A MIDDLE TO LATE SAXON CEMETERY AT ROTHLEY, THE GRANGE

Tim Upson-Smith

with contributions from:
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Archaeological excavation at Rothley, north of the present parish church and its churchyard, recovered the burials of up to 149 individuals at least partly *in situ*, along with further disarticulated remains. Standing remains of Roman buildings, probably part of a former villa complex, may have still been extant when burial commenced, perhaps as early as the late seventh century and certainly by the early to mid-eighth century – as established by radiocarbon dating. The cemetery had probably been attached to an undocumented minster, presumably the precursor to the existing church. Many of the burials had been heavily disturbed, with extensive deposits of reburied and disarticulated bone. There was a single well-defined primary row of burials, further partial rows and a few outliers. The numerous gaps appear to be genuine and not solely a result of later disturbance. Burial in this area appears to have ceased by around the end of the tenth century, after which there has been little activity within the site.

INTRODUCTION

Northamptonshire Archaeology, now MOLA (Museum of London Archaeology) Northampton, was commissioned by CgMs Consulting, on behalf of William Davis, to undertake an archaeological excavation between March and July 2007, in advance of residential development at The Grange, Rothley (NGR SK 5867 1273, Fig. 1). The excavation, *c.*1,450m^2 in area, followed on from a desk-based assessment (JSAC 2004) and two trial trench evaluations (OA 2006a, 2006b). The site lies to the north-east of the present churchyard of St Mary's with St John the Baptist, directly to the north of School Street and south of The Grange (Fig. 2). The Rothley Brook flows roughly north to south some 100m to the east of the site. The site was on relatively flat land at *c.*48m aOD. The underlying superficial deposits comprise alluvium overlying Triassic mudstones (http://www.bgs.ac.uk/geoindex/).

The full client report (Upson-Smith 2011) is available on the Archaeology Data Service (ADS) and at the Leicestershire HER under the Leicestershire Museums Accession Number XA.52.2007.

BACKGROUND

Roman remains are noted on Ordnance Survey maps of 1885–1929 and on the 1:2,500 Ordnance Survey map of 1956, centred to the east of the vicarage, *c.*50m

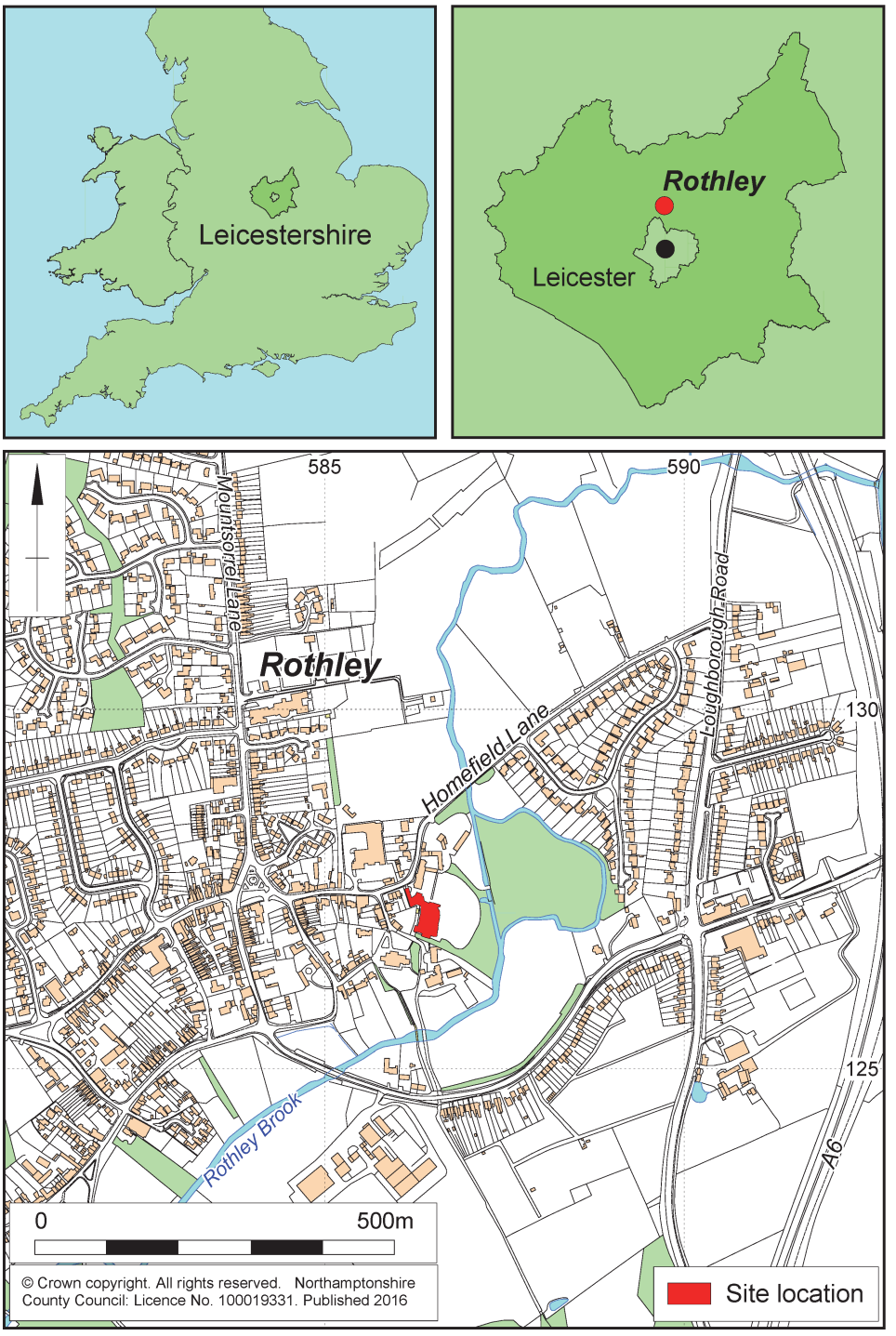

Fig. 1. Site location.

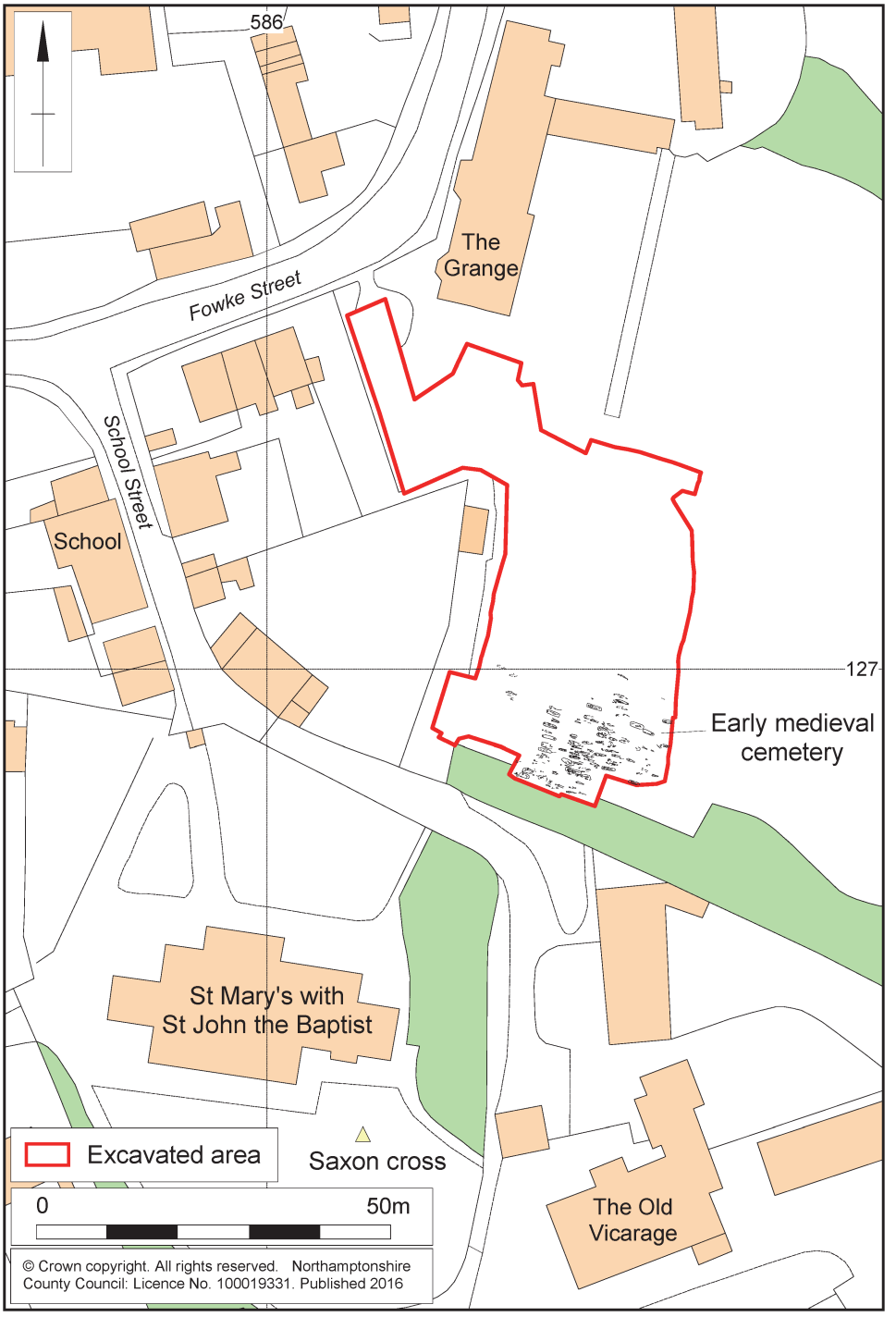

Fig. 2. The excavated area and its environs.

south of the present site. The 1903 map specifically notes a 'Roman pavement, found AD 1722', and this presumably implies a Romanised building such as a villa (JSAC 2004). A bronze coin of Constantine the Great was recorded from Fowke Street, *c.*50m west of the site.

In the mid-Saxon period (*c.*650–850), Rothley was part of the Middle Anglian region within the kingdom of Mercia, an area that converted to Christianity in AD 653 under Peada son of Penda (Bede 1968, 176–7). From the 870s onward this area was dominated by Scandinavian invaders who, after establishing their supremecy through warfare, took over many English estates and created new ones (Phythian-Adams 1986, 7). The area was briefly under the control (*c.*939) of the Hiberno-Norse kings of York and Dublin before they were defeated by the Saxon king Eadmund in 942. The Scandinavians took back control in 1013 until the Saxons re-asserted their domination in 1015.

At Domesday, Rothley was in the hands of King William; prior to this it was held by King Edward. The lands attached to Rothley were far-reaching, the overall area being roughly 25km by 19km.

In addition to the Domesday holdings, Rothley's ecclesiastical connections – some of which mirror manorial ones – stretched over a similarly wide area. Domesday manorial holdings are often ancient but not invariably so, often changing over time. Not so with ecclesiastical dependencies; they are daughters of the mother church (the minster), not 'holdings', and are almost invariably ancient connections reaching back for hundreds of years.

A Saxon 'cross' (see this volume, p. **142**) which stands in the churchyard of the parish church of St Mary's and St John the Baptist (SM 21646), on what is thought to have been its original site, is generally considered to be late eighth or ninth century in date. It appears to have been a monolith that was broken into four stones – date unknown, and subsequently reconstructed. The cross, which is considered to be standing on its original site, may have been a funerary monument rather than a preaching cross (Stafford 1985, 174). The presence of the cross is a powerful indicator that the church was almost certainly a major minster, with its extensive parochia adding additional corroboration of this. Vanessa McLoughlin, an expert on the documentary sources of the Rothley estate, has concluded that, by analogy with documented minsters, Rothley fulfils many of the expected conditions for minster status.

The present church, dating mainly from the thirteenth and fourteenth centuries, was restored in 1878. There is, however, compelling evidence for a Norman foundation to the present structure. The font is also Norman. The pier bases of the north and south arcades are considered to be of Norman date, and during drainage works undertaken in the nave in 1977 it was observed that they rest on large rafts of limestone dating from the same period.

The land ownership of the site can be traced to Rothley Grange, which was built in 1774 adjacent to the north. Post-medieval maps dating from 1782 show the site had not been built on and was presumably gardens of The Grange.

ROMAN OCCUPATION

There was no evidence of pre-Roman occupation within the excavation area, and activity in this period only comprised a scatter of residual late Neolithic or early Bronze Age flints. Roman occupation may have begun in the second century AD with the earliest features comprising two ditch systems, both aligned east–west in the northern part of the site, 331 and 329, and 177/282 (Fig. 3). To the south-west a series of post-pits 7, 340, 285, 218 and 318, *c.*1.0m in diameter by *c.*0.4m deep, possibly formed the eastern end of a timber structure *c.*7.8m wide, north to south. (This structure is interpreted as being of Roman date in view of the pottery from the fills which dated to the early third century, although it is not unfeasible that it may be post-Roman with residual pottery present.)

In the middle of the site there were patches of a compacted gravel-metalled surface. The largest patch was cut by a series of pits containing Roman roof tile, indicating that the surface predated these pits and may have been Roman; perhaps a yard surface associated with a building to the west. Immediately north of the post-pits, an extensive layer (97) of Roman roof tile and mortar, *c.*250mm thick, extending 10m north–south and more than 7m east–west, was likely to be the result of the collapse, demolition or robbing of a nearby building. There was also a spread of granite rubble (120), immediately to the north of the roof tile. The associated pottery dates these two layers to the fourth century.

On the eastern edge of the site was a large sub-rectangular pit 415, 2.7m wide by more than 3.7m long and 0.4m deep. Within the fill was much roof tile and a complete Roman floor tile, with mortar bedding still adhering to it.

THE ROMANO-BRITISH POTTERY
Jane Timby

The excavation recovered 314 sherds of Roman pottery, weighing 17.9kg. The assemblage is in very good condition, as reflected by the overall average sherd weight of 57g; however, this figure is somewhat skewed by a number of amphorae sherds, their parent vessels being large and robust. The assemblage appears to mainly date to the later Roman period, and comprises a mixture of imports, both continental and regional, and local wares. Some 48 sherds of Baetican olive oil amphorae were present, which may be from a single vessel. Regional imports include Lower Nene Valley products, Dorset black-burnished ware and a whiteware mortaria from Oxfordshire. A variety of vessels feature from the Nene Valley industries, including plain-walled dishes, a copy of a Samian Dragondorf 36, flanged bowls, boxes, beakers, and a jar or flagon. The local wares dominate the assemblage, accounting for 61 per cent by count.

THE CERAMIC AND SLATE TILE
Pat Chapman

All the ceramic tile was quantified on site, with a representative sample and the more complete examples of all types being retained for study and archiving. The

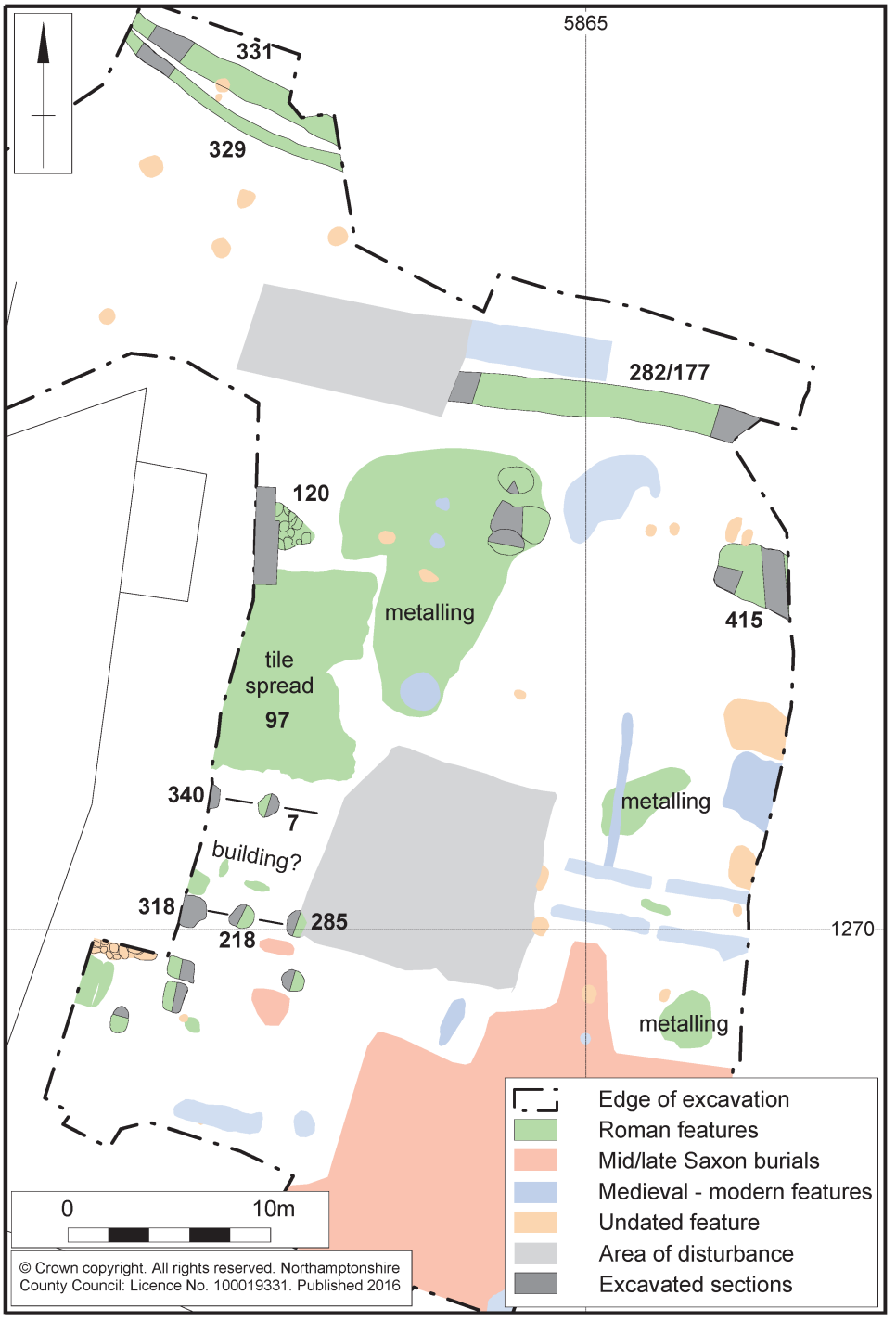

Fig. 3. The Roman features.

total assemblage comprised 815 sherds of roof tile, floor tile and a few box flue tiles, altogether weighing 521kg. There were also 180 slate roof tiles, weighing 163kg, the majority residual from medieval pit 303. Most of the retained tiles were diamond-shaped, the others are triangular or rectangular, and some have been retained in the archive.

OTHER ROMAN FINDS
Tora Hylton

Nine objects were recovered from stratified Roman deposits: two coins of the fourth century; two steelyard lead weights; part of a worked bone shaft, probably from a hair/dress pin; a fragment of copper alloy plate; and three iron nails. There were 28 *tesserae*.

THE ANIMAL BONE
Karen Deighton

A total of 95 bone and bone fragments came from Roman contexts: 39 were cattle, 14 sheep/goat, eight horse, seven pig, a red deer bone and antler fragment, and two goose bones. The remainder were unidentifiable large ungulates. Instances of canid gnawing and a few examples of butchery were noted.

THE CHARRED SEEDS
Wallis Lord-Hart

Weed seeds recovered, such as Bromus (Bromes) and Rumex (Dock), are typical crop contaminants. There were a moderate number of various cereal grains, including spelt, although not a large enough number to be certain that grain processing was occurring on site, as few chaff fragments were found.

THE EARLY MEDIEVAL CEMETERY
Tim Upson-Smith and Andy Chapman

At the southern end of the excavation area were the remains of up to 149 inhumation burials partially *in situ* (Fig. 4), together with large quantities of redeposited or disarticulated remains (Figs 5 and 6). The total number of skulls is 161, the minimum number of individuals buried here. The extent of the burial ground was not demarcated by any surviving features, but most of the burials were located within rows or partial rows. It is clear the cemetery continued to the east and south of the excavation area. All of the burials were extended supine inhumations, with the head to the west. There was a high level of disturbance of individual graves, with only 12 individuals more than 75 per cent complete. Bone preservation was poor to fair, with the major limb bones often degraded, and the minor bones – ribs, vertebrae and digits – often absent or so degraded as to be unrecoverable. A total of 298 deposits of bone was collected during the excavation of the cemetery (Table 2).

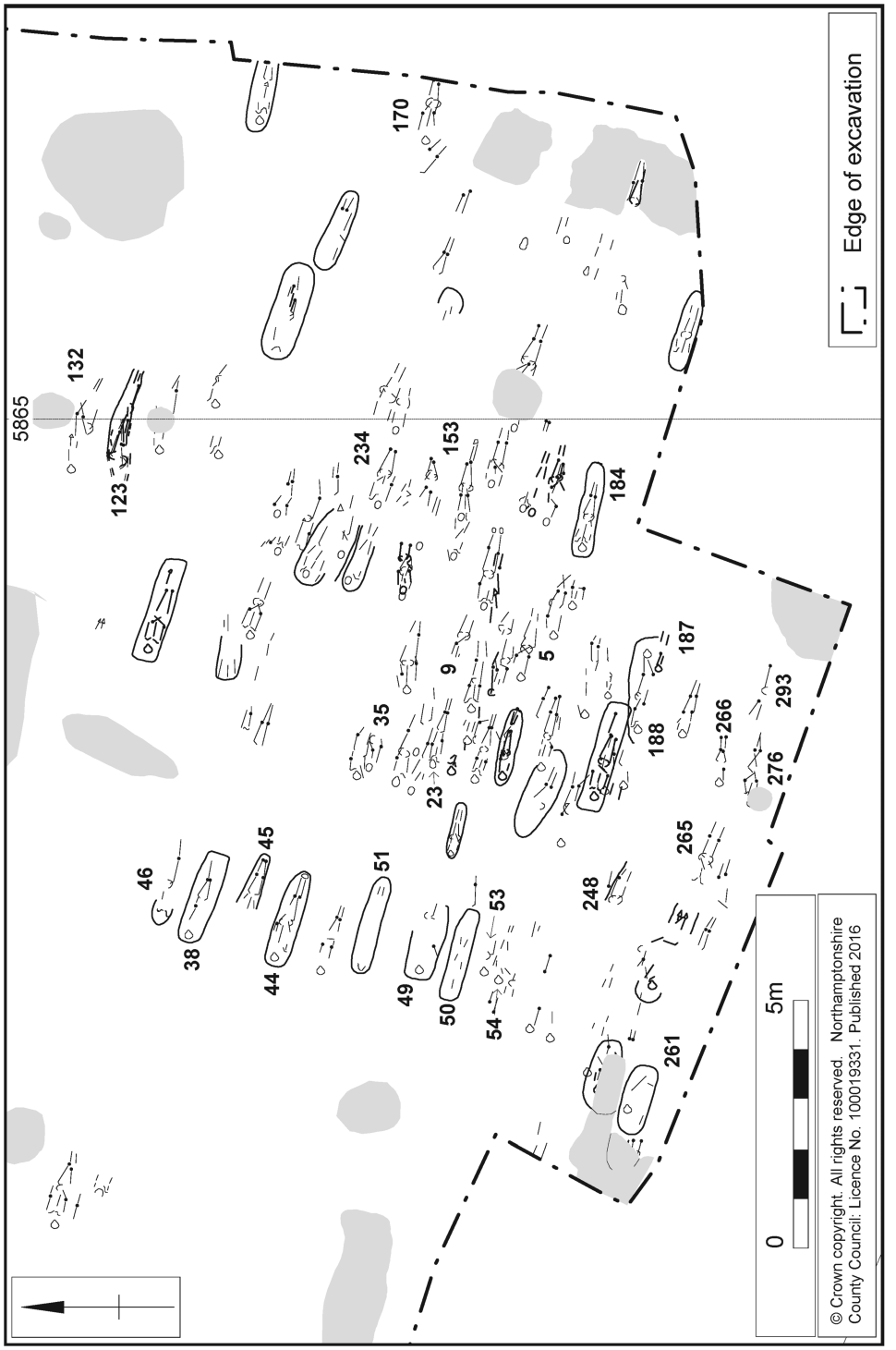

Fig. 4. The early medieval cemetery.

Fig. 5. General view showing density of burials.

No burials had grave goods, but there was a small scattering of artefacts in the backfill of a few graves; these were mainly single nails, Roman roof tile and pottery, and a partly worked bone object. Seventeen probable Roman nails were recovered from grave soil. A worked bone point came from Grave 132 and although incomplete, it appears to be part of a double-pointed pin-beater, the only Saxon object from the back-fill of the graves. Eight burials were radiocarbon dated, with the resultant dates (Table 1) showing that the excavated area of the cemetery seems to have started around the mid/late seventh century, continuing in use to around the end of the tenth century.

Row structure and outliers

The earliest burials were those which formed a well-defined row on the western side of the main group of excavated burials, with radiocarbon dating indicating a

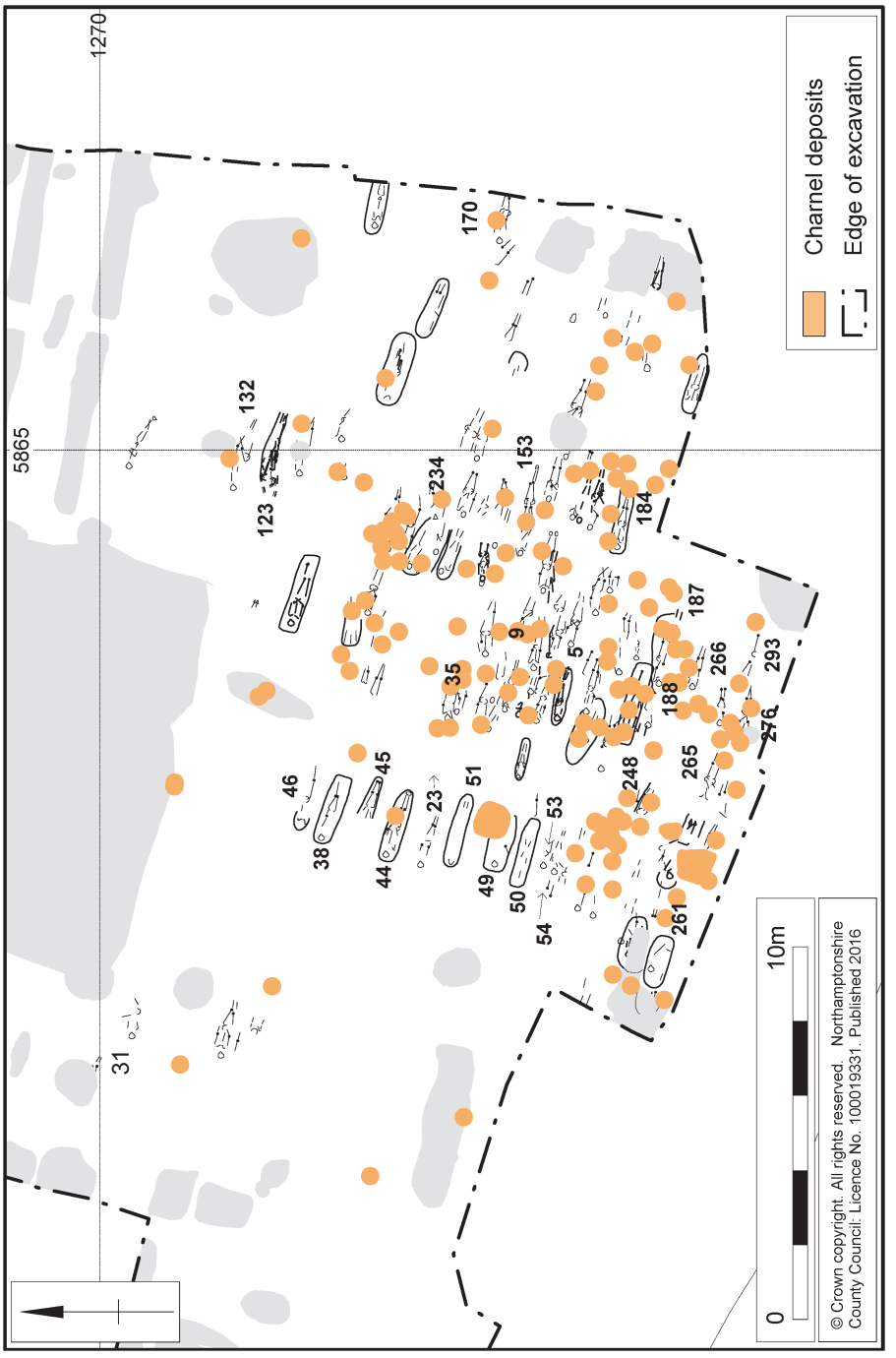

Fig. 6. Charnel deposits within the cemetery.

Lab. No.	Context	Sample details	dC13 15N/14N	Conventional radiocarbon age BP	Cal AD intercept 68% confidence 95% confidence
Beta-263409	Burial 38	Human bone	–19.8 +11.2	1300+/–40	680 660–720 & 740–770 650–780
Beta-263410	Burial 123	Human bone	–20.5 +11.5	1150+/–40	890 870–900 & 920–960 780–980
Beta-263412	Burial 293	Human bone	–19.8 +12.3	1150+/–40	890 870–900 & 920–960 780–980
Beta-263411	Burial 248	Human bone	–19.8 +11.6	1090+/–40	980 900–1000 880–1020
Beta-270604	Burial 54	Human bone	–19.9 +10.3	1280+/–40	690 670–770 650–810
Beta-270603	Burial 31	Human bone	–19.7 +10.5	1220+/–40	780 720–740 & 770–780 680–890
Beta-270606	Burial 261	Human bone	–20.0 +11.0	1200+/–40	810 770–890 690–900 & 920–950
Beta-270605	Burial 170	Human bone	–20.0 +11.0	1160+/–40	890 810–900 & 920–950 770–980

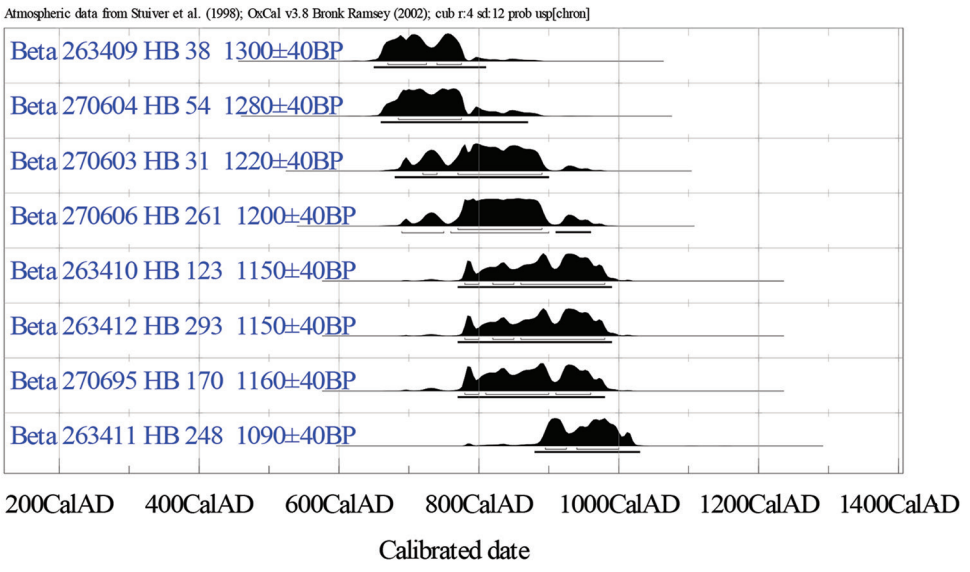

Table 1. Radiocarbon dates for the burials.

commencement of burial in this area – perhaps as early as the late seventh century, but certainly in the early to mid-eighth century (Table 1). This was also the only extensive and fully occupied row, with some 13 burials along a length of 9.5m, and possibly a further two burials, including inhumation 261, slightly dislocated to the south. Seven of the burials in this primary row (46, 38, 45, 44, 51, 49 and 50) were in deeper graves, which cut the mottled sandy clay natural geology (120).

Burial 38 (Fig. 7), at the northern end of the row, has been radiocarbon dated to 650–780 Cal AD (95 per cent confidence, 1300+/–40 BP, Beta-263409); and at the middle of the row, Burial 54 has a near identical date of 650–810 Cal AD (95 per cent confidence, 1280+/–40 BP, Beta-270604). Burial 261, at the dislocated southern extent of the row, produced a wide date from 690–950 Cal AD (95 per cent confidence, 1200 +/–40 BP, Beta-270606).

Fig. 7. Burial 38.

The later cemetery development appears to have been less well organised, with partial rows and outliers. The general indication is that the primary row had provided a structure to the usage of this area of the cemetery, but other factors, such as the provision of family plots, may have been as important as the maintenance of a row structure. There are also small groups, and even isolated burials and charnel deposits to the north-west, the north and the east, indicating that the churchyard extended well beyond the main grouping of burials, but were only occasionally used for burial.

After the primary row had been started, the next datable burial, some 8m to the north-west, may have been an outlier (31), located at the far north-western extent of the cemetery. Burial 31 produced a date in the late seventh to ninth centuries (680–890 Cal AD, 95 per cent confidence, 1220+/–40 BP, Beta-270603). It was one of four burials which made up a dispersed group (ignoring charnel deposits) over a 5m distance, and these were the only *in-situ* burials located to the west of the primary row.

Multiple, overlapping partial rows are discernible to the east of the primary row (using nearest neighbour analysis to link skulls close to common row lines). These typically comprise small groups of four or six burials over row lengths of some 4m to 6m, and in one instance only 1.5m. The shortest row length could be seen as marking a family group, rather than part of a formalised row structure. However, the longer lengths of 4–6m do seem to belong to a more extensive row system. Some of these rows are only partially occupied with gaps that could contain one or two further burials, although at least some of these gaps may derive from burials totally lost to later disturbance. The degree of overlap between these partial rows suggests that there was a sufficiently long period of usage for later burials to transgress onto earlier rows or groups, with at least three phases of use indicated through the lifetime of the cemetery. In parts of the most densely occupied central area of the cemetery, there were also instances of two, three or even four burials almost directly overlying each other in a very shallow grave soil. This may suggest the presence of family plots/family graves or a later unconnected re-use of the plot. This practice led to truncation and disturbance of the earlier burials, as seen in Burial 188 replacing 187 (Fig. 8).

Three burials (123, 170 and 293), to the east of the primary row, produced near identical radiocarbon dates with a 200-year timespan, from the end of the eighth to the end of the tenth centuries. These burials were located over a wide area (14m by 9m) within which more than 100 burials lay, possibly suggesting that the majority of the people had been interred in this time frame. Burial 123 lay within a partial row of four burials at the north-eastern extent of the site (780–980 Cal AD, 95 per cent confidence, 1150+/–40 BP, Beta-263410). Burial 170 was partly within the eastern site baulk and was an isolated burial (770–980 Cal AD, 95 per cent confidence, 1160+/–40 BP, Beta-270695). Near the southern baulk was isolated Burial 293, which dated to 780–980 Cal AD (95 per cent confidence, 1150+/–40 BP, Beta-263412); 5m to the west lay Burial 248, possibly the northern extent of a partial row near the southern baulk, and this gave the latest radiocarbon date centred on the tenth century (880–1020 Cal AD, 95 per cent confidence, 1090+/–40 BP, Beta-263411).

Fig. 8. Burial 188 showing the disarticulated remains of another individual (Burial 187), moved to the side of the grave.

Burial practices

All of the articulated burials were extended supine inhumations, although there were some variations involving the positioning of the arms and legs. The majority of burials, where the positioning could be identified, had their arms by their sides. However, seven examples had the right arm over the pelvis, seven had both hands over the pelvis, two had left arm over right over the pelvis, and one had its left arm over the pelvis. Three individuals had their right lower leg over the left, one of these also had their right arm over their chest, and two further burials had their left lower leg over the right. Burial 276 was unusual in that as well as having the arms crossed

Fig. 9. Burial 153 showing the displaced right arm and lower left arm.

over the pelvis, right over left, the legs were also crossed, but in this case it was the left over right. The burials with their lower legs crossed were at the northern end of the row to the east, which included the dated Burial 123. Only one burial (153) showed evidence it may have been placed in a coffin. Its right arm was articulated but had moved away from the shoulder, as had the lower left arm after decay, which would not have occurred if it was within a shroud (Fig. 9).

Burial 53, from the southern end of this row, had stones placed around the head suggestive of pillow stones, a burial practice associated with the late Saxon period. Burial 5, within the central area of the cemetery, was the only other burial to exhibit a trait associated with Saxon burial practice; this individual had a stone in the mouth.

Charnel and other disarticulated bone

Disarticulated remains were distributed fairly evenly through the grave soil amongst the *in-situ* burials (Fig. 6). Disarticulated bone from earlier burials was sometimes

placed within the new grave, but sometimes material was collected for deposition in specially dug charnel pits, although cuts for these were rarely visible in excavation. In addition to disturbance during the lifetime of the cemetery, it was evident that there has also been frequent disturbance during the later use of the site. There are few deep recent intrusions that would have removed burials, but as the remains were so close to the modern ground surface, even routine gardening activities posed a threat to their integrity, and a percentage of the scattered disarticulated bone within the general grave soil has come from more recent turning over of the ground.

HUMAN BONE
Sarah Inskip

Osteological analysis was undertaken of 287 individually numbered groups of human remains at the University of Southampton. These included remains from articulated burials and deposits of disarticulated bone, sometimes from more than one individual.

Preservation, completeness, minimum number of individuals (MNI) and elemental representation

Preservation and completeness

Bone preservation was scored using four categories: Poor (stages 4 and 5), no cortical bone surfaces remaining; Fair (stages 2 and 3) refers to few cortical bone surfaces left for analysis; Good (stage 1), most surfaces available for analysis; and Excellent (stage 0), all bone surfaces available for analysis. Out of a total of 298 burial deposits, 14 had good preservation, 217 fair and 67 poor. Over 90 per cent of the material therefore was recorded as fair to poor in preservation, severely limiting macroscopic analysis. For each articulated burial an inventory of elements was completed, and disarticulated material was recorded by element in order to calculate the minimum number of individuals (MNI). Subsequent to this, the quantity of remains for each articulated burial was recorded in four categories: <25 per cent, 25–50 per cent, 50–75 per cent and >75 per cent.

Table 2 highlights the extreme incompleteness of the skeletal material. Females are less complete and generally appeared to be more fragmented than males. Juveniles show a similar pattern of incompleteness to females, with most individuals

Completeness	<25%	25–50%	50–75%	>75%	Total
Adults	66	11	4	2	83
Males	7	11	3	8	29
Females	6	4	3	0	13
Juveniles	13	5	4	2	24*
All burials	92	31	14	12	149

*Five subadults are included in male and female categories.

Table 2. Completeness categories for adults and juveniles.

(54 per cent) in the <25 per cent category. The incompleteness of female and juvenile skeletons is consistent with males processing larger, denser, more robust elements, which survive the soil conditions and fragmentation.

The number of burials and MNI

There were 287 numbered deposits of bone, of which 65 groups contained multiple individuals. Burial 167 was discounted as it was animal bone. To obtain a more accurate estimation of the number of individuals buried at Rothley the minimum number of individuals (MNI) was calculated from each sided element (see Table 3). The most common element was the skull with an estimate of 161 individuals. The left femur was the most frequent appendicular element recovered, providing an MNI of 139 individuals. Under-representation of the ulna, radius and fibula is due to difficulties in siding poorly preserved and broken shaft fragments. Bones with high trabecular content, such as the vertebrae, sternum and some tarsals, were prone to fragmentation and disintegration. Further to this, particular regions of long bones were at risk; epiphyses were frequently damaged, preventing osteological examination of joint surfaces. All of the MNIs, particularly the femur and skull estimates, are far lower than the number of burials. This is caused by the high level of disarticulation and incompleteness, as highlighted by Table 3. Furthermore, the large disparity between the MNIs and the burial number is likely to be compounded by the fact that some individuals may be found in multiple graves, as appeared evident with Burials 211 and 212.

Elemental representation

The pattern of element preservation is similar to Wharram Percy, where the skull was also the most common element observed (Mays 2007, 82). Generally, the smaller the element, the least likely it was to be recovered and identified. This is certainly true of the Rothley assemblage, with the clavicles and fibula faring poorly. Although the hands and feet appear more frequently than the ulna, radius and fibula, hand or foot was scored as present if just one bone was remaining regardless of side. In fact, the hands and feet were highly incomplete. Taking the above observations into consideration, the elemental distribution and survival of the Rothley remains is normal allowing for the taphonomic history of the site.

Element	MNI	Element	MNI
Skull	161	L ulna	56
L femur	137	Hands	53
R femur	124	R ulna	50
L tibia	107	R radius	43
R tibia	91	L radius	40
Os coxae	89	L fibula	36
L humerus	88	R clavicle	32
R humerus	84	L clavicle	27
Feet	58	R fibula	26

Table 3. MNI taken from major bone elements (L = left, R = right).

Demography

Seven methods were used to estimate age. However, the fragmentary nature of the assemblage resulted in some individuals being aged using a single indicator. Adult individuals were placed into one of three broad categories: young (under 35 years), middle (35–50 years) and old (50 years +). Adult was defined as M2 erupted and in occlusion with all major epiphyses fused – approximately 22 years +.

Methods used to age adult individuals were based on increasing degeneration with advancing age. The pubic symphyses were also scored. After the teeth, the auricular surface was the most frequently preserved indicator. Insufficient numbers of ageable juveniles were available to calibrate. Furthermore, there were too few individuals with all other age features (auricular surface, pubic symphysis and cranial suture closure) to calibrate an attrition pattern specific to the population. Long bone length was used to estimate age in juveniles when no other indicator was available. Immature individuals were classified as adolescent, child and infant. Adolescent describes ages between approximately 12 and 22 years, and corresponds to individuals with occluding M2, but unfused long bones and iliac crest. Child is an individual aged between 3 and 12 years. Infant is classed as an individual below three years of age.

Sexing

Due to the high level of incompleteness, a large proportion of the assemblage consisted of unageable and unsexable adults. Sexing was problematic because the pubic region of the pelvis, the most reliable indicator (Black 1978), was scorable in only three individuals. Accordingly, sex determination relied largely on the skull. The results in Table 4 indicate that there are far more males (19 per cent) than females (8 per cent). Of the sexable individuals, males make up 68 per cent and females 32 per cent.

Juvenile age distribution

Of the articulated burials (n = 149), 29 (20 per cent) of them could be classed as younger than 22 years, only nine (6 per cent) under the age of 12 years and just over 1 per cent aged below three years.

Measurement

Due to the fragmentary nature of the assemblage, no cranial measurements were taken. Various skeletal elements were used to calculate stature, as few long

Age	Male	Female	Unknown	Total
Infant (0–3 years)	–	–	2	2
Child (3–12 years)	–	–	6	6
Adolescent (12–21 years)	–	–	7	7
Young	5	2	6	13
Middle	11	5	4	20
Old	4	3	3	10
Unknown juvenile	–	–	10	10
Unknown	8	3	70	81
Total	**28**	**13**	**108**	**149**

Table 4. Age and sex of the Rothley assemblage.

Sex	No.	Mean (m)	Stature range (m)
Male	10	1.75	1.70–1.81
Female	2	1.58	1.56–1.59

Table 5. Average adult stature for males and females.

	Means			
Sex	L	R	L+R	Range
Male	78.3	77.1	77.7	69.4–88.9
Female	78.9	80.1	79.5	71.9–88.9

Table 6. Meric and Cnemic index.

	Means			
Sex	L	R	L+R	Range
Male	69.8	74.4	71.4	60.9–83.6
Female	74.3	80.7*	76.4	73.3–80.7

*n = 1.

Table 7. Cnemic indices.

bones were complete or undamaged. Stature estimates and ranges are presented in Table 5.

Meric and Cnemic indices

Meric indices are presented in Table 6. Twenty-six individuals were observable at the subtrochanteric region, with a total of 32 femurs examined. Twenty-five of the femora were platymeric. An extreme individual (Burial 170) had a mediolateral diameter nearly twice that of the anterior posterior. The femur was analysed for any pathological changes. Except for a small amount of active periostitis on the left femur, no significant pathology was observed. This femur probably represents an extreme example of activity-related change, but problems arise in isolating the exact cause. It is widely accepted that action can be identified, but not specific activity. A multitude of activities can be carried out in a single posture. As the individual was unsexed, the inclusion of the measurements into the unknown category increases platymeria in this group.

Cnemic index = mediolateral diameter × 100/anteroposterior diameter. Cnemic indices for Rothley are presented in Table 7. Twelve of the tibia (70 per cent) (n = 17) were eurycnemic and a single individual had a platycnemic tibia (individual 156). The average measurement is 72.6 (Eurycnemic).

Non-metric traits

Few non-metric traits were observable and limited information is presented in Table 8. The hypertrochantic fossa was found on 85 per cent of the femurs of Rothley; identification in foetal material indicates that activity related factors do not fully

Trait	Observable	Present	%
Squatting facets tibia	11	5	45
Squatting facets talus	7	2	29
Third trochanter	19	8	42
Gluteal tuberocity	19	18	94
Hypertrochantic fossa	29	25	85

Table 8. Non-metric traits.

explain their occurrence (Anderson and Andrews 1997) and indicates inheritability. The gluteal tuberocity was present in 18 of the 19 (94 per cent) observable individuals and found on 83 per cent of femurs (n = 29). The third trochanter scored high, being observed in 42 per cent of femurs. Burials 27 and 170 have particularly large prominent third trochanters and were platymeric. Aiello and Dean (1990) note a relationship between the third trochanter and platymeria. Turner (1887) and Cameron (1934) suggest that platymeria can be caused by the pulling of the gluteus maximus on the femoral shaft. As the third trochanter and gluteal ridge are sites for gluteus maximus attachment, the frequent observation of gluteal tuberocity and third trochanters is unsurprising considering the platymeria at the site.

As the hypertrochantic fossa and third trochanters are linked to muscle development, an activity involving the lower half of the body can be suggested, particularly when taken into consideration with the platymeric femurs. Capasso *et al.* (1999, 119) suggests that when the trunk is in a vertical yet unstable position, it can lead to platymeria and development of the lesser trochanters as the gletues muscles are used to stabilise body weight; for example, sitting on the back of a horse. Unfortunately, a whole host of activities can be undertaken in this position.

Although caused by squatting, facets on the anterior distal tibia are thought to be related to other locomotive actions requiring ankle hyperdorsiflexion (Trinkaus 1975). Eleven individuals were analysed for tibial squatting facets and seven for talar facets. Just two (29 per cent) individuals had squatting facets on the talus and five (45 per cent) on the tibia.

Pathology

Flaking and destruction of cortical bone severely limited palaeopathological observation. For example, it was difficult to observe signs of localised inflammation and periostitis, and fragmentation made it difficult to assess for peri-mortem fractures.

Infections

Within the Rothley skeletons there were very few cases of infectious disease. There were no infections that could be definitely attributed to specific pathogen. Two femurs had changes consistent with osteomyelitis: one from disarticulated Burial 294 and one from individual 139. A severe midshaft compound fracture affecting individual 139's right femur had probably provided the opportunity for bacteria to enter the body via the open wound.

Very few individuals with periostitis were observed. Individual 139 had periostitis, both active and remodelled, on the midshaft of the fractured femur, a likely result of trauma and subsequent infection. Individuals 170 and 276 had

active periostitis on the proximal shaft of the right femora. Individual 44 had active periostitis on the first, fourth and fifth metatarsals.

Trauma

Five cases of trauma were identified in the skeletons. Burial 139 had a severe ununited fracture on the midshaft of the right femur. A large well-remodelled callus has formed over the two ends of the diaphysis. The inferior two-thirds of the femur are medially posteriorly displaced. There is a substantial amount of overlap between the two diaphysis sections, which will have led to a marked degree of shortening. Unfortunately, it was not possible to measure the amount of shortening due to the absence of the distal femur. The presence of woven bone on the callus and the remaining shafts provides evidence of periosteal inflammation and osteomyelitis, indicating active infection at the time of death. Severe osteoarthritis, diagnosed by extensive eburnation of the right and left hips, was noted and is likely to be the result of the fracture to the femur, which would have significantly altered the individual's gait. The cortical bone of the affected femur is markedly thinner than the unaffected leg. This suggests disuse atrophy and or nerve/blood supply impingement, unsurprising considering the severity of the fracture and the extent of the osteoarthritis in the hips. In addition, there were two individuals (265 and 35) with well-healed fractured metacarpals. No sign of inflammation was observed. Individual 293 had a well-healed fracture of a rib. Burial 13 (disarticulated) had a well-healed depressed fracture, measuring 19.2 × 10.4mm, on the right parietal.

No perimortem trauma was identified, unusual for the period and number of individuals observed. Although this may indicate a peaceful and accident free population, it is more likely to be the result of the preservation.

Degenerative joint disease

Spinal

Twenty-nine individuals had four or more observable neural arches. Individuals with osteoarthritis (OA) of the spine included four males, three females and two of unknown sex.

Degenerative disc disease

Osteophytosis, or degenerative disc disease, was scored as positive when a vertebra had osteophytes at grade 2 or above. Thirteen individuals had osteophytes in the vertebral column. A single individual (23) had grade 2 osteophytes. An additional indicator of joint degeneration in the spine is characterised by the surface becoming rough, pitted and irregular. Six individuals had changes to the vertebral bodies consistent with degeneration of the intervertebral disc. All of these individuals had OA in the apophyseal facets. Overall, 20 individuals had some form of change that could be attributed to degenerative joint disease in the spine. However, only nine individuals out of 29 (31 per cent) had grade 2 osteophytes.

Extraspinal

Table 9 shows the joints and percentage affected. OA was scored as present in a joint if one surface was affected. After spinal osteoarthritis the most affected joints were the shoulder and the hip (25 per cent and 24 per cent respectively). Although

Joint	Number affected	Number of observable sites	% affected
Spine	9	29	31
Shoulder	3	12	25
Hip	8	33	24
Elbow	3	19	16
Wrist	1	14	7
TMJ	1	16	6
Knee	0	14	0
Ankle	0	5	0

Table 9. Distribution of OA throughout the skeleton.

there were osteoarthritic changes in the knees and ankles, no cases displayed two types of OA change simultaneously.

Dental

Because of the fragmentary nature of the assemblage, it was decided to calculate prevalence rates for dental pathologies by individual rather than tooth. In total, 50 individuals had some teeth and jaw to permit the analysis of dentition.

Caries

Just four individuals (8 per cent) had evidence for caries. Teeth with caries tended to be broken and may have been lost from the archaeological record. It is in the later medieval period, with the introduction of refined sugars, that occlusial caries became commonplace.

Ante-mortem tooth loss (AMTL)

Fourteen individuals had suffered AMTL, representing 24 per cent of all the observable individuals (n = 50). There were no individuals observed with AMTL in the maxilla. This is a result of the fragility of the maxilla, and the fact that there were far fewer maxillae and maxillary teeth in general.

Hypoplasia

At Rothley, 11 individuals have hypoplastic lines and considering only 50 individuals had observable teeth, this works out at a prevalence rate of 22 per cent.

Calculus

Calculus was scored following Brothwell's (1981) grading system of 0–3. The percentage of individuals affected by calculus is not presented, as it is highly possible that some calculus may have been lost to taphonomy. Twelve individuals had calculus ranging from grade 1 (small amount) through to one case of grade 3 (individual 184), where the entire tooth was nearly encased.

Other dental anomalies

Burial 9 has an impacted right third molar, visible due to a serendipitous *post mortem* break. Two individuals had rotated premolars: individual 110's lower second premolars are rotated by 90 degrees distally; and disarticulated Burial 15's lower left second premolar rotated by 95 distally. Within disarticulated Burial 292, a lower left second molar has enamel pearls on the roots.

Other

Few orbits were observable, all of which were adult. The thin nature of the orbital roof makes them susceptible to breakage and taphonomic alteration. Three out of 16 individuals had cribra orbitalia, equal to 18.9 per cent. There were two individuals with button osteomas: individual 200 and disarticulated Burial 150.

LATER MEDIEVAL AND POST-MEDIEVAL

The cemetery was left undisturbed for several centuries (Fig. 10), the sole exception being an isolated sub-rectangular pit 229 dated to the thirteenth century, which cut some charnel deposits in the northern part of the cemetery. The pit was 2.7m long by *c.*0.6m wide and more than 0.9m deep. Sparse medieval remains were found to the north of the cemetery, the earliest being a shallow gully (254) aligned north–south and containing pottery dating to the twelfth century. In the centre of the site was a sub-circular well 256, *c.*2.0m in diameter and 1.16m deep. Within the lower fill (259) there was an almost complete Potters Marston ware pottery vessel of twelfth century date, while the middle fill (258) contained pottery dated to the mid-thirteenth century. Pit 303, which was partially beyond the eastern limit of excavation, dated to the fourteenth/fifteenth century.

The post-medieval and modern features relate to the use of this area as the formal garden of 'The Grange', the house located further to the north. They comprised disparate and isolated post-medieval garden features, which included a pair of parallel, interrupted, nineteenth-century ribbon planting beds, a Victorian brick-lined well and the brick footings of a Victorian greenhouse. In the modern period a prefabricated L-shaped building, set on a concrete raft over the central part of the excavation area, truncated this part of the site. Deep landscaping occurred across some of the area.

SAXON TO MODERN POTTERY

Paul Blinkhorn

The Saxon to modern pottery assemblage comprised 87 sherds, with a total weight of 3.34kg. The estimated vessel equivalent (EVE), by summation of surviving rimsherd circumference, was 1.80. It was recorded using the conventions of the Leicestershire County-type series (Sawday 1994), as follows (the alphanumeric codes refer to those used in the archive database):

F1:	Early/Middle Saxon Grano-Diorite ware, AD450–850; 5 sherd, 110g, EVE = 0.10.
F100: LI2:	Lincoln ware, AD850–1050; 1 sherd, 30g, EVE = 0.18.
F205: ST:	Stamford ware, AD900–1150; 7 sherds, 38g, EVE = 0.
F300: PM:	Potter's Marston ware, AD1100–1300; 29 sherds, 1,792g, EVE = 1.28.
F301: CC1:	Nuneaton 'A' ware, AD1200–1400; 1 sherd, 10g, EVE = 0.
F302: CC3:	Nottingham Ware 2, AD1230–1300; 1 sherd, 4g, EVE = 0.
F303: CC2:	Chilvers Coton 'C' ware, AD1200–1475; 16 sherds, 333g, EVE = 0.

Fig. 10. The later medieval features.

F330: LY4: Shelly wares, AD1100–1400; 1 sherd, 18g, EVE = 0.
F360: MS1: Medieval Sandy ware, AD1100–1400; 6 sherds, 75g, EVE = 0.04.
F365: RS: Late Medieval Reduced ware, late fourteenth–fifteenth century; 1 sherd, 303g, EVE = 0.20.
F403: MP1: Midland Purple ware, AD1375–1550; 4 sherds, 208g, EVE = 0.
F414: EA3: Staffordshire Mottled ware, AD1650–1780; 1 sherd, 2g.
F426: EA6: Post-medieval Blackware, late seventeenth century+; 6 sherds, 113g.
F1000: EA10: Fine white earthenware, nineteenth century+; 8 sherds, 301g.

The range of fabric types is typical of the area, and indicates that there was low-level activity at the site from the later eleventh or early twelfth century onwards, as well as a small assemblage of early/middle Saxon pottery; although it is impossible to date these wares other than to within the period AD 450–850. The single sherd of Lincoln ware shows that there may have been some activity at the site in the late Saxon period, although it could be as late as the Norman Conquest and date to the start of medieval occupation.

MEDIEVAL FINDS
Tora Hylton

Finds of medieval date include a Scottish silver penny, Alexander III (1249–86), from the subsoil and a whittle-tang knife from pit 220.

FAUNAL REMAINS
Karen Deighton

Sixty-two fragments of animal bone came from medieval contexts comprising 23 pig, 13 sheep/goat, 10 cattle, one horse, one dog, two fowl, two geese, 10 unident. Neonates were present, including a possible partial neonatal pig skeleton (context 258) in the medieval well.

THE ENVIRONMENTAL EVIDENCE
Wallis Lord-Hart

Six soil samples were taken from medieval pits, a well and a layer. Pit 303 produced a medium quantity of cereal grains. As there is no chaff associated with this feature, it is likely that the grain was of a partly processed crop where the chaff has already been separated out. It would seem that this fill contains evidence for the storage of processed barley and wheat. The other pits contained sparse charred grains, likely to be simply blown in from neighbouring houses/land.

DISCUSSION
Tim Upson-Smith, Sarah Inskip and Rob Atkins

The late Alan Vince (2006, 166) noted that late seventh- to ninth-century cemeteries of any size have rarely been excavated in the East Midlands. He described this period as a ‘missing’ phase between pagan cemeteries and the establishment of most

parish churches in the tenth and eleventh centuries. He recorded that cemeteries associated with religious organisations of this period had been excavated at Repton and Lincoln, but these burials may not have been representative of the population at large. The Rothley cemetery addresses this imbalance with an excavation examining part of a middle to late Saxon Christian lay burial ground that fell out of use pre-Conquest. It is the largest yet examined in the East Midlands.

Rothley's middle to late Saxon cemetery was attached to an important, undocumented minster church standing at the centre of an extensive royal estate. The church and cemetery are sited within a probable Roman villa complex. This discussion therefore tries to understand the cemetery in relation to the earlier villa, the minster church and an examination of the burials themselves.

Possible continuation of Roman villa estate into Saxon estate and minster centre

The main Roman villa buildings were probably *c.*50m to the south of the excavation, where a tessellated pavement was recorded in 1722. The Roman remains within the site itself date from the second century to the fourth century, and included a postulated post-hole structure, presumably an outbuilding of the villa, a metalled surface and other features, together with almost 1,000 ceramic and slate tile fragments.

No early Saxon remains were found, with the next phase of activity comprising the middle to late Saxon Christian burial ground which stopped short of the main areas of Roman debris and features. No contemporary physical boundary of the cemetery, such as a ditch, was present, although perhaps it was provided by the still evident limits of the Roman ruins to the north.

The royal Saxon soke of Rothley has been examined, with its extensive landholdings recorded over a 25km by 19km area (Phythian-Adams 1986, 9; see Background above). It is therefore worth considering whether Rothley continued from a Roman estate centre into a Saxon one, although without extensive excavations this suggestion has to be tentative: 'In attempting to explain the relationship between villas and (minster) churches it has been observed that the majority of English churches are proprietary in origin, owing their foundation to the initiative of lay lords (Morris and Roxan 1980, 191) and that their location might indicate those villa estates that continued into the Anglo-Saxon period maintained the same administrative centre' (Cooper 1996, 176). Rothley was one of four soke centres in Leicestershire and Rutland, and seems to fall into Bourne's (1986, 13) definition of early and middle Saxon major land units which covered perhaps 250km^2, with each looking to a royal centre. Parsons (1996, 32), partly based on it being a major soke centre, stated that Rothley was one of three major minsters in Leicestershire and Rutland (the others being Breedon and Oakham), with perhaps a further five lesser minsters known. Patrick Hase, in his researches into the mother churches of Hampshire, noted that they were located originally in royal estates (Parsons 1996, 24).

Minster and cemetery

Minsters were also often associated with being near the bends in rivers and on higher ground. The Church in Rothley could hardly be described as being on higher ground,

but it does sit in the angle of a bend in the Rothley Brook, with a meander to the east, subsequently straightened (Fig. 1). Blair (2005, 189) notes that those people who founded minsters were likely to have been attracted to the formal settings afforded by well-preserved villa complexes. A relatively nearby comparison is Castor, 8km west of Peterborough, where within the ruins of a former Roman villa/*praetorium* there are documentary records referring to a middle-Saxon monastery dedicated to St Kyneburgha, although the current archaeological evidence for it is inconclusive (Upex 2011, 97–8). Former villas were also reused by more minor cemeteries such as at Empingham site 2, Rutland, where a seventh-century Christian cemetery was dug into the remains of an aisled villa (Cooper 1996, 175). Cooper suggested that in the vast majority of cases, villas were chosen as a focus for burial either because of previous religious significance, or because the building's shape and orientation made it suitable for conversion into a church (*ibid*, 176). Building materials of this villa estate could have been quarried, as evidenced in the standing middle-Saxon minster church of Brixworth, Northamptonshire, where substantial quantities of masonry from a nearby villa was appropriated (Woods 1970).

The present parish church of St Mary's with St John the Baptist at Rothley has some surviving Norman features, but the lack of Saxon remains is not unsurprising, as fewer than half a dozen churches in Leicestershire have surviving remains dating to this period (Parsons 1996, 11). The earliest inhumation burials, 38 and 54, dated to 650–780 Cal AD and 650–810 Cal AD (with 95 per cent confidence; Fig. 7), are likely to predate our previous earliest knowledge of Christianity at Rothley; evidenced by the still standing late eighth- or ninth-century Anglo-Saxon probable funerary cross (Stafford 1985, 174). A later seventh century date for Rothley's church and burials would not be unexpected given the importance of its soke. A comparison would be Breedon-on-the-Hill, the only place in Leicestershire and Rutland where there is direct written evidence for the foundation of a church before the end of the seventh century (Parsons 1996, xxi). The Rothley cemetery ties in with the evidence with other sites, which show that the numbers of minster cemeteries grew steadily between the late seventh and mid-ninth centuries (Blair 2005, 241).

Middle to late Saxon burials were found between 37m and 55m to the north-east of the present parish church, with the latter distance defining the northern cemetery boundary (though burials still continued further to the east). A primary burial row in the middle of the excavation area, with only a handful of outliers to the north-west of them, suggests that the pre-Conquest north-western boundary limits of the cemetery had been found. The lack of other burials to the west of the primary row suggests that the church in this period was unlikely to have burials interred directly to the north of it. If we assume that the pre-Conquest church lay close to or on the same site as the present church, then the excavation would likely to have taken in a small part of the pre-Conquest burial ground. It is presumed that burials would have continued to the church on its eastern side and almost certainty also to the south. It is probably not a coincidence that the Saxon funerary cross is located to the south of the church and thought to be still in its original position.

This postulated large size of the pre-Conquest Rothley cemetery is not unusual. Elsewhere, many minster cemeteries have been recorded over a wide area. Blair (2005, 243) quotes several examples, including an eighth- to tenth-century cemetery

of the lesser minster at Aylesbury which covered the entire hilltop. A relatively nearby comparison is Harringworth, Northamptonshire, which is located near the Leicestershire border, possibly also an undocumented minster church. Its probable seventh- to eleventh-century burial ground covered an area up to *c.*50m by 47m, and is likely to have contained a minimum of 1,000 individuals and possibly significantly more (Atkins 2004, 105; Muldowney 2013, 26–7).

Uncovering Rothley's burial ground has therefore considerably strengthened the arguments of Parsons (1996, 26) and McLoughlin (2010, 208–10) that Rothley had been an undocumented minster church. That Rothley was undocumented is not unusual for this area. Blair (2005, 152) singles out Leicestershire as one of three counties where there are relatively settled areas but the numbers of known minsters are thin. Blair asks whether these counties really did have fewer minsters than counties such as Worcestershire or whether the contrast lies in that there are sparse surviving Saxon documentary sources? Parsons (1996, 19–20) notes that pre-Conquest documents relating to Leicestershire are as few and far between as surviving Anglo-Saxon churches.

Origin and development of the cemetery

The earliest radiocarbon dates come from burials within the single well-defined row on the western side of the cemetery, which was perhaps the primary setting out within the northernmost part of the cemetery. Whether this area was defined and set out at the same time as the construction of the church to which they belonged, or was a slightly later extension to the cemetery, is unknown.

Later development of this area appears to have been less well organised. There were partial rows that may have been set out in relation to the row to the west, but any such organisation may have been localised and of short-term duration, so that no other rows extended for more than six burials or around 6m in length. In addition, there were some outliers or isolated burials. There are some similarities at the minster church at Wing, Buckinghamshire (Holmes and Chapman 2008), where an outlying area of the cemetery had come into use in around the mid-eighth century, and the majority of the excavated burials here were also pre-Conquest in date. At Wing the organised row structure also broke down and there was a scatter of later burials indicating that the area had declined, but was still in use for occasional burial until the later twelfth century.

Three or four of the burials at Rothley almost directly overlay each other in a shallow grave, and may suggest family plots or a later re-use of the plot. Burying two deep occurred at least in one area of the middle to late Saxon cemetery at Harringworth, Northamptonshire (Atkins 2004). Here, based on radiocarbon dates, the upper burials were probably a re-use of the plot perhaps more than a generation later, with the lower burials likely to date from around the mid-seventh into eighth centuries, while the later burials were eighth to mid-ninth century.

The earliest burial occurred when Rothley lay in the kingdom of Mercia; the last (248) was probably 920–950 Cal AD, a turbulent time of Scandinavian invasion and settlement. The burial ground excavation revealed what appears to have been the same Christian burial practices throughout its life.

There was no evidence for post-Conquest burial at the site. The model is therefore one of cemetery contraction occurring by around the end of the tenth century. The cessation of interments within the excavation area was probably due to external changes in the immediate area around Rothley. In this period the more easterly parts of England were gradually filling up with little churches with their own priests, landholdings, and rights to burial and tithe (Blair 2005, 368). This occurred in Leicestershire, with Liddle (1999, 3) noting that the 'evidence of churches in the late Saxon period becomes more common with a parish system being created to supplement the earlier minsters'. This boundary contraction event may have been part of a larger policy. It is noticeable that there were radical re-adjustments of earlier boundaries in Leicestershire, which affected centres such as sokes that probably occurred in the pre-eleventh century period (Phythian-Adams 1986, 10).

The contraction of minster burial boundaries may have been a policy applied across most of Saxon England. Excavation of other minster cemeteries have found at the outer zones, burials that are uncommon after the mid eleventh century, with churchyards often contracting in size, and by the later tenth century it seems that churchyards normally had demarked boundaries (Blair 2005, 465–7). It is therefore likely that the present contracted churchyard boundaries at Rothley occurred at this pre-Conquest period.

Burial practice

Burial practice within the cemetery followed the accepted Christian alignment of head to the west and feet to the east, in an extended supine position. The excavated burials were without grave goods, with the only possible exception being Burial 132, where an incomplete bone pin beater (SF 40) was recovered from the fill of the grave. However, it was not clear if this was a deliberate deposition or a residual find. The lack of any definite grave goods found in the excavation is not unusual, as artefacts recovered in pre-AD 720 minster graveyards are distinctly rarer than contemporary open-ground cemeteries, where on average 55 per cent of burials were furnished in this period (Blair 2005, 240–2). After AD 720 there was not a sizeable deposition of non-perishable grave goods, except for occasional knives, within both minster and open-ground cemeteries (*ibid*, 240).

There were some variations within the standard burial practice: Burial 5 had a stone in its mouth and Burial 53 had stones around the skull, but these were the only surviving examples of 'special' graves, as seen at other contemporary sites. Examples of the latter are relatively common in the later Saxon period, with numerous examples recorded at Raunds Furnells (Boddington 1996) in burials dating to the mid-tenth to mid-twelfth centuries. Two examples of this particular type of burial were also identified during the excavation of a small late Saxon cemetery at Ketton Quarry, Rutland (Meadows, pers. comm.).

There were minor variations involving the positioning of the arms and legs of the individuals, with the majority having their arms by their sides. Burial 276 was unusual in that as well as having the arms crossed over the pelvis, right over left, the legs were also crossed, but in this case it was the left femur over the right femur. The

burials with their lower legs crossed were at the northern end of the row containing Burial 123. The significance of having the lower legs crossed is not clear, although it has been suggested that they may have been individuals who have completed a pilgrimage (Hadley 2001). The other variations on position of hands, arms or legs were spread with no special grouping.

Despite nails being found in the grave soil, none of the burials had direct evidence of being buried in wooden coffins, although coffins do not necessarily have to have nails as they can be held together with dowels. The exception was Burial 153, an old male, who exhibited possible evidence of having been a coffin burial in that the right arm was articulated but had moved away from the shoulder, as had the lower left arm, suggesting either that decay had been advanced at the time of burial or that there had been space for bones to become displaced within a coffin (Fig. 9). No shroud pins were present in any of the burials. If indicative of pre-burial decay, the condition of Burial 153 would suggest that bodies were being transported over distances (therefore time) to be buried at Rothley, which may indicate that burials were being received from outlying settlements to the mother/minster church.

Early medieval community: age, health, diet and living conditions

Preservation of the material has undoubtedly had a marked effect on the information that can be collected from the assemblage. A lack of pubic symphyses, fragmented, incomplete skulls and disarticulation resulted in most (70 out of 147) individuals being classed only as adult. More critically, it has placed limitations on interpretations and conclusions that can be drawn from the skeletal analysis. This can be seen in analysing where the 161 skulls were found. Eighty-two were from *in-situ* inhumations, with 79 disarticulated skulls and 67 *in-situ* inhumations lacking skulls. There are, therefore, 13 skulls more than the likely maximum number of *in-situ* inhumations. This implies that there are at least 13 individuals (8 per cent of the total) where no remains had survived *in situ*.

The demography of the population is interesting. There were twice as many men (28) as women (13) within the cemetery. This is unusually high when compared to other non-monastic and medieval sites (Table 10). Was there a genuine inequality in the population or have preservational factors led to a preferential identification of males? While Walker (1995) and Bello *et al.* (2006) demonstrated some preferential destruction of females, Walker *et al.* (1988) suggest that male and female remains have an equal chance of survival. It is possible that both scenarios are valid and the conflict may be the result of site differences, including inter-observer error, methods and soil types. Accordingly, Weiss (1972) has suggested that assessing and comparing the fragmentation and preservation between males and females should highlight whether this is a concern. Females were both more incomplete and less well-preserved than the males at Rothley. This poses the possibility that females were more susceptible to taphomonic destruction, an idea that is reinforced by bone mineral data produced by Galloway *et al.* (1997). Weiss (1972) had advised that genuine population differences on the scale of Rothley rarely exist in either modern or ancient populations.

Site	Males %	Females %
Empingham II, Leicestershire (Mays 1996)	53	47
North Elmham, Norfolk (Wells 1980)	52	48
Raunds, Furnells, Northants (Powers 1996)	55	45
Rothley, Leicestershire	68	32

Table 10. Sex ratios at medieval sites in England.

Site	Juveniles %	Age
Barton-upon-Humber	33	<15 years
Wharram Percy	45	<17 years
Empingham II	40	<18 years
Raunds	47	<17 years
Rothley	20	<22 years

Table 11. Juvenile percentages for Saxon and Medieval sites.

Only 58 burials could be aged, with a range of burials from infant to old adults, with the majority of burials being of either middle (20) or old (10) adults. Rothley has fewer children when compared to the early phase at St Peter's, Barton-upon-Humber, Wharram Percy, Raunds and Empingham (Table 11). According to Hewlett (1991), both modern and ancient populations without modern medical care are likely to have 20–56 per cent of individuals die before reaching 16 years. This demonstrates that a substantial loss of the infants and younger children has occurred at Rothley. In fact, even at Wharram Percy, where preservation was good to excellent, it was still thought that some infants and children were lost to taphonomic processes (Mays 2007). The imbalance at Rothley again may be due to a bias of preservation or due to the fact that only a small proportion of the cemetery was actually excavated. At Raunds, Northamptonshire, where the burials date to the mid-tenth to mid-twelfth centuries, it was shown that there was a marked concentration of infants and young children immediately around the church (Boddington 1996).

Stature of the population was also difficult to determine due to the small number of available samples. The men appear to be taller for the period when compared to other contemporaneous sites (Table 12). However, they are similar in height to Empingham II (Mays 1996, 26), geographically the closest to Rothley, albeit a little earlier in date (fifth–seventh century), where the men are also taller. Considering the fragmentation and preservation of the site, this perceived difference might be artificial. The larger more robust individuals may have increased probability of recovery due to higher bone densities. Studies have shown that bones with higher densities are more likely to survive (Bello *et al.* 2006; Inskip *et al.* in press). This would produce an overall greater stature average.

Site	Mean male stature (m)	Mean female stature (m)	Source
Empingham II	1.74	1.64	Mays 1996
Rothley, The Grange	1.75	1.58	Inskip, this report
Raunds, Furnells	1.67	1.62	Powell 1996
North Elmham Park	1.72	1.58	Wells 1980
Wharram Percy (phases 1–2)	1.69	1.57	Mays 2007
St Peter's, Barton (phases C–E)	1.70	1.59	Waldron 2007

Table 12. Mean stature from other Saxon sites.

Twenty-five of the femora at Rothley were platymeric (exhibiting flattening of the femur). The overall level of platymeria is comparable to the results from urban Barton-upon-Humber, where 95 per cent of the early phase femora is platymeric (Waldron 2007, 46). Rothley is also similar to rural Wharram Percy; phases 1–2 (Mays 2007, 117) and North Elmham Park (Wells 1980, 255). The average cnemic (shin bone) indices measurement at Rothley is 72.6 (Eeurycnemic), which is similar to other Saxon sites, including Wharram Percy (Mays 2007, 117) and North Elmham Park (Table 13). The similarities between Wharram Percy, Rothley and North Elmham are unsurprising given that they are all rural sites. What is interesting is that Rothley does not conform to the pattern of increased platymeria in females. This may signify that the males were undertaking an activity which significantly affected anterior posterior bending strength. It may also indicate that the males were generally more mobile than the females. Preservational factors cannot be ruled out as the producer of this phenomenon. A greater number of individuals would be required to confirm the difference observed, particularly females.

The pre-Conquest community of Rothley, despite the generally poor survival of the burials, seem to compare favourably in terms of general health with other communities of a broadly similar date, such as Raunds, Northamptonshire, Empingham, Leicestershire and North Elmham, Norfolk. This can be seen in analysing several different areas of information recovered from the bones (see below).

Just two (29 per cent) individuals had squatting facets on the talus and five (45 per cent) on the tibia at Rothley. This frequency is high when compared to the early period of St Peter's at Barton-upon-Humber (3.4 per cent) (Waldron 2007). At Wharram Percy (Mays 2007, 127), the frequency of tibial facets was similar or

	Meric		Cnemic	
Site	Male	Female	Male	Female
Rothley	77.7	79.5	71.9	76.4
Wharram Percy	79.3	76.3	71.3	72
North Elmham	74.8	72.1	69.2	70.9

Table 13. Meric and Cnemic indices for Rothley and comparison sites.

higher depending on sex (males 45 per cent, females 69 per cent). The frequency at Raunds was 58 per cent in females and 45 per cent in males (Powell 1996, 117). The results suggest that Rothley is comparable to contemporaneous rural sites.

In comparison to other medieval sites, Rothley has a very low level of periostitis (3 per cent of articulated individuals), Wharram has 8.4 per cent (Mays 2007, 169) and Barton-upon-Humber between 5.9 and 8.7 per cent (Waldron 2007), suggesting low levels of infection and trauma at Rothley. However, the relationship between health and lesions is multifaceted, and further interpretation of this may be flawed, particularly due to the poor preservation of the site.

Interestingly, the prevalence of shoulder osteophytosis seems high at Rothley, but Rogers *et al.* (1981) identified a similar level of shoulder arthritis (24 per cent) in a Saxon sample from Trowbridge, Wiltshire, indicating that Rothley is not atypical. Rothley follows the same OA skeletal distribution pattern as the population from rural Raunds, Furnells (Powell 1996) and that identified by Mays (2007) at Wharram Percy. At the urban site of Barton-upon-Humber, the spine was also the most affected region, but the hip and shoulder fell far behind other joints including the knee and the elbow (Waldron 2007). This difference may be due to variations in lifestyle between rural and urban populations. Research by Thelin and Holmberg (2007) demonstrates that the modern farmers were far more likely to develop hip OA than their rural non-farming and urban peers, demonstrating that farming introduced a significant risk of developing the disease and not just residing in the countryside.

Fourteen individuals had suffered ante-mortem tooth loss, representing 24 per cent of all the observable individuals (n = 50). At Wharram Percy the prevalence was double that at Rothley, with 50 per cent of the phase 1–2 individuals having incurred some tooth loss. The teeth most commonly lost at Rothley were the molars, similar to those observed at Raunds (Powell 1996). The fragility of the maxilla may explain why AMTL was half that observed at Wharram. At Rothley, 11 individuals have hypoplastic lines, and considering only 50 individuals had observable teeth, this works out at a prevalence rate of 22 per cent, which is a little lower than Wharram (31 per cent) but higher than Empingham (12 per cent) (Mays 1990, 15). In line with Hillson (1996, 167), the defects were visible on the anterior portion of the teeth, as was the case at Wharram Percy (Mays 2007, 138). Similarly, like Wharram Percy and Raunds (Powell 1996), the most common tooth affected was the canine. Burial 292 had a lower left second molar with enamel pearls on the roots. Of 8,854 extracted molars in modern Norwegians, there were 219 macroscopically detectable enamel pearls on a total of 201 teeth (2 per cent) (Risnes 2007). Enamel pearls were also found at nearby Empingham II on a single molar (Mays 1996).

Three out of 16 individuals had cribra orbitalia, equal to 18.9 per cent. At Wharram, 19.2 per cent of adults were affected (Mays 2007, 172), and 29 per cent of adults and children at Raunds (Powell 1996, 123).

Analysis of the carbon and nitrogen isotope ratios has provided a minor insight into the diet of the population at the time. The ratios are all closely consistent and within the ranges that would be appropriate for people living on a mainly temperate terrestrial diet, as would be expected for a Leicestershire population living in this part of the country, far away from the sea.

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