Iron-Age and Roman material, all of which are abraded and/or quite small, and, even when not obviously deposited in later features, are still likely to be the product of secondary deposition, perhaps as a result of manure scatters on agricultural land.

The eight sherds of early/middle Anglo-Saxon material are all undecorated body sherds, but apparently reliably stratified, as no later pottery occurred in the features in which they were present. Two of the features of this date were graves, and so residuality is possible in those cases, although there is a possibility that the sherds could be contemporary with the burials (see below). The dating of early Anglo-Saxon handmade pottery is almost entirely reliant on the presence of decorated sherds. It seems that Anglo-Saxon potters generally

of Middle and Late Saxon, Medieval and Early Post-Medieval Pottery in the Oxford Region', *Oxoniensia*, 59 (1994), pp. 17–217.

Table 1. Pottery occurrence by number and weight (in g) of sherds per context by fabric type

Cut	Deposit	E/MS		OXR		OXAC		OXBF		OXY		OXBK		OX234		OXAW		OXAM		OX68	
		No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	Spoil heap			1	2	1	22														
	Surface			2	26	1	10														
	260																				
1	54	1	11																		
10	60											1	3	1	17	3	110	1			35
11	61											1	4								
12	62					2	8					2	44	3	27						
13	63																				
14	64					1	8														
16	surface																				
17	67					1	8														
18	70																				
22	79					1	22														
23	80																				
26	84																				
30	91					3	2														
33	97																				
44	169																				
45	175																				
46	167	1	3																		
47	173																				
102	187	3	15																		

Table 1 (Continued)

	E/MS	OXR	OXAC	OXBF	OXY	OXBK	OX234	OXAW	OXAM	OX68										
103	256	1	3			1	11		6	25										
103	257		1	4	8	58	1	3												
104	261		1	3																
105	280	1	14		1	5			1	3										
105	262	1	1																	
106	265	3	7																	
107	277	1	4	1	13															
108	270	5	63	1	9	2	5													
109	272		2	14	1	7	3	20	36	404										
109	274	1	11				16	45	1	2										
111	276						6	177	1	6										
113	281	3	10	1	4	4	36		8	70										
Total	8	36	16	134	17	127	1	7	48	434	9	93	12	131	6	116	81	906	3	83

Table 2. Ceramic phase chronology, occurrence and defining wares

Phase	Defining wares	Date (century AD)	No. sherds	Wt (g)	Mean sherd wt (g)
E/MS	E/MS	5th–9th	7	25	3.6
CP1	OXR	10th	1	1	1.0
CP2	OXAC	11th	8	52	6.5
CP3	OXY	Late 11th–12th	32	276	8.6
CP4	OXAM	13th–14th	139	1500	10.8
CP5	OXDR, OXFH	Mid 16th–17th	6	64	10.7

Table 3. Pottery occurrence per ceramic phase by fabric type, expressed as a percentage of the total weight per phase, major fabrics only; shaded cells = residual material

Fabric	E/MS	CP1	CP2	CP3	CP4	CP5
LIA	–	–	–	9.1%	–	–
RB	–	–	–	3.6%	–	–
E/MS	100%	–	–	–	–	–
OXR	–	100%	7.7%	22.8%	2.5%	–
OXAC	–	–	92.3%	7.6%	1.7%	–
OXBF	–	–	–	–	0.5%	–
OXY	–	–	–	27.9%	23.8%	–
OX234	–	–	–	9.8%	2.7%	–
OXBK	–	–	–	18.5%	1.1%	–
OXAW	–	–	–	0.7%	7.6%	–
OXAM	–	–	–	–	54.6%	–
OX68	–	–	–	–	5.5%	–
OXCL	–	–	–	–	–	6.2%
OXDR	–	–	–	–	–	93.8%
Total	25g	1g	52g	276g	1500g	64g

stopped decorating handmade pottery around the beginning of the seventh century,²³ but it cannot be said that an assemblage which produced only plain sherds is of seventh-century date. Usually, decorated handmade pottery only comprises around 3 to 4 per cent of domestic assemblages, as at sites such as West Stow, Suffolk and Mucking, Essex.²⁴ Thus, a fairly small assemblage of plain pottery such as this one cannot be said with certainty to be dated to the seventh century or later, and has to be given a broad period date of the fifth to ninth century. Mellor has indicated that there is a real possibility that handmade pottery of this type was still in use in Oxfordshire at the beginning of the late Anglo-Saxon period, so the sherds could be broadly contemporary with the burials.²⁵ The assemblage is a useful small addition to the corpus of material of this date from Bicester and indicates there was settlement in the immediate vicinity of the site during that period. Pottery of a similar date occurred at an Anglo-Saxon settlement at nearby Chapel Street.²⁶

²³ J.N.L. Myres, *A Corpus of Anglo-Saxon Pottery of the Pagan Period* (1977).

²⁴ S.E. West, *West Stow. The Anglo-Saxon Village*, East Anglian Archaeology, 24 (1985); H.F. Hamerow, *Excavations at Mucking Volume 2: The Anglo-Saxon Settlement*, English Heritage Archaeology Report, 22 (1993).

²⁵ Mellor, 'Oxford Pottery', p. 36.

²⁶ L. Mephram, 'The Pottery', in P.A. Harding and P. Andrews, 'Anglo-Saxon and Medieval Settlement at Chapel Street, Bicester: Excavations 1999–2000', *Oxoniensia*, 67 (2002), pp. 141–79.

Table 4. Radiocarbon dating

Lab. no.	Context	Material	Corrected pMC	$\delta^{13}\text{C}(\text{‰})$	Radiocarbon age	Calibrated age	Probability
KIA44190	Grave 30; Sk 90	left femur; collagen, 4.0mg C	84.41 ± 0.24	-19.59 ± 0.11	$\text{BP}1361 \pm 23$	cal AD 640–685	95.4%
KIA44191	Grave 102; Sk 178	left femur; collagen, 3.7mg C	84.88 ± 0.27	-20.46 ± 0.24	$\text{BP}1317 \pm 25$	cal AD 655–721 cal AD 741–770	72.5% 22.9%

The presence of a relatively large proportion of St Neots ware (fabric OXR) suggests very strongly that there was activity at the site in the tenth and eleventh centuries. Most of the assemblage is residual, and the mean sherd weight fairly small, but a few larger sherds are present, including a rimsherd from a small jar typical of the late Anglo-Saxon products of the tradition, from context 270.

The medieval assemblage is typical of sites of the period in the region, being dominated in the thirteenth to fourteenth centuries by fragments of glazed and often highly decorated Brill/Boarstall ware jugs, with smaller quantities of unglazed wares from a variety of sources to the north and south. It appears entirely domestic in nature.

STRUCK FLINT BY STEVE FORD

The two struck flints from the site were both small, patinated white and clearly residual. A spall (less than 20 x 20 mm) was recovered from grave 102 (187) and a narrow flake from grave 47 (173). The presence of narrow flake scars on the dorsal surface of the narrow flake suggests that it might be Mesolithic or earlier Neolithic.

RADIOCARBON DATING

Samples of bone from the femurs of two skeletons were submitted to the University of Kiel for AMS radiocarbon dating (Table 4). Details of methodology and an assessment of reliability are contained in the archive; in summary the laboratory considered the results to be reliable. Calibrations are given using CALIB rev 5.01 and Data set IntCal04,²⁷ and quoted at 2-sigma. Skeleton 90 in grave 30 can be dated very closely to between AD 640–685, while skeleton 178 in grave 102 has a wider range of possible dates from AD 655–770 (with a higher probability at the earlier end).

HUMAN BONE by CERI FALYS

Physical Anthropology

The assemblage consisted of nine articulated individuals in distinct graves, as well as a significant quantity of disarticulated remains, the result of cutting of new graves on top of

²⁷ P.J. Reimer et al., 'IntCal04 Terrestrial Radiocarbon Age Calibration, 0–26cal kyr BP', *Radiocarbon*, 46:3 (2004), pp. 1029–58.

old. Age-at-death, pathological observations and non-metric traits were fully documented. Estimates of stature were not possible for any individual, due to the high degree of fragmentation. For the purposes of this report, the articulated individuals are the main focus, and described separately from the disarticulated material which is more briefly dealt with. A detailed skeleton catalogue and full methodological detail are in the site archive and can be accessed online.²⁸

The population was composed primarily of older female individuals (46+ years). With the exception of a single infant (SK96), and one probable female (SK94) which could not be aged beyond the generalized “adult” stage of skeletal development, all other individuals were estimated to be over the age of 36 years at the time of death. Two females (SK 88, 178) were aged 36–45 years, and five individuals (a female, SK 170; three probable females, SK 90, 171, 174; and the lone male, SK 168) were aged 46+ years.

Preservation and Completeness

The preservation of the skeletal remains varied although all skeletal elements were fragmented, and the overall condition of the bone was generally poor. The shafts of the long bones and pieces of cranium were generally intact. In contrast, areas of trabecular bone in the proximal and distal ends of the long bones and vertebral bodies and ribs were the most infrequently preserved. Surface preservation was also poor with the majority of the bone surfaces affected by erosive action exfoliating the outermost layers of cortical bone. No contexts had bone in excellent or good preservation. Of the nine articulated individuals, four were of fair preservation, with five poorly preserved. Of the disarticulated contexts, 62 per cent displayed fair preservation and 38 per cent were poorly preserved. This less than ideal preservation hindered aspects of the osteological assessment.

The greatest problem encountered during the excavation was frequent disturbance and truncation of large portions of the grave by later activity. No individuals were 100 per cent complete at the time of excavation. The majority of deposits of bone were single disarticulated elements (for example a humerus or a femur), or areas of disturbed and/or co-mingled remains. Of the 46 contexts containing human bone, five (11 per cent) were 75 per cent or more complete, two (4 per cent) were between 25–75 per cent complete, and by far the majority, 39 deposits (85 per cent), were less than 25 per cent complete.

Minimum Number of Individuals

Nine articulated skeletons were excavated. At least six additional individuals are represented in the disarticulated material. The most frequently occurring skeletal element was the left proximal femur, of which there were six, all adult, but this almost certainly underestimates the number of original burials represented.

Sex

The assemblage was found to contain predominantly female (n=3) and probable female (n=4) individuals. A single male (SK168) was present, as well as an infant (SK96) for whom sex could not be assessed (Table 5).

Disarticulated Remains

Little information was retrievable from the disarticulated bone. Table 6 provides an inventory. While all ageable bones were again from adults, more specific determinations were rarely possible. Sex determinations were not possible or at best unreliable and the poor preservation of this material inhibited all analysis of pathology.

²⁸ <http://www.tvas.co.uk/reports/reports.asp>.

Table 5. Summary of articulated human bone

Context (SK)	Preservation	Completeness	Age (years)	Sex
88	poor	75+ %	36–45	F
90	fair	75+ %	46+	F?
94	poor	< 25 %	adult	F?
96	poor	< 25 %	infant (<1)	n/a
168	fair	75+ %	46+	M
170	poor	25–75 %	46+	F
171	poor	25–75 %	46+	F?
174	fair	75+ %	46+	F?
178	fair	75+ %	36–45	F

Table 6. Summary of disarticulated remains

Context	Preserv.	Age category	Inventory							
			Cranial	Upper limb		Lower limb		Spine	Pelvis	Unidentified
				L	R	L	R			
92	poor	adult	Y	-	-	-	-	-	-	Y
97	poor	?	-	-	-	-	-	-	-	Y
99	poor	adult	Y	-	-	-	-	-	-	-
below 99	fair	adult	Y	-	-	Y	-	-	-	-
102	fair	adult	-	-	Y	Y	Y	-	-	-
161	fair	adult	-	-	Y	-	-	-	-	-
163	poor	adult	-	-	-	Y	-	-	-	-
164	poor	adult	-	-	-	Y	-	-	-	-
167	poor	?	-	-	-	-	-	-	-	Y
174a	poor	adult	Y	-	-	Y	-	-	-	-
176	poor	?	-	-	-	Y	-	-	-	-
179	poor	adult	Y	-	-	-	-	-	-	-
180	poor	adult	Y	-	-	-	-	-	-	-
181	fair	adult	-	-	-	Y	-	-	-	-
182	poor	?	-	-	-	-	Y	-	-	-
183	poor	?	-	-	-	Y	-	-	-	-
184	poor	adult	-	-	-	Y	-	-	-	-
185	fair	adult	-	Y	-	-	-	-	-	-
186	fair	?	-	-	-	Y	-	-	-	-
188	fair	?	-	-	-	-	Y	-	-	-
189	fair	?	-	-	-	Y	-	-	-	-
190	fair	adult	-	Y	-	-	-	-	-	-
191	fair	adult	-	-	Y	-	-	-	-	-
192	poor	adult	-	-	-	Y	-	-	-	-
193	fair	adult	-	-	-	Y	-	-	-	-
195	fair	adult	-	-	Y	-	-	-	-	-

(Continue)

Table 6. (Continued)

Context	Preserv.	Age category	Inventory							
			Cranial	Upper limb		Lower limb		Spine	Pelvis	Unidentified
				L	R	L	R			
196	fair	adult	-	Y	-	-	-	-	Y	-
197	fair	adult	-	-	-	Y	-	-	-	-
198	fair	adult	-	-	-	-	Y	-	-	-
199	poor	adult	-	-	-	-	-	Y	Y	-
230	fair	adult	-	Y	-	-	-	-	-	-
250	fair	adult	-	-	-	Y	-	-	-	-
252	fair	adult	-	-	-	Y	-	-	-	-
253	fair	36-45	-	-	-	-	-	-	Y	-
254	fair	adult	-	-	Y	-	Y	-	-	-
dis 44	fair	adult	-	-	-	-	-	-	-	-
dis 45	fair	adults	Y	Y	Y	Y	Y	Y	Y	-
disartic	fair	adults	Y	Y	Y	Y	Y	-	Y	-

Health Status

Skeletal pathology provides information about the living conditions, diet, work, access to medical care and numerous other aspects of everyday life of past populations.²⁹ The pathological observations recorded in this assemblage nearly all reflect alterations related to advanced age: degenerative joint disease and osteoarthritis (spinal and extra-spinal), osseous changes to the frontal bone (for example, endocranial surface of the frontal bone), and dental disease (caries, calculus, abscesses, periodontal disease and tooth loss). Other less frequent abnormalities were also identified, which likely occurred in response to the living conditions of the inhabitants of Bicester in the seventh century. Observations of cribra orbitalia, sinusitis and tuberculosis provide evidence for a deficient diet, and possible indoor pollution and less than ideal living conditions. Detailed descriptions of individual pathologies are presented in the skeleton catalogue.

Degenerative joint disease of the vertebral column. Four individuals (SK168, 170, 174 and 178) displayed vertebral osteophytic lipping. On its own osteophytic lipping usually indicates degenerative joint disease as part of the normal ageing process. The most frequently affected areas in this assemblage were the lower spine (mid to lower thoracic, lumbar and first sacral vertebrae), and rib articular facets. Schmorl's nodes were identified on the thoracic vertebrae of the male SK168, as well as the first lumbar vertebra of female SK178. Schmorl's nodes most commonly form during adolescence.³⁰

Extraspinal joint disease. In association with degenerative joint disease of the vertebral rib articular facets, porosity and osteophytes were also present on the rib heads and tubercles of SK168, 174 and 178. Porosity was present on the lateral surfaces of the clavicles on SK168 and 174. SK170's right lateral clavicle, acromion and glenoid cavity of the right scapula had osteophytic lipping and porosity, while SK171's left glenoid cavity of the scapula equally affected by osteophytes. Finally, osteophytic growths were present on the proximal and distal surfaces of SK174's left ulna.

²⁹ C. Roberts, *Human Remains in Archaeology: A Handbook* (2009).

³⁰ C. Roberts and K. Manchester, *Archaeology of Disease* (1995).

Osteoarthritis. SK170 displayed eburnation on both the superior and inferior articular facets of the cervical vertebrae as well as the right distal ulna. The ulnar eburnation may have occurred secondary to a well-healed oblique fracture of the distal one-third of the ulnar shaft. The lunate surface of SK171's acetabulum also had eburnation patches.

Hyperostosis frontalis interna (HFI). Five individuals displayed osseous changes to the endocranial surface of the frontal bone (SK88, 90, 170, 171, and 178) as did fragments from disarticulated material (92). These alterations included nodules of new bone formation, and in some cases, the endocranial surface of the frontal bone was billowed in appearance (that is, no longer flat and smooth). These observations indicate a condition called hyperostosis frontalis interna (other causes are possible but this is considered most likely, for reasons fully discussed in the archive report). All of these individuals were female, or probably female; two aged 36–45 years, the remainder 46+ years. The condition is thought to be largely asymptomatic, however the billowing of the frontal bone may place some pressure on the brain, resulting in headaches. Archaeologically, the prevalence of HFI has been reported as relatively low.³¹ It is difficult to assess if this reflects shorter life expectancy, due to the current inability to assess the age at death of skeletal individuals accurately past the age of 46 years. It is unclear if the modern increase in cases is related to greater life expectancy, or is culturally derived (fewer children, or the lengthening of reproductive period).³²

Dental disease. All individuals here displayed at least moderate dental wear. SK170 displayed noteworthy extensive and extreme wear on all mandibular and maxillary dentition. SK88, 174 and 178 displayed dental caries. Levels of calculus varied between slight and severe in SK170, 174, 178. Periodontal disease was noted in SK178, who also had an abscess of the right maxillary first molar, with two associated cloaca at the position of the tooth roots.

Metabolic disease. Six individuals (SK88, 90, 168, 170, 171 and 174) displayed the characteristic porous lesions of cribra orbitalia, most commonly scattered fine foramina, Type 2.³³ Cribra orbitalia have been traditionally linked to iron-deficiency anaemia (either through malnutrition, parasitic infection or excessive blood loss). However, recent work suggests that it may be the result of megaloblastic anaemia resulting from a deficiency of vitamins B12 and B9 (found in animal products).³⁴

Non-specific infectious disease. Sinusitis is a chronic and irritating infection that causes irregular pitting and new bone formation on the interior surface of the maxillary sinuses. Predisposing factors include allergies, smoke, environmental pollution and house dust, among others.³⁵ New bone formation was noted on the floor of the maxillary sinuses of SK178. Although this infection may be related to the dental abscess and associated bacteria of the right maxillary first molar, the bilateral appearance of the new bone formation in the maxillary sinuses suggest a different cause.

³¹ G. Barber et al., 'A Comparison of Radiological and Palaeopathological Diagnostic Criteria for Hyperostosis Frontalis Interna', *International Journal of Osteoarchaeology*, 7 (1997) pp. 157–64; I. Hershkovitz et al., 'Hyperostosis Frontalis Interna: An Anthropological Perspective', *American Journal of Physical Anthropology*, 109 (1999), pp. 303–25.

³² Hershkovitz et al., 'Hyperostosis Frontalis Interna', p. 304.

³³ P. Stuart-Macadam, 'Anaemia in Roman Britain: Poundbury Camp', in H. Bush and M. Zvelebil (eds.), *Health in Past Societies: Biocultural Interpretations of Human Skeletal Remains in Archaeological Contexts* (1991).

³⁴ Roberts and Manchester, *Archaeology of Disease*; P.L. Walker et al., 'The Causes of Porotic Hyperostosis and Cribra Orbitalia: A Reappraisal of the Iron-Deficiency-Anemia Hypothesis', *American Journal of Physical Anthropology*, 139 (2009), pp. 109–25.

³⁵ Roberts and Manchester, *Archaeology of Disease*.

Tuberculosis. Male SK168 displayed several pathological observations, which may originate from a single infectious disease cause. Irregularly shaped erosive lesions were located on the sixth cervical vertebra, the seventh vertebral body, and the eleventh thoracic vertebra. Irregular new bone formation with associated erosive lesions were present on the left and right ilium, with associated porosity and new bone formation on the iliac blades, while the posterior surfaces of the ilia displayed large areas of active highly irregular discoloured new bone formation. These lesions are suggestive of an infectious disease of the gastro-intestinal tract, such as tuberculosis. This not only indicates his poor health from this chronic illness, it also provides an important insight into his living conditions. Tuberculosis has long been described as a disease of poverty, contributory factors including 'poor nourishment, overcrowded living conditions, high population density, and probably unhealthy low-level occupations'.³⁶

Discussion

This skeletal assemblage contains a minimum of fifteen individuals, including nine articulated skeletons. With the exception of a few highly fragmented skeletal elements of an infant, and SK94, for whom age-at-death could not be determined, the burials were predominantly female, over the age of thirty-five years at the time of death. Although some osteological and pathological analyses were hindered by the generally poor preservation of the bone, observable disease processes reflected the older age of these skeletal individuals. They display pathologies which are rarely found in archaeological populations (HFI and sinusitis). Degenerative joint disease and osteoarthritis, both of the spine and larger joints of the body, reflect advancing age. Nodules of bone and/or billowing appearance to the endocranial surface of the frontal bone were frequently observed in the female and probable female individuals, possibly the result of changing hormone levels during menopause. Other observations highlight frequent dental disease (for example, caries, calculus, periodontal disease), suggesting poor dental hygiene, while pitting of the roofs of the eye sockets, suggests a diet lacking in vitamin B12. Sinusitis suggests environmental pollution, while the presence of an individual with tuberculosis suggests overcrowded living conditions, high population density, and/or probably unhealthy low-level occupations.

STABLE ISOTOPE STUDIES by PETER DITCHFIELD

Samples for stable isotopic analysis were collected from nine skeletons. Where possible, samples of bone from femora and ribs as well as a second molar tooth were taken from each individual to enable dietary analysis throughout the individuals' lifetimes. Not all of the skeletons sampled had all of the skeletal elements of interest (Table 7). A description of methodology, standards and transformations used can be accessed online.³⁷

The Carbon to Nitrogen molar ratio is used as a quality control measure. All but one of the samples (Table 8) have ratios that pass the accepted tests for reliability, the exception being the rib sample from SK171 with a C/N ratio of 3.8. The carbon and nitrogen stable isotopic data are shown graphically in Fig. 5. The data for the femora and tooth dentine collagen are generally quite tightly clustered with little variation between tooth/femur pairs. The data for the ribs are a little more scattered showing a small but significant shift towards less negative $\delta^{13}\text{C}$ values for samples SK168, SK171 and SK178.

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³⁶ C. Roberts and J. Buikstra, *The Bioarchaeology of Tuberculosis* (2003), p. 86.

³⁷ <http://www.tvas.co.uk/reports/reports.asp>.

Table 7. Bones sampled for isotopic study

Sample	Rib	Femur	Molar (m2)
SK88	Y	Y	Y
SK90	Y	Y	–
SK94	–	Y	–
SK168	Y	Y	Y
SK170	Y	Y	Y
SK171	Y	–	–
SK172	Y	Y	–
SK174	Y	–	Y
SK178	Y	Y	Y

Table 8. Averages of the replicate analyses for each collagen sample

Sample	Skeletal element	$\delta^{13}\text{C}$ V-PDB	$\delta^{15}\text{N}$ air	C/N ratio
SK88	Molar (M2)	–19.71	11.22	3.28
SK88	Femur	–19.62	10.40	3.25
SK88	Rib	–19.17	10.54	3.25
SK90	Femur	–20.04	11.78	3.34
SK90	Rib	–20.38	10.77	3.23
SK94	Femur	–20.18	9.86	3.24
SK168	Molar (M2)	–19.27	10.25	3.22
SK168	Femur	–19.57	10.94	3.26
SK168	Rib	–17.87	11.57	3.30
SK170	Molar (M2)	–19.83	11.14	3.22
SK170	Femur	–19.78	11.28	3.27
SK170	Rib	–20.89	11.33	3.25
SK171	Rib	–18.17	12.09	3.83
SK172	Femur	–19.73	9.24	3.21
SK172	Rib	–19.65	9.57	3.19
SK174	Molar (M2)	–18.99	10.96	3.21
SK174	Femur	–19.67	9.46	3.25
SK174	Rib	–18.86	10.94	3.32
SK178	Molar (M2)	–19.35	10.69	3.23
SK178	Femur	–19.93	9.79	3.23
SK178	Rib	–17.32	9.87	3.39

enamel carbonate fraction also form a relatively tight cluster with only SK88 showing any significant difference (Table 9). All of the $\delta^{13}\text{C}$ (carbonate) values are compatible with a C3 based carbohydrate dietary component although the less negative values for individual SK88 might suggest a minor C4 carbohydrate component in early life.

We compared the $\delta^{18}\text{O}$ values in the dental enamel carbonate with other published values, to test whether they lie outside the range to be expected for southern England, using results from Leach et al.³⁸ who give an 'estimated $\delta^{18}\text{O}_\text{p}$ range for UK populations' based on analyses from

³⁸ S. Leach et al., 'Migration and Diversity in Roman Britain: A Multidisciplinary Approach to the Identification of Immigrants in Roman York, England', *American Journal of Physical Anthropology*, 140 (2009), pp. 546–61.

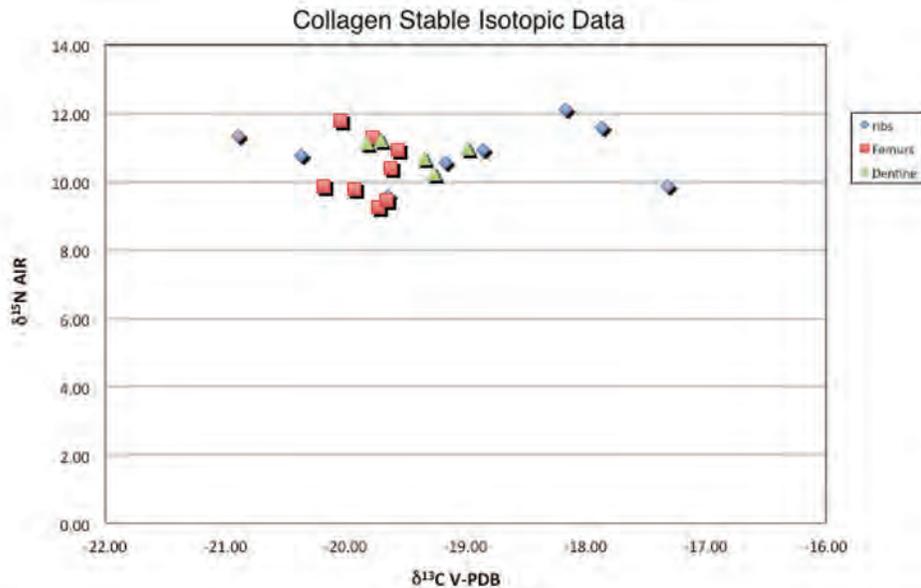


Fig. 5. Comparison of collagen isotope data, Bicester and Alchester.

Table 9. Oxygen and carbon stable isotope results for the analysis of the tooth enamel carbonate

Sample	Element	$\delta^{13}\text{C V-PDB}$	$\delta^{18}\text{O V-PDB}$	$\delta^{18}\text{O (carbonate) SMOW}$	$\delta^{18}\text{O (phosphate) SMOW}$
SK178	M2 enamel	-12.93	-4.96	25.80	17.16
SK168	M2 enamel	-13.46	-4.83	25.93	17.29
SK170	M2 enamel	-13.58	-4.43	26.34	17.69
SK174	M2 enamel	-13.38	-5.03	25.72	17.08
SK88	M2 enamel	-11.98	-6.07	24.65	16.03

57 humans from nine UK archaeological sites, identified as 'locals' from their Sr isotope data. They give a two sigma UK range of $\delta^{18}\text{O}_p = 16.8\text{--}18.6$ per thousand at 95 per cent confidence. Based on this range all the samples with the exception of SK88 give values compatible with an origin within southern England; SK88 is an outlier in terms of both oxygen and carbon stable isotopic values (Fig. 6).

Interpretation

The collagen stable isotopic data have been compared to that of late Roman and post-Roman assemblages from the nearby site of Alchester approximately 2.5 km to the south-west.³⁹ Although there is substantial overlap in the data ranges of the late and post-Roman humans from Alchester with those from this study (Fig. 7), the Bicester humans are enriched in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ relative to the Alchester assemblages. Taken at face value this difference, of approximately +0.5 per mil, could be due to a variety of dietary factors which include the possibility of slightly enhanced levels of marine protein (although this would seem not very likely given the inland location of the site), or more fresh water protein resources which

³⁹ C. Cummings, 'Food and Society in Late Roman Britain', University of Oxford D.Phil. thesis (2008).

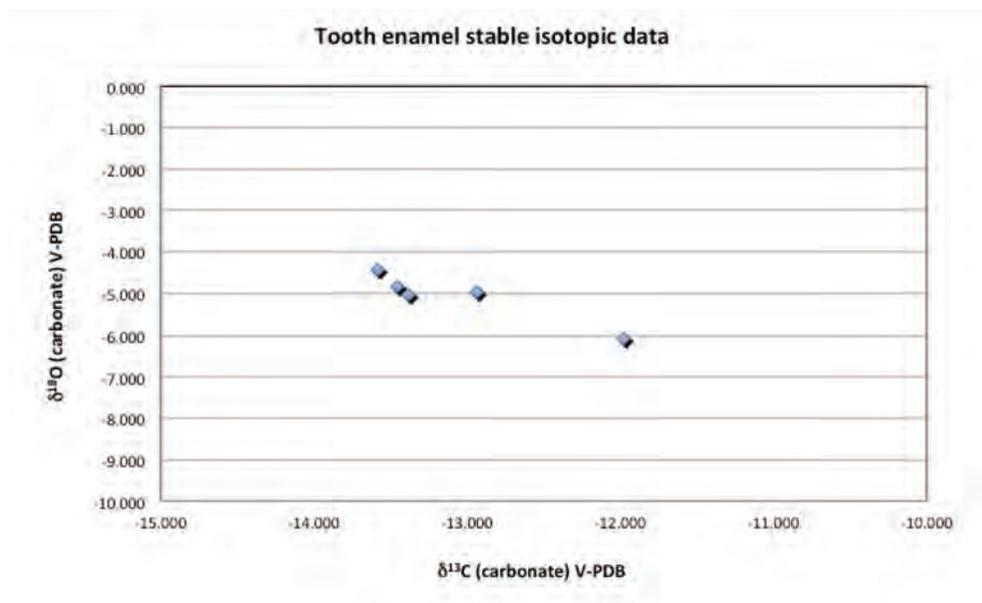


Fig. 6. Tooth enamel stable isotopic data.

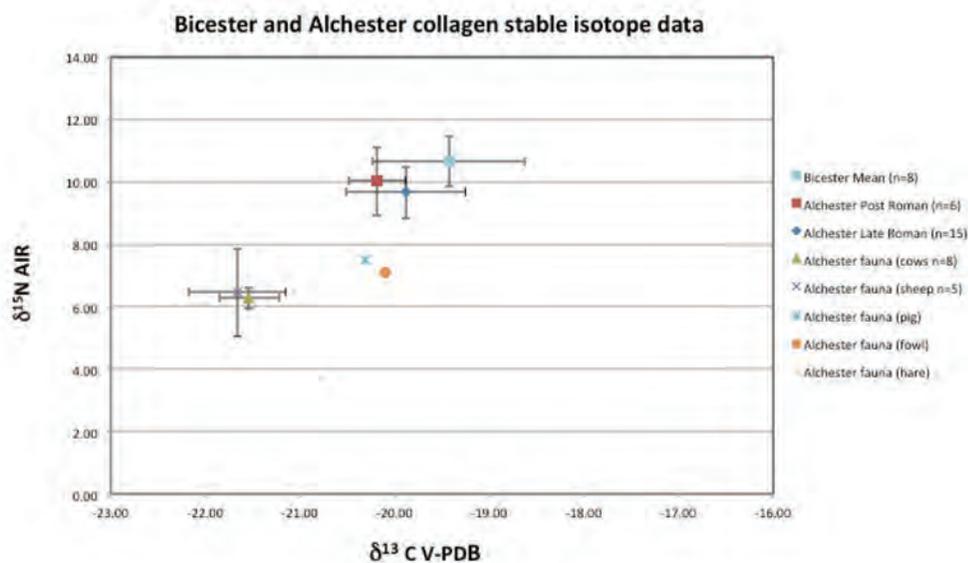


Fig. 7. Comparison of collagen stable isotopic data from Bicester and Alchester.

could give a similar shift in both carbon and nitrogen. Alternatively, a greater proportion of terrestrial meat-based protein coupled to a shift away from closed canopy (woodland) to more open (pasture) animal husbandry practice could produce a similar pattern.

The majority of the teeth sampled for this study have oxygen isotopic compositions compatible with mineralization of these teeth within southern England. However, SK88 has a substantially more continental oxygen isotopic composition. The tooth enamel carbonate

for this sample also shows an enrichment in $\delta^{13}\text{C}$ of the tooth enamel carbonate by about one per mil relative to the other samples, possibly suggesting a minor C4 carbohydrate input to the early diet of this individual. However this is not supported by the dentine collagen carbon isotopic values for SK88, which do not show any $\delta^{13}\text{C}$ enrichment over the other samples.

ANIMAL BONE by CERI FALYS

A total of 72 fragments of animal bone, weighing 1,845 g, was recovered. Almost all fragments were small, non-descript portions of long bone shafts. The minimum number of animals present was four: one each of cow, pig, sheep/goat, and small mammal. No evidence of butchery was present.

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