YORK ARCHAEOLOGICAL TRUST

Roman Burials at
16-22 Coppergate, York

By J. M. McComish, T. Kendall, B. Savine and S. Mays

YAT Web Publication Report AYW 12 February 2021

YORK ARCHAEOLOGICAL TRUST

York Archaeological Trust undertakes a wide range of urban and rural archaeological consultancies, surveys, evaluations, assessments and excavations for commercial, academic and charitable clients. We manage projects, provide professional advice and fieldwork to ensure a high quality, cost effective archaeological and heritage service. Our staff have a considerable depth and variety of professional experience and an international reputation for research, development and maximising the public, educational and commercial benefits of archaeology. Based in York, Sheffield, Nottingham and Glasgow the Trust's services are available throughout Britain and beyond.

CONTENTS

Tables

Figures

Abbreviations

AF   Architectural Fragment

NGR   National Grid Reference

OD   Ordnance Datum

SF   Small Find

YAT   York Archaeological Trust

1   INTRODUCTION

From 1976 to 1981 excavations were undertaken by York Archaeological Trust at 16-22 Coppergate, York (NGR SE 6046 5168; Figure 1). The excavation methodology for the site has already been eloquently described in detail in previous publications (Hall et. al. 2014), and is not repeated here. Although the site is internationally renowned for its Anglo-Scandinavian archaeology, the site also revealed significant archaeological remains of Roman date.

The Roman remains were first located in 1980, in a strip approximately 7.5m wide adjacent to the present street frontage. The Roman deposits included a small mid-4th century inhumation cemetery comprising six burials and an empty grave cut, together with a possible cemetery boundary ditch.

An extension to the period available for excavation in 1981 led to the investigation of an area 37 x 12m in size along the south-western side of the site, at right angles to the street frontage. Although this yielded further Roman remains, no additional burials were present (Figure 2). A narrative detailing the sequence of Roman remains at the site was produced by Hall, Evans and Ottaway (2011, 199-221) using details from the original Level III report archive report (Evans 1997). In 2003 the six burials were assessed by Dr S. Mays from the Ancient Monuments Laboratory, English Heritage (now the Research Department of Historic England).

The present report was commissioned and funded by Historic England to ensure the publication and dissemination of this small but important group of burials. The report collates the information relating to the excavated remains (based on Hall et al. 2011, 213-7) and the osteological analysis of the six skeletons recovered (Mays 2003). Details of the individual graves are given in the burial catalogue.

2   LOCATION, GEOLOGY AND TOPOGRAPHY

The site lies on the southern side of the modern street of Coppergate, some 170m from the south-east side of the legionary fortress, around 145m from the west bank of the River Foss, and within 200m of the north-east bank of the River Ouse (Figure 1).

The underlying geology is of Sherwood group sandstone overlain by superficial Vale of York deposits of clay, sand and gravel (British Geological Survey).

Undisturbed natural deposits at the site were located at between 6-9.7m OD, sloping downwards from north-west to south-east. The natural comprised a firm clay deposit, sealed by silty sand, the latter possibly resulting from material washing down slope from the higher ground to the north-west.
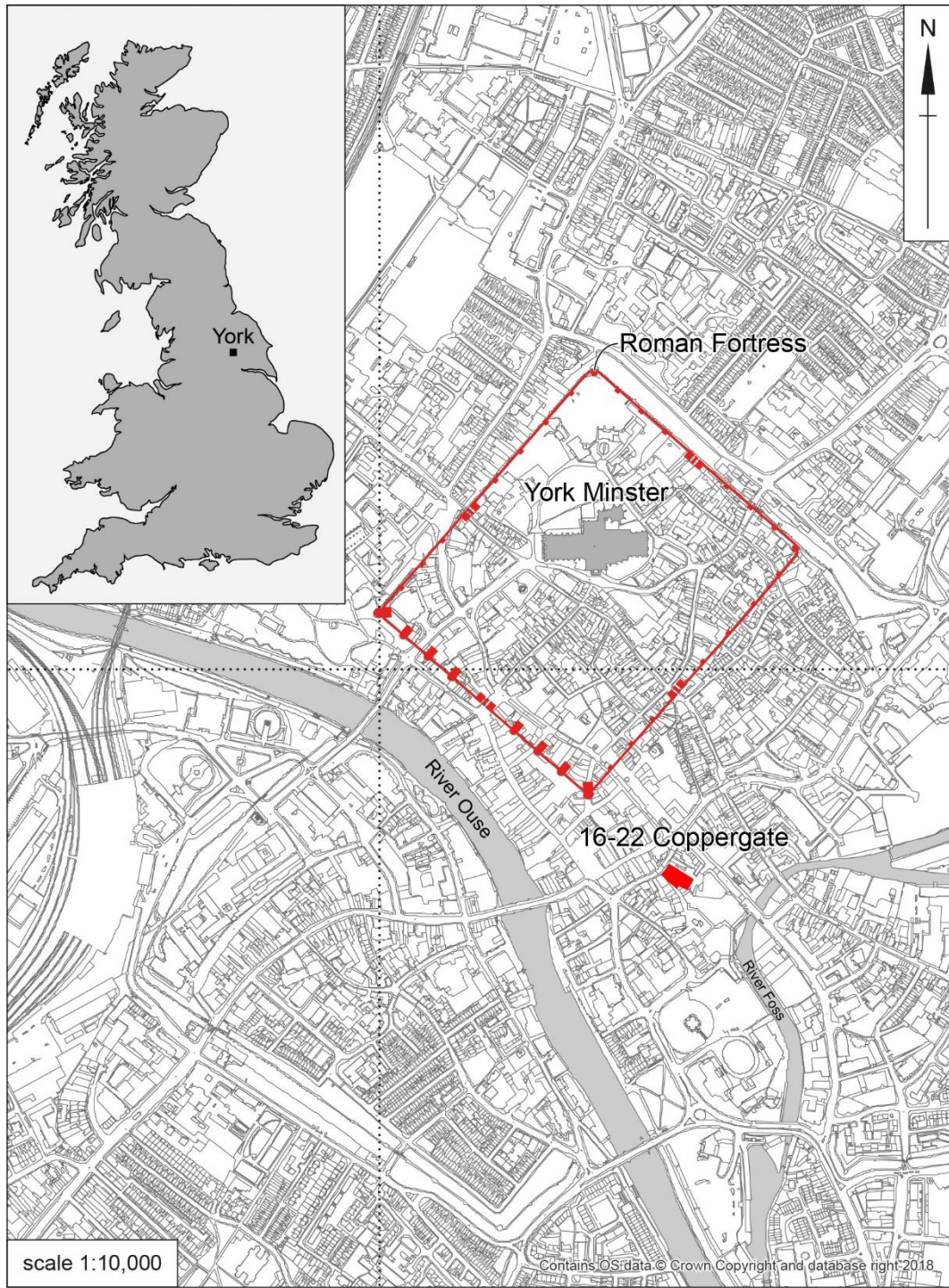
Figure 1 Site location map
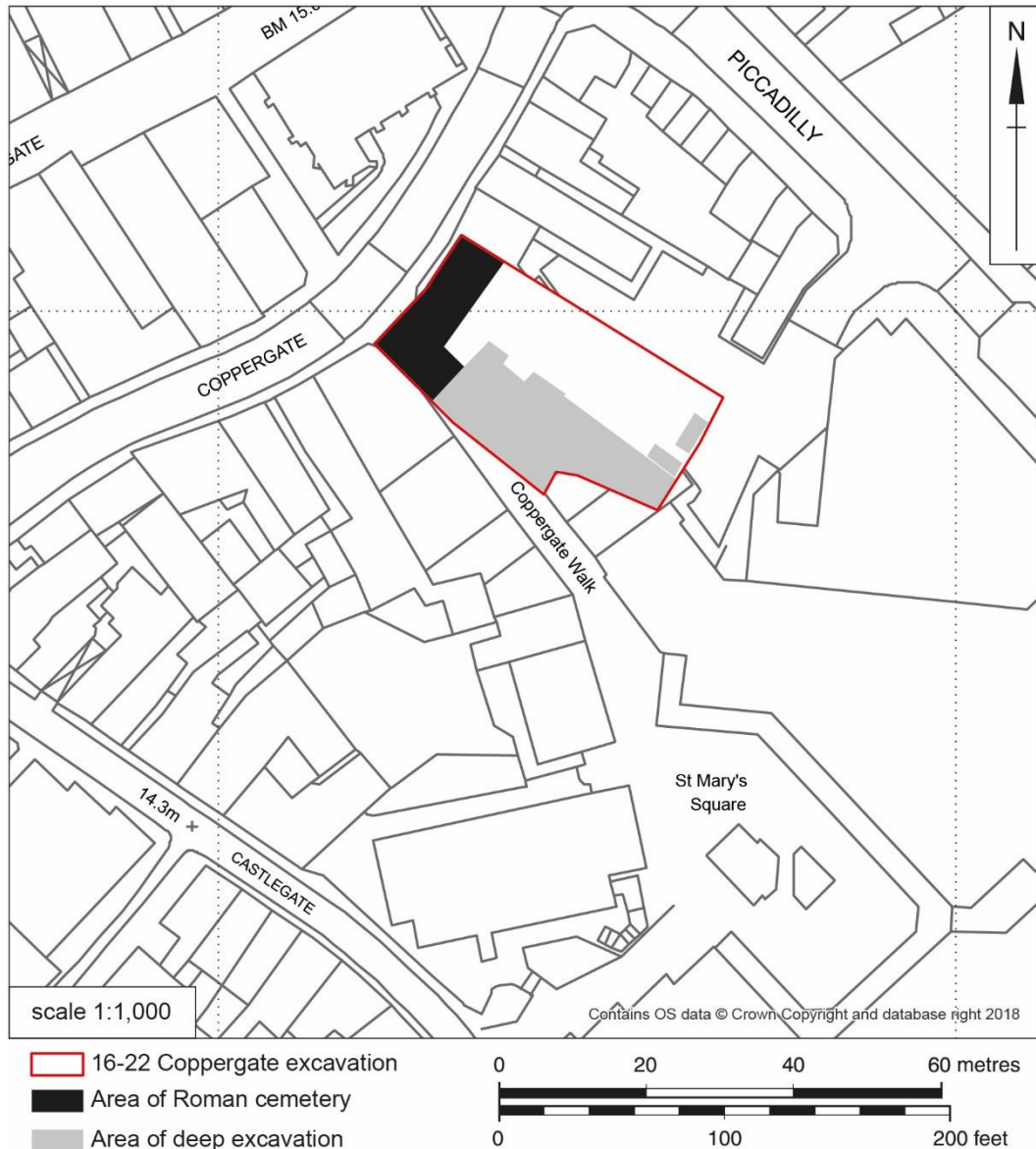
Figure 2   The 16–22 Coppergate site in red showing the area occupied by the Roman burials and associated features highlighted in black, and the area investigated in 1981 in grey

3   ARCHAEOLOGICAL BACKGROUND - ROMAN YORK

The legionary fortress of York (*Eboracum*) was established in c. AD 71 by the 9th Legion *Hispana.* The site chosen for the fortress was that of a slightly elevated plateau on the north-eastern bank of the River Ouse (Ottaway 2011, 117). The presence of two rivers, the Ouse and Foss provided defence on two sides of the fortress, while the river Ouse was accessible from the sea via the Humber, enabling supply by ship; the site also lay on the boundary of the lands held by the Parisi and the Brigantes enabling control of both tribes (Ottaway 1999, 137).

The fortress was a standard playing-card shape 20ha in area, with the corners of the fort on the cardinal points (Ottaway 1996, 202-9). The south-western side faced the River Ouse while the south-eastern side faced the River Foss (Figure 3).
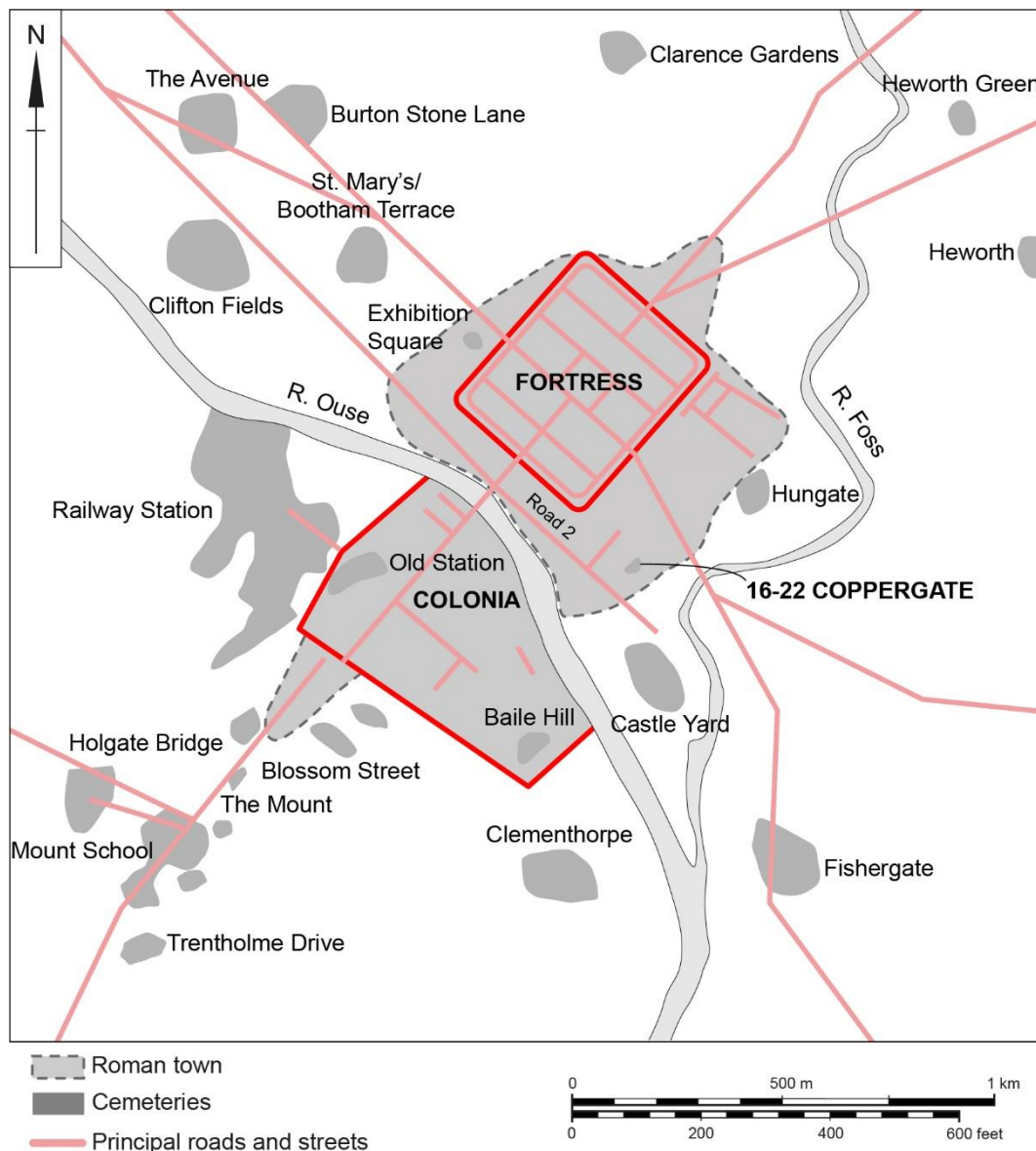
Figure 3 The principal Roman cemeteries in York

Around AD 120 the 9th Legion was replaced by the 6th Legion *Victrix,* which remained based at York until the end of the Roman occupation (Ottaway 2013, 11).

Civilian settlement developed around the fortress in two main areas, the first being located between the fortress and the rivers Ouse and Foss, the second on the opposing south-western bank of the River Ouse in an area broadly comparable to the extent of the present medieval city walls (Ottaway 1999, 145). By 237 the settlement had been granted *colonia* status, and it was established as the capital of the province of Britannia Inferior (Ottaway 2013, 83). The precise extent of the *colonia* is unclear. From the late 3rd or early 4th century there was a change in the character of the civilian settlements of York, with the development of a number of substantial residences, while most of these properties were to the south-west of the Ouse one house with a mosaic is known from 21-33 Aldwark (Ottaway 2013, 134-6).

The later 4th century produced evidence of decline within the civilian settlements of York with some buildings falling into dereliction or disuse (Ottaway 2013 146-8; Carver et al. 1978, 50). The main road leading south-west through the *colonia* reduced in width and was encroached

upon by timber structures while dark-earth accumulated in parts of the *colonia* (Ottaway 2013, 148). Although there is abundant fourth century pottery on some sites it is unclear if this represents a substantial surviving population in the *colonia*, or the breakdown of civic organisation leading to rubbish disposal within derelict buildings (Ottaway 2013, 148). The robbing and re-use of earlier sarcophagi may also indicate a breakdown in civil order (Monaghan 1997, 854).

The traditional date for the end of Roman Britain is AD 410 (Ottaway 2013, 144). As archaeological evidence for the 5th century in York is sparse (Mainman 2919, 4), the precise nature of the immediate post-Roman period is uncertain.

3.1.1 The Civilian Settlement North-West of the Ouse

The area between the fortress and the Rivers Ouse and Foss was crossed by a number of roads (Figure 3), the two principal being the approach road from the south-east, and a second road on a north-west to south-west alignment which ran immediately adjacent to the south-western wall of the fortress (the line of this road to the south-east of the fortress is largely conjectural).

Early settlement around the fortress has been interpreted as *canabae*, under military supervision (RCHMY 1962, xxxiv-xxxv). Part of this area was clearly used by the military for the production of both pottery and tile, with the 9th Legion kilns being sited outside the eastern corner of the fortress in the vicinity of Peasholme Green and Aldwark, in the vicinity of St Cuthbert's church and the Borthwick Institute (Figure 4, 1; Ottaway 2013, 55; McComish 2012, 58). In addition, a two-phase late 1st to early 2nd century timber grain warehouse is known from 39-41 Coney Street (Figure 4, 2; Ottaway 2013, 54, 104). Timber structures of late 1st to 2nd century date are also known from the 16-22 Coppergate site (Figure 4, 3; Hall et al. 2011, 201).

There is some suggestion that the area between the fortress and the rivers Ouse and Foss was reorganized towards the end of the 2nd century, developing rapidly thereafter. In terms of the road system, the grain warehouses at 39-41 Coney Street were replaced by two gravel streets at right angles to one another, one of which had an associated stone drainage gutter (Ottaway 2013, 88). A new north-west / south-east aligned road was also built in the late 2nd century in the Aldwark area, with a second north-east / south-west aligned road being built in the early 3rd century (Ottaway 2013, 89).

Substantial stone buildings have been observed across the area, including a building with a mosaic at St Mary's Castlegate, a masonry building at 25-27 High Ousegate, stone buildings possibly forming parts of two baths on the north-east of Spurriergate, gritstone blocks and a cobble surface at 8 High Ousegate, a stone building and an altar to the *Genius loci* (local spirit) found at 11-13 Parliament Street, and traces of stone walls observed in a sewer trench on Parliament Street (Figure 4, 4-9; RCHMY 1962, 48-61). In addition, there was a temple at the corner of High Ousegate and Nessgate; the inscribed dedication tablet found in association with this building, bore a dedication to Hercules by two men who may have been magistrates or part of a college of priests (Figure 4, 10; RCHMY 1962, 159) suggesting that the settlement north-east of the River Ouse had gained autonomy from military control at some stage.
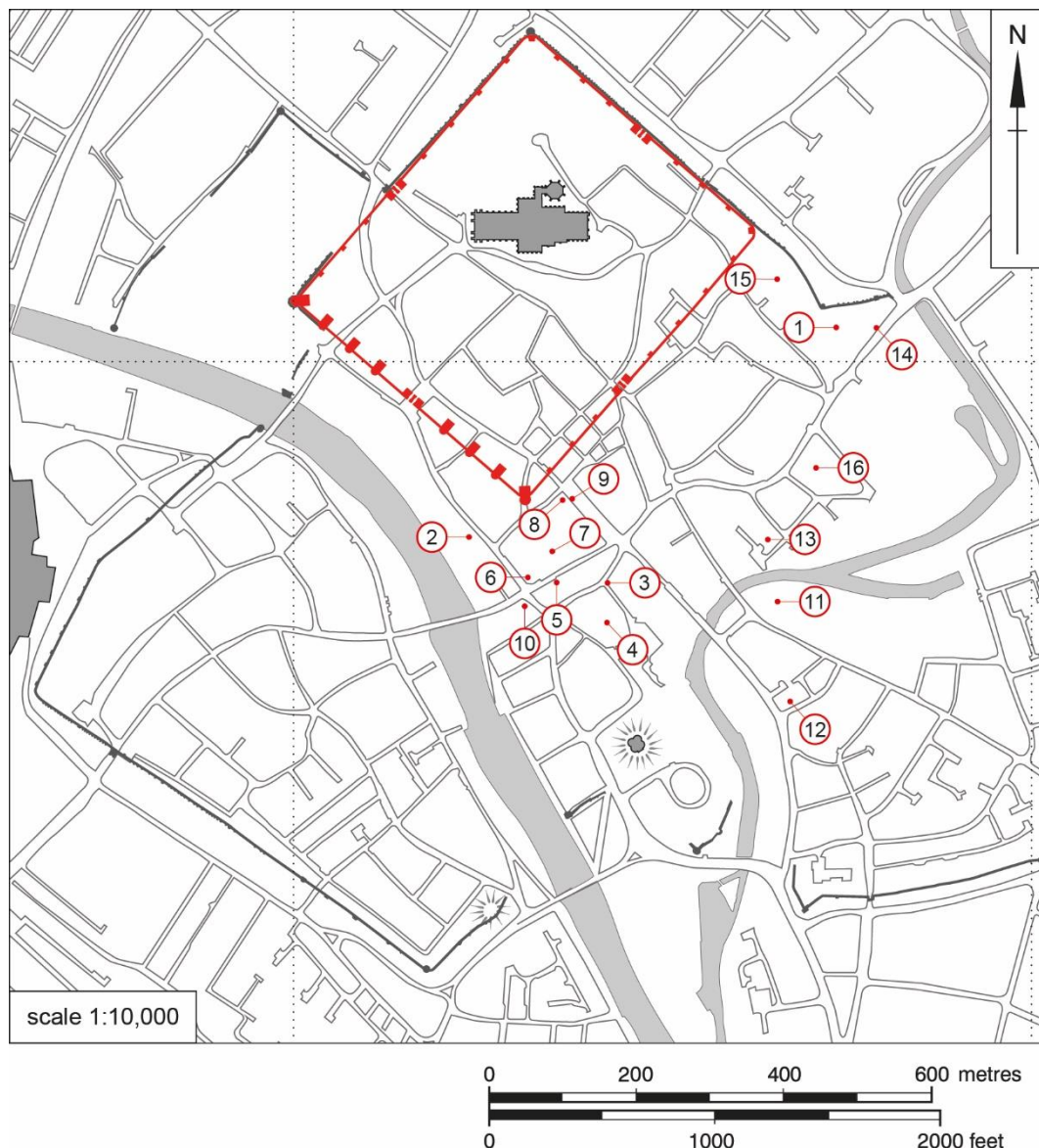
Figure 4   Roman sites mentioned in section 3.1.1 of the text

(1) St Cuthbert's church and Borthwick Institute; (2) 39-41 Coney Street; (3) 16-22 Coppergate; (4) St Mary's Castlegate; (5) 25-7 High Ousegate; (6) Spurriergate; (7) 8 High Ousegate; (8) 11-13 Parliament Street; (9) Parliament Street sewer; (10) Dedication stone for temple of Hercules; (11) Malt Shovel Inn, Fossgate; (12) Piccadilly; (13) Garden Place; (14) Peasholme Green; (15) 21-33 Aldwark

At 16-22 Coppergate evidence of glass working dating to the early 3rd century is known, while in the mid-3rd century a number of ditches were cut across the site and a stone building with several rooms was constructed (Hall et al. 2011, 201-8; Ottaway 2013, 88).

Two possible jetties relating to the original course of the River Foss are known at the site of the Malt Shovel Inn, Fossgate, and on Piccadilly (Figure 4, 11-12; RCHMY 1962, 64-5). A massive stone surface at Garden Place is interpreted as a crane base, possibly relating to the waterfront (Figure 4, 13; RCHMY 1962, 64; Ottaway 2013, 89). The precise date of these waterfront structures is unknown.

Early 3rd century dumps of pottery waste in the Aldwark area, together with pottery waste at two sites in Peasholme Green area are indicative of large-scale legionary pottery production at

this stage (Ottaway 2013, 89). Tile production by the 6th legion also seems to have been centred at Aldwark, though the precise location of the kilns is unknown (McComish 2012, 59-60).

The Aldwark/Peasholme Green area seems to have changed function in the later 3rd century. Charcoal and ash deposits 0.5m thick, including sherds of kiln structure, were revealed by augering on a site at Peasholme Green, and these were interpreted as the deliberate dumping of kiln-derived material, perhaps resultant from a major clearance exercise in the area (Figure 4, 14; Swan and McBride 2002, 183, 191-2). After removal of the kilns the area developed as a residential suburb, including a house with a mosaic floor at 21-33 Aldwark (Figure 4, 15; Ottaway 2013, 134-6; Brinklow et al. 1986, 40-44).

3.1.2   Roman Cemeteries

In the Roman period there was a strict prohibition on the burial or cremation of a corpse within settled areas, as stipulated in Law III, Table 10 of the 12 Tablets of the Law of Rome (Constitution Society). Roman cemeteries were usually sited close to the major approach roads leading to settlements/fortifications (Ottaway 2011, 121). Examples of Roman cemeteries adjacent to roads are known across Britain, and in some cases wealthy burials were housed in mausolea or had funerary monuments. For example, in a cemetery adjacent to Watling Street, at Great Dover Street, Southwark, which came into use between 120-50 and continued until the 4th century, there were four structures immediately adjacent to the road interpreted as two walled enclosures containing funerary monuments and two mausolea (Mackinder 2000, 24, Figures 12, 19, 21).

For the most part the Roman cemeteries in York also followed the pattern of being located close to the major approach roads, with by far the largest cemeteries being under the present York Railway station and lining the major approach road into York on the south-western side, from The Mount/Blossom Street as far as Trentholme Drive (Figure 3; RCHMY 1962, 67). Of York's Roman cemeteries only those at Clarence Gardens, Clementhorpe and Heworth do not seem to have been sited close to roads, though this may simply reflect a lack of excavated evidence for roads in these areas.

Across Roman Britain cremation appears to have been the preferred means of burial until the late 2nd century. Early cremation cemeteries are known around York including Fishergate, Heworth, Heworth Green, Burton Stone Lane and Exhibition Square (RCHMY 1962, 67-8, 70-2).

From the middle of the 2nd century inhumation burial became increasingly common across Britain, and the reason for this shift in burial practice is thought to relate to a change in fashion rather than a change in religious practices (Philpott 1991, 57, 212). The adoption of inhumation as a burial rite is seen in York with mid-2nd century inhumations present at Trentholme Drive (skeletons 156, 209 and 213, Wenham 1968, 49).

If the area of settlement expanded, early cemeteries could be encroached upon by settlement. This is seen in York in the area of the Old Station and possibly also along Micklegate, though in the latter area the evidence is less certain (RCHMY 1962, 54).

Cremation and inhumation burial rites were used simultaneously across Britain for a considerable period of time. In the case of York, cemeteries with both burial rites are known around both the fortress and the settled area south-west of the River Ouse, including at The

Avenue, Clifton and Clifton Fields, the Railway Station, Blossom Street, The Mount, the Mount School, Holgate, Trentholme Drive and Hungate (RCHMY 1962, 73-4, 79, 92-3, 95-6, 97-99 and 101-6; Wenham 1968, 21-47; Savine 2017, 9-10; Gustavsen 2002, 12-14 and 33; Macnab and McComish 2000, 10; YAT archive project code 5000, documents 1-2). Clear evidence for the overlapping of the two burial rites was seen at Trentholme Drive, where there were examples of both inhumations above cremations, and cremations above inhumations (Wenham 1968, 27).

By the late 3rd century the use of cremation was dying out (RCHMY 1962, 79). An example of the shift from cremation to inhumation is the cemetery at Dorchester-on-Thames which had cremation burials up to the 180s, then cremation and inhumation simultaneously until c. 280 after which time the cemetery was inhumation only (Alcock 1996, 42).

The late Roman cemeteries at Castle Yard, St Mary's / Bootham Terrace (RCHMY 1962, 72-3, 107-8), 35-41 Blossom Street (Ottaway 2011, 297-308) and 16-22 Coppergate in York were inhumation only. A cemetery at Clementhorpe, York, though not closely dated, also contained only inhumations (RCHMY 1962, 67), suggesting it is also of later Roman date.

Although cremation was largely superseded by inhumation by the later 3rd century there are occasional cremations of later 3rd to 4th century date, such as Lankhills, Winchester and the eastern cemetery of London (Philpott 1991, 47, 50; Booth et al. 2010, xv; Barber and Bowsher 2000, 55). A few late cremations are also known in York, two at The Avenue, Clifton, and one at the Railway Station (RCHMY 1962, 74, 91).

4   THE 16-22 COPPERGATE CEMETERY

Several phases of Roman occupation were identified at 16-22 Coppergate which are summarised in Table 1 below. Inhumation burial began in the north-western part of the site in Phase 4, with six inhumation burials being present together with a grave-shaped and grave-sized shallow cut which did not contain any skeletal remains (Figures 5-6; Hall et al. 2011, 214-6). Analysis of the site stratigraphy and artefactual evidence supports a mid-4th century date for the cemetery, perhaps around AD 360 (Hall et al. 2011, 217).

Table 1 16–22 Coppergate Roman Phases (Hall et al. 2011, 200)		
Phase	**Archaeology**	**Date**
1	Natural deposits	-
2	Features cut into natural and deposits above	Late 1st/ early 2nd century
3a	Stone walls and cut features in south-western part of site	Mid-3rd century
3b	Cut features and building-related deposits	Late 3rd - early 4th century
4	Graves and associated features	Mid-4th century
5	Deposits and minor features	?Late 4th century

4.1 Cemetery layout

The full extent of the cemetery is unknown, but it presumably extended beyond the limits of excavation on both the north-western and south-western sides.

Two linear features were assigned to the same phase as the burials (Figure 5; Hall et al. 2011, 214). Approximately 5m to the south-east of the burials was a north-east / south-west aligned ditch (36353), which was 0.92m in width and 0.38m deep, with steeply sloping sides. To the south-west it extended beyond the limit of excavation, while the north-eastern end was been truncated by a post-Roman pit. The ditch-fill (36238) was dark grey slightly silty sticky clay with flecks of light brown clay (Hall et al. 2011, 214).

A second linear cut 1.7m long, 0.95m wide and 0.85m deep with near vertical sides (33162) was present at right-angles to 36353 (Figure 5; Hall et al. 2011, 214). Cut 33162 continued beyond the limit of excavation on the north-western side and being truncated on the south-eastern side by a later intrusion. This cut contained three successive fills the earliest of which was dark grey clay with patches of very dark grey clay (33161). This was overlain by, a dark grey clay with patches of reddish-brown clay and occasional charcoal fragments (33160). The uppermost fill (33122) was a mixture of grey sandy clay with charcoal flecks and reddish-brown clay (Hall et al. 2011, 214).

Cut 33162 was interpreted by (Hall et al. 2011, 214) as forming part of the cemetery boundary, however if this was the case the boundary must have gone out of use very quickly, as three graves were placed above or to the east of the cut during the life of this short-lived cemetery.

To the north-west of boundary ditch 36353 there were six grave cuts (Figures 5-6). One grave was aligned north-south (27957, Figure 6) and one was north-west / south-east (33183), while four burials and the empty grave cut were aligned south-west / north-east (33092, 34133, 34089, 33215 and 33212, Figure 6).

Three of the south-west / north-east aligned graves, together with the empty grave cut (34133, 34089, 33215 and 33212) were arranged end to end in a south-west / north-east aligned row. The spacing between the graves were irregular, with a gap of 0.75m between grave cuts 33212 and 33215, a space of 1.75m between grave cuts 33215 and 34089, then 2.75m between grave cuts 34089 and 34133. The northernmost south-west / north-east aligned grave (33092) lay approximately 1.5m to the north-west of, and was aligned to, grave 33215. Grave 33092 was truncated by a north-west / south-east aligned grave (33183).

Several cut features were interpreted as being contemporaneous with the cemetery. Two intercut pits (31793 and 31905; Figure 4) were sited between graves 33215 and 34089. Pit 31739 was 1.5m in diameter and 0.85m deep, while pit 31905 was 0.86 x 0.5m in area and 0.3m deep. A third badly truncated pit 0.6m deep (Figure 4, 34047) was located between graves 34089 and 34133. The function of these pits is unclear, but their siting in relation to the grave cuts suggests they were linked to the burials in some way.

Grave 34133 was truncated on the south-eastern side by a single post-hole 0.1m in diameter (Figure 4, 3435). It is unclear if this was coincidental or whether this represented the site of a marker post for the grave.
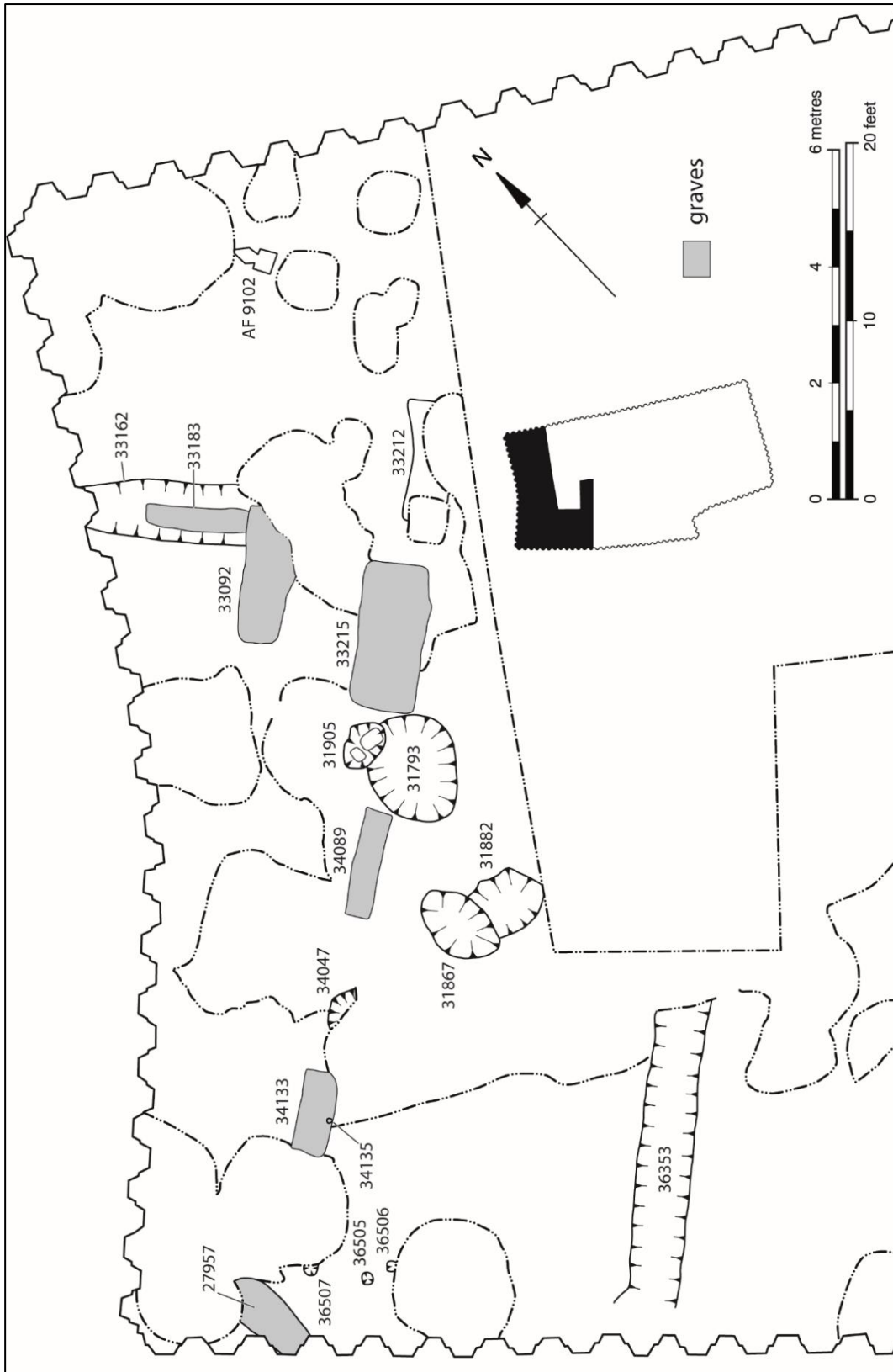
Figure 5   16–22 Coppergate Roman cemetery features (based on Ottaway 2011, Fig.141)

Figure 6 The south-western portion of the cemetery with grave cuts indicated, facing south-west, scale unit 0.5m

Three post-holes between 0.1-0.2m in diameter and up to 0.25m deep were also present (36505-7; Figure 4). The original function of these post-holes is unclear as they did not seem to form any obvious structure such as a fence. Two intercut pits (31882 and 31867; Figure 4) were located slightly to the south of grave 34089. There was nothing within the backfill of these pits to indicate a specific cemetery-related function.

4.2   Burial rite

The principal details of each inhumation are summarised in Table 2, while the layout of the skeletons is shown on Figure 7 (for ease of reference the burials were labelled Inhumations A-F working from south-west to north-east). A catalogue of each burial is given in section 6 below.

Table 2 16–22 Coppergate, Summary of burials (based on Hall et al. 2011 Table 3, 3215)				
Grave cut and (burial reference)	Alignment	Age	Sex	Remarks
27957 (A)	N-S	20-30	f	Iron nail, jet ring, hone and six glass beads
33092 (E)	SW-NE	35–45	m	Iron nails
33183 (F)	NW-SE	17–18	m	Iron nails, coffin stain
33215 (D)	SW-NE	20-25	m	Coffin stain, coin under skull
34089 (C)	SW-NE	approx.19	m	Iron nails, hobnailed boots, coin by right leg
34133 (B)	SW-NE	20–30	f	Iron nails, coffin stain
33212	Empty			

The burials can be subdivided into three types on the basis of burial rite:

Type 1 – Inhumation on left side with flexed legs, buried with grave goods (Inhumation A)

In the case of Inhumation A, an iron nail was present by the knee of the skeleton, but the position of the skeleton suggests that it was not originally interred in a coffin. This burial differs from the others at the cemetery not just in terms of the position of the body and the lack of a coffin, but also in terms of orientation being aligned north-south, with the head at the northern end of the grave.

Type 2 - Supine extended burials in a wooden coffin (Inhumations B and E-F)

Two of these burials (Inhumations B and F) had clear coffin-stains together with iron nails from the coffin. In the case of Inhumation E, no coffin-stain survived, but there were at least four iron nails, two by the head, one by the left foot and one by the right thigh, indicative of a coffin. The Type 2 burials were on two differing alignments.

Type 3 - Supine extended burials in a wooden coffin with grave goods (Inhumations C-D)

The Type 3 burials both had wooden coffins, which in the case of Inhumation D was marked by both a coffin-stain, while the presence of eight iron nails associated with Inhumation C were suggestive of a wooden coffin. Inhumation C had both a coin by the right leg and the remains of two pairs of hobnailed boots by the feet of the skeleton, while Inhumation D had a coin by the skull.

There is no correlation between the presence of grave goods and the sex of the individual concerned, with one female, one male and one probably male burial having grave goods (Inhumations A and C-D). The richest burial in terms of grave goods was female.

There was clearly no standard burial position for the inhumations as each skeleton was in a different position:

Inhumation A – On left side, with flexed legs, left arm flexed

Inhumation B – Supine, extended, right hand on right pelvis, left hand on abdomen

Inhumation C – Supine, extended, both arms fully extended

Inhumation D – Supine, extended, both hands on abdomen

Inhumation E – Supine, extended, left arm extended, right hand on right pelvis

Inhumation F – Supine, extended, right hand on stomach, left hand on left pelvis

The westernmost two burials were female and probably female respectively, while the easternmost four were male or probably male. Given the small number of burials excavated it is impossible to determine whether this is a meaningful pattern or not.
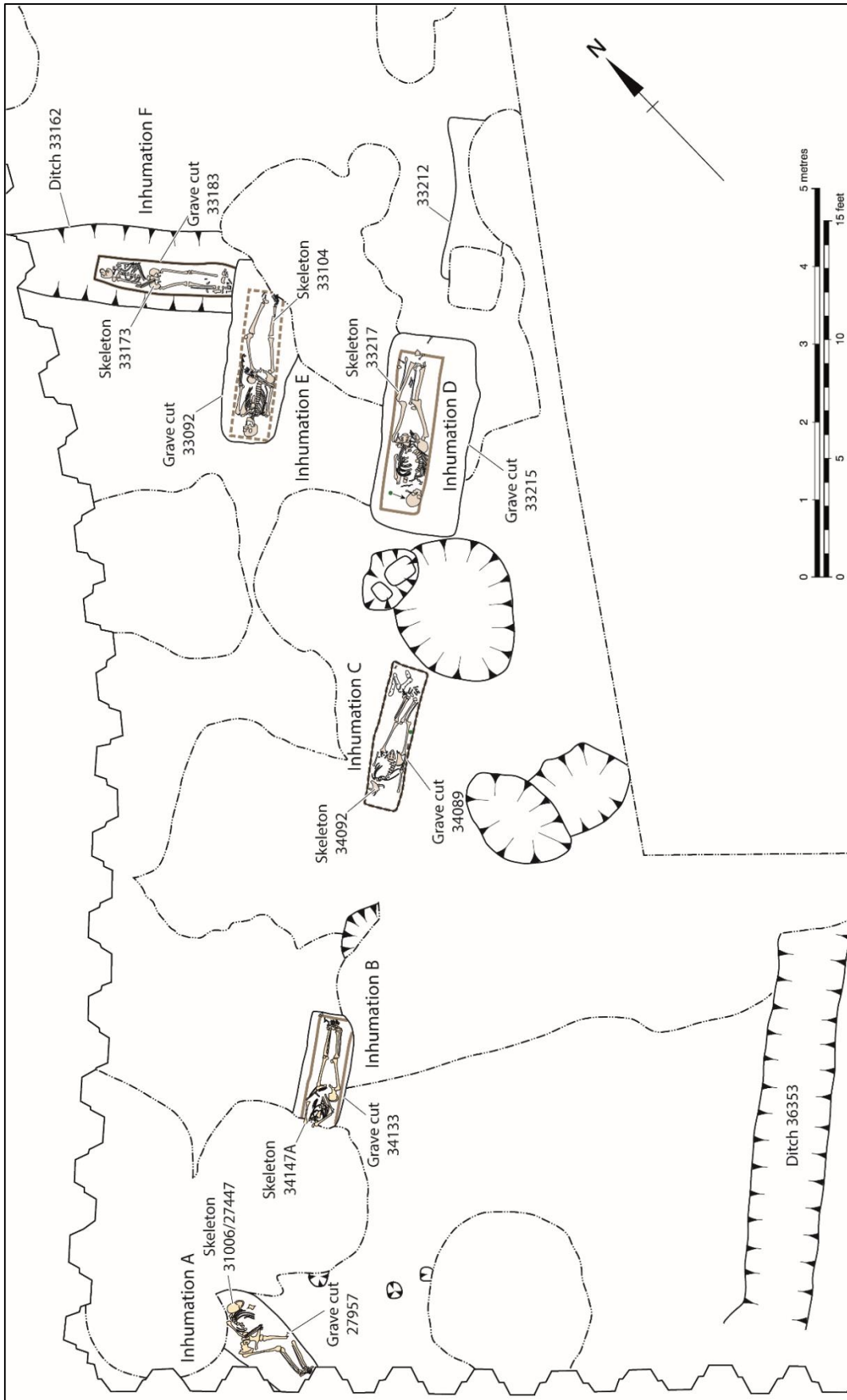
Figure 7   16–22 Coppergate Roman cemetery features (based on Ottaway 2011, Fig.141)

4.3   Cemetery related artefacts

A range of residual Roman material was recovered from post-Roman features and deposits, some of which may be linked to burial and votive offerings, including mid-3rd to mid-4th century pottery including sherds of head pots, Romano-Saxon pots, candlesticks and a complete Knapton type jar dating to 320-60 with a lid comprising of a small slab of micaceous sandstone (Hall et al. 2011, 216-17). The Knapton jar was lifted intact and the contents analysed, but it yielded only soil.

Two architectural fragments were also recovered from the excavations, suggesting the presence of funerary monuments in the general vicinity. The first of these was a small magnesian limestone fragment with part of an inscription (SF3618; Figure 8), which was found in an 11th to 12th century context above the area of Roman burials.

Figure 8   Magnesian limestone fragment (SF3618), bearing part of an inscription.

The second was a 0.72m high pine cone finial carved from millstone grit (AF9102; Figure 9), which was found slightly to the north-east of the burials, in a layer dating to sometime between 400-850 (Hall et al. 2011, 216-17).

In the Roman period a species of tree called a Stone-pine was associated with mourning and the afterlife, as well regeneration and water (Lodwick 2017, 152). The importance of pine cones as a symbol is reflected in representations across Roman art including frescoes and a wide range of artefacts ranging from hairpins, from small items of jewellery such as hair-pins, to sculptures including mortuary structures and fountains (Lodwick 2017, 152). Arguably the most famous representation of a pine cone in Roman art is the almost 4m high bronze sculpture of a pine cone, originally from the Temple of Isis near the Parthenon, now housed in

the Vatican (Vatican State). In Britain representations of pine-cones are known from mortuary monuments at Brough, Cumbria, Overborough, Lancashire, Southwark in London (Lodwick 2017, 152) and The Mount, York (RCHME 1962, 124, Plate 55).

Figure 9   Millstone Grit pine cone finial (AF9102). Scale unit 0.1m

4.4   The skeletal remains

By S. Mays (Research Department, Historic England).

4.4.1   Methodology

Sex was determined using dimorphic aspects of the pelvic bones and skull (Brothwell 1981). Stature was estimated from long bone lengths using the regression equations of Trotter and Gleser (reproduced in Brothwell 1981, 101). The method for determining age for the individual burials is described in Section 6 below. The more important pathological changes observed are discussed here, while the more minor ones are listed Section 6 below. In addition to the data discussed below, cranial and post-cranial measurements were taken according to Brothwell (1981), and non-metric variants were recorded according to the definitions of Berry and Berry (1967) and Finnegan (1978); these results are held in archive at Historic England.

4.4.2   Results

The main point of interest in the Roman burials is the presence of two individuals, Inhumations C and F, who each show unilateral, right-sided spondylolysis, the former in the 5th

lumbar vertebra, the latter in the 6th cervical vertebra. Spondylolysis is a cleft in the neural arch at the pars interarticularis. It is a fairly rare finding, occurring typically in about 4-8% of individuals in Caucasian populations (Waldron 1992). When it is found, it is generally bilateral, i.e. there is a cleft at both left and right pars interarticulares. Unilateral defects form only about 10% of cases (Waldron 1992). It is most often found in the 5th lumbar vertebra, and is rare outside the lumbar spine (Merbs 1996). In his survey of the literature, Merbs was unable to find any archaeological cases of the lesion in the cervical spine, so burial 34092/34028 from 16-22 Coppergate is a palaeopathological rarity.

Spondylolysis is thought to be, at least in bilateral cases, a fatigue fracture of the neural arch which fails to unite, but some studies have shown a familial suggesting an inherited predisposition, probably due to dysplasia of the pars interarticularis or other aspects of conformation of the veretebrae (Waldron 1992; Merbs 1996). It seems that in some instances unilateral lesions are in fact partially healed bilateral ones (e.g. Wiltse et al. 1975). In the present cases, there is no evidence for any callus formation at the intact pars interarticularis, so these would seem to be true unilateral lesions not partly healed bilateral ones. In both instances, the affected lamina is rather more slender than the intact one, arguing for the importance of a unilateral dysplasia in their causation. The rarity of the lesion, and the morphological similarity of the two cases (albeit at different locations in the vertebral column), may suggest a close kinship between these two burials from 16-22 Coppergate.

5 DISCUSSION

Although the number of Roman burials encountered at 16-22 Coppergate was small, it is clear from the arrangement of the graves that they formed part of a cemetery with at least one boundary ditch, located between the south-eastern side of the fortress and the River Foss.

In terms of its setting it is one of three Roman cemeteries located to the south-east of the fortress on land that slopes downwards towards the River Foss, the others being at Hungate and the Castle Yard. These cemeteries lie on slightly higher land, at approximately 13m OD for both Hungate and the Castle Yard cemeteries and 16m OD in the case of 16-22 Coppergate, while the level of the River Foss is at approximately 9m OD (though it would have been lower in Roman times, the present level relating to the 18th century canalisation of the river).

The Coppergate burials were located approximately 170m from the south corner of the legionary fortress and around 145m from the present west bank of the Foss, while the Hungate cemetery was approximately 225m south-east of the east corner of the Roman legionary fortress and 170m from the present west bank of the River Foss, and the Castle Yard cemetery was 350m south-east of the southern corner of the fortress on a narrow spit of higher land between the confluence of the Rivers Ouse and Foss.

All three of these cemeteries were in use in the 4th century. The 16-22 Coppergate cemetery dates to the mid-4th century (Hall et al. 2011, 217), while that at the Castle Yard is dated as late-Roman (RCHMY 1962, 67), and the burial ground at Hungate was in use from the 2nd-3rd centuries to the late 3rd- 4th century (Macnab and McComish 2000, 10; Gustavsen 2002, 12-4, 33; dating for Hungate 2007-11 excavations based on pottery analysis by R. Leary in YAT archive project code 5000, document 2).

5.1 Cemetery location in relation to settled areas

With the exception of Exhibition Square, located to the immediate north-west of the fortress, the early Roman cremation cemeteries of York located to the north-east of the River Ouse were all 700m-1km outside the fortress (Figure 3, Fishergate, Heworth, Heworth Green and Burton Stone Lane). In contrast, the later inhumation-only cemeteries north-east of the River Ouse were located between 170-350m from the fortress walls (Figure 3, Marygate / Bootham Terrace, Castle Yard and 16-22 Coppergate). This suggests that in the later Roman period new burial grounds were located closer to the settled areas, possibly encroaching onto vacant plots (Ottaway 2011, 237).

In the case of 16-22 Coppergate, the cemetery seems to have been founded following the desertion and partial abandonment of a stone building at the site (Ottaway 2011, 237). By implication, there had been a contraction of the area of settlement at the site, since according to Roman law burials should be placed away from settled areas.

5.2 Layout of the cemetery

5.2.1 Cemetery boundary ditches

The 16-22 Coppergate cemetery was clearly defined by a boundary ditch (36353) on the south eastern side. A second ditch (33162) at right angles to the Ditch 36353 was also interpreted as a cemetery boundary (Hall et al. 2011, 214). It must be noted that cut 33162 did not continue across the full width of the excavated area and there is no clear evidence that it ever joined 36353, furthermore, the two ditches were of very different depths, with 33162 being 0.47m deeper than 36353. This may suggest that the ditches were unrelated. Given that burials lie above and to the north-east of cut 33162 it is possible that this ditch is totally unrelated to the cemetery, representing an earlier feature. Another possibility is that cut 33162 represents the grave cut for Inhumation F, mis-interpreted as a ditch, but this seems unlikely given that the base of the coffin was 0.35m above the base of the ditch.

Whatever the origin of cut 33162, it was clearly re-used for the location of Inhumation F, which is aligned perfectly within the ditch. The careful placing of a burial above an earlier ditch is known elsewhere in York, as at from the County Hospital site, Fossbank (Ottaway 2011, 173), while at the Hungate cemetery many burials were clustered around two earlier ditches, one aligned north-east to south-west and the other perpendicular to it, which intersected near to the north corner of the site; usually the graves at Hungate were orientated parallel to or at right angles to the nearest ditch, or cut into the ditch fill (YAT archive project code 5000 Document 3).

The defining of a cemetery within a ditched enclosure, as seen at 16-22 Coppergate, is paralleled elsewhere in Britain. For example, the southern side of a cemetery at Colchester was defined by a ditch (Crummy et al. 1993, 4, Fig. 2.10), while the late Roman cemetery at Lankhills, Winchester, was defined by a ditch to the north, and a hedge line and gully, then a ditch on the eastern side; at some stage burials extended eastwards beyond the eastern boundary ditch, though the ditch on the northern side remained the boundary for the entire period of cemetery usage (Booth et al. 2010, 18, 21). In the case of York, the cemetery at the County Hospital, Monkgate, was defined by a ditch on the south-eastern side (Ottaway 2011, Fig. 111).

5.2.2   Phases of use

It is clear from the cemetery layout that there were two phases of burial. The earliest phase comprises the south-west / north-east aligned grave (33183). The north-south aligned grave (27957) may be related to this, representing an early phase of the cemetery which was not well-ordered, with burials on slightly varied alignments.

Grave 33092 was truncated by a north-west / south-east aligned grave (33183). It seems from the layout that all of the south-west / north-east grave cuts were aligned in relation to one another, suggesting that the cemetery was deliberately re-planned at some stage on a new alignment. Given that Ditch 36353 was also aligned south-west / north-east it may represent part of this phase of re-planning, though there are no direct stratigraphic links which could prove this association.

Rearrangement of a cemetery is paralleled elsewhere both in York and nationally. A Roman cemetery in Colchester, which commenced c. 270 was originally laid out with burials on north-south alignments, but c. 320-40 it was re-arranged with burials being placed on east-west alignments and a building interpreted as a church was built at the edge of the cemetery (Crummy et al, 1993, 4-5), the change of alignment was interpreted as the change to a new religion. At 35-41 Blossom Street, York, the earlier phase of burial comprised inhumations and a mausoleum dating to c. 200-325 on a north-east / south-west alignment, but c. 325 the mausoleum was demolished and a new cemetery laid out with burials on a north-west / south-east alignment (Ottaway 2011, Figs. 218 and 224).

While it is possible to suggest that the rearrangement of the 16-22 Coppergate burial ground was due to a change from paganism to Christianity (as at Colchester) this is highly speculative given the limited area of cemetery exposed.

5.2.3   Burial orientation

The orientation of the burials at 16-22 Coppergate is either aligned with or at right angles to the principal axis of the fortress. Given that the road system in the area reflected the alignment of the fortress walling this is hardly surprising. A similar pattern is seen at the County Hospital, York, with the burials being aligned with their long axes at right angles to the north-eastern fortress walling (Ottaway 2011, 194).

5.2.4   Internal cemetery planning

Roman households were responsible for commemorating the dead not just by providing a proper funeral and burial, but also by honouring the deceased for years after death by visiting the grave regularly, and on specific anniversaries such as the birthday of the deceased, to offer libations, food and flowers (Rives 2007, 117-8). In order to undertake such ceremonies it was necessary to locate the correct grave, which has implications not just for the presence of grave markers, but also for the necessity of clear access routes through cemeteries.

Designing cemeteries with clear rows of burial was one way to ensure access. In the case of York, burials at County Hospital, Monkgate, were in a row immediately adjacent to the cemetery boundary ditch (Ottaway 2011, Fig. 111), while at Wentworth House, Clifton, though the presence of superimposed burials indicated more than one phase of use, there are clear indications of orderly rows of burial (Ottaway 2011, Fig. 85). The second phase of burial at the

16-22 Coppergate cemetery was clearly highly organised with the burials sharing a common alignment, the use of burial rows, and the graves being sufficiently well-spaced to enable easy access, and to avoid damage to or disturbance of adjacent burials.

Nationally there was an increase in managed cemeteries with orderly rows in the 4th century (Philpott 1991, 226). Examples are seen across Britain, as in the highly organised 3rd-4th century cemetery at Poundbury, Dorset, and the 4th century cemetery at Lankhills, Winchester (Farwell and Molleson 1993, Figure 10; Booth et al. 2010, Fig. 2.1). The 16-22 Coppergate cemetery also fits into this pattern.

5.2.5   Grave markers

It is often difficult to determine how graves were marked above ground, due to a combination of truncation removing features such as earth mounds marking graves, the poor survival of organic markers such as wooden-posts and the deliberate removal for re-use of above ground stone monuments. Clearly, however, where there is little intercutting between graves, the burial site must have been marked in some way (Pearce 2011, 140).

In the case of 16-22 Coppergate only one burial was truncated by a later grave, Inhumation F being cut by Inhumation E, but this can be interpreted as the result of a deliberate rearrangement of the cemetery. The remaining graves did not intercut, suggesting that they were marked in some way. The presence of two fragments of funerary sculpture at the site (SF3618 and AF9102) suggests funerary sculpture was present at the cemetery, though it is impossible to link these items with any specific grave.

The only possible surviving evidence for a marker is the small post-hole mid-way along the south-eastern side of grave 34133 (Figure 4), though if it is a marker, it would seem unusual to place this on the long edge of the grave as opposed to the shorter head or foot end.

Clearly in terms of layout pits 34047 and 31793/31905 relate in some way to the main row of burials at the 16-22 Coppergate site (Figure 5), possibly relating in some way to grave markers. The presence of two large stones in the uppermost fill of cut 31095, as depicted on Figure 5, may have acted as a base or support for some form of grave marker.

5.2.6   Family plots

Two burials at 16-22 Coppergate have unilateral, right-sided, spondylolysis, and a close kinship has been suggested for the individuals concerned (section 4.4.2). These burials were on different alignments, with Inhumation F being north-west / south-east and Inhumation C being south-west / north-east, and the two graves were also just over 5m apart. Clearly the two graves were not placed in direct relation to one another, indeed the differing alignments indicate that they belong to two differing phases of use within the cemetery.

The presence of these burials raises the possibility, however, that the cemetery, or at least this portion of the cemetery, was used by a single family throughout the life-span of the burial ground.

5.2.7   Other cemetery features

A possible explanation for the two intercut shallow pits to the south-east of grave 34089 is that they represent the position of trees or shrubs within the cemetery.

The precise function of the three small post holes near Inhumation A is less certain as these are randomly placed and do not form a line suggestive of any specific structure, such as a fence, within the cemetery.

5.3 Burial rite

Given the small number of burials recovered at 16-22 Coppergate, relatively little information can be determined regarding Roman burial rites, that said, all aspects of burial rites observed at the site have clear parallel in Roman York and beyond.

5.3.1 The use of coffins

By the later 2nd century, in Roman Britain as a whole, inhumations were often placed in wooden coffins (Philpott 1991, 53). The evidence for coffins is usually in the form of iron nails in lines suggestive of coffins, or the presence of a distinct coffin fill in a grave where no other evidence for a coffin survives, or the presence of a coffin stain indicating the position of the decayed woodwork; such stains are sometimes accompanied by iron nails. Survival of coffin wood is rare, though two examples are known from a 2nd-3rd century cemetery at Atlantic House, London (Weston 2003, xi). It should be remembered that coffins could be made entirely of wood, and that such items may leave no discernible trace, dependent upon soil conditions.

Evidence for wooden coffins is known across Britain. For example, in the Eastern Cemetery of London inhumations were generally in coffins (Barber and Bowsher 2000, 91). In Roman York 2,300 nails were present at the Trentholme Drive cemetery (Wenham 1968, 39), and nails indicative of coffins are also known from the County Hospital site, Fossgate, and from early to mid-3rd century burials at 26-28 Marygate (Ottaway 2011, 173-4, 137-8). In the case of the cemetery excavated between 2007-11 at Hungate, 13 graves contained nails, 54 contained nails and a coffin stain, a further three had nails, coffin fittings or brackets and a coffin stain, nine graves had a coffin stain, and one had a clear coffin backfill, though the coffin did not survive (YAT site archive project 5000 Document 1). A further burial at Hungate excavated in 2002 was associated with iron nails (Gustavsen 2002, 33).

Coffins remained widespread in the later Roman period. At Lankhills, Winchester, 245 of the burials had coffin nails, with anything from 6-62 nails per coffin, there were also 36 graves with coffin stains, 43 graves with indications of a coffin fill, and an additional 16 burials associated with nails though it was impossible to determine if these were evidence of a coffin or not (Booth et al. 2010, 45). In Phase 2 of the cemetery at Colchester, Essex, dating from 320-40 to 400+, most of the 669 graves contained evidence for coffins in the form of coffin stains and/or nails, though 62 of the burials were un-coffined (Crummy et al. 1993, 105, 120). Of the 25 4th century burials at 35-41 Blossom Street, York, nine were associated with coffin nails, with one burial having both a coffin stain and iron nails present (Ottaway 2011, 307-8). Against this, at some sites there was a decline in the use of coffins in the second half of the 4th century at some cemeteries, such as Kelvedon, Essex (Philpott 1991, 53).

Five of the six burials (Inhumations B-F) at 16-22 Coppergate were in wooden coffins, two having coffin stains and iron nails present, one having a coffin stain and two being associated with iron nails. The presence of wooden coffins at the site therefore conforms to the picture seen nationally. The presence of a coffin surviving as a stain with no associated nails is a reminder that nails can be constructed entirely of wood. The number of nails in any given

coffin at 16-22 Coppergate was low, being 3, 8, 4 and 2 for Inhumations B, C, E and F respectively.

5.3.2   Burial position

In Roman Britain as a whole, by the mid-2nd century inhumations were usually placed supine and extended, but there was considerable variation in the positioning of the arms, hands, legs and head, though It is unclear whether the positions of the limbs and head had any significance (Philpott 1991, 53).

For example, at Colchester, Essex, a range of arm positions were present (Crummy et al. 1993, Fig. 2.66), and in the case of Trentholme Drive, York, the report states 'It would be a waste of space to attempt to list all the different types [of burial position] encountered' (Wenham 1968, 38). Other cemeteries in York, at Wentworth House, 35-41 Blossom Street and Hungate, also showed considerable variation in the positions of the arms and hands (Ottaway 2011, 152, Fig. 224; YAT archive project code 5000 documents 1 and 3). In terms of burial posture, the 16-22 Coppergate cemetery fits this pattern, for while five of the six burials were supine and extended, there was clearly no standard position for the placing of the arms and hands.

Occasional burials laid on their side with flexed legs are known at various Roman cemeteries across Britain, such as at Colchester, Exeter, where one burial was placed on the side with flexed legs (Crummy et al. 1993, Fig. 2.66), while in York, two burials at Hungate (YAT archive project code 5000 document 3) and burials 184 and 194 at Trentholme Drive (Wenham 1968, Figures 9-10) were also placed on their side with flexed legs. Inhumation A at 16-22 Coppergate is clearly another example of such a burial. In the case of the Trenholme Drive cemetery it was suggested that some of the more unusual burial positions were the result of people being interred in the posture in which they died, as fixed by *rigor mortis* (Wenham 1968, 38), the same may be true of the 16-22 Coppergate flexed burial.

5.3.3   Clothing the dead

As textiles are rarely preserved, evidence of how the dead were clothed for burial is usually seen only by the presence of artefacts such as hobnailed footwear, metal objects such as brooches and belt fittings, and by items of jewellery such as beads, rings and bracelets.

The precise way in which the bodies at 16-22 Coppergate were dressed for burial is unknown. Although two of the burials at the site had evidence of clothing in the form of jewellery associated with female burial Inhumation A, and hob nailed shoes associated with Inhumation C, these seem to have been deposited in the grave rather than being worn by the deceased, they are therefore considered as grave goods rather than clothing and are discussed below.

5.3.4   Grave goods

Graves furnished with objects are widely known across Roman Britain. Pottery is the most common category of grave furniture, followed by personal ornaments, which are known from 233 and 200 sites across Britain respectively (Philpott (1991, 136, 440-46). In addition, there is abundant evidence in the form of hobnails for the placing of shoes within graves, which is known from 120 inhumation cemeteries (Philpott 1991, 167, 458-9).

Personal ornaments have been recorded at 200 Roman inhumations cemeteries, but at any given site such burials usually accounted for around 10% of the graves and no more than 20% of the total number of burials (Philpott (1991, 136). In the case of the Roman cemetery at

Colchester, Essex, 47 of the 669 burials had grave goods (Crummy et al. 1993, 129) representing 7% of the total, while at Poundbury, Dorset, the figure was 100 burials with grave goods out of 1327 graves (Farwell and Molleson 1993, 16,21, 39, 67) representing 7.5% of the total number of burials. At 16-22 Coppergate the figure is 17%, though the number of graves uncovered was small.

While grave furnishings could be interpreted as representing the status of the individual, it is also possible that they were provided to give sustenance, comfort or protection to the dead. Alternatively if an object was particularly closely associated with its owner it may have been deliberately buried to prevent any malign influence being transferred to a new owner (Barber and Bowsher 2000, 325). Certain categories of burial goods are often associated, in particular jewellery, with bracelets, beads and finger rings often being found in association (Philpott 1991, 131). It is also clear that personal ornaments and shoes could be either worn by the deceased, or could be unworn being placed in the coffin or in the grave cut outside the coffin (Philpott 1991, 142). Most examples of unworn ornaments nationally are of 4th century date (Philpott 1991, 147).

Grave goods were placed in the graves of three of the six burials at 16-22 Coppergate, though the objects present were different in each grave. The richest burial in terms of the number of objects present was a female, Inhumation A, associated with a jet ring, six glass beads and a hone. The ring and one of the beads were recovered near the head of the skeleton, five beads were recovered from a deposit of soil beneath the skeleton, implying that they were placed in the grave before the interment of the body, while the hone was from the grave fill. Clearly none of the jewellery was worn by the deceased. Inhumation C had a coin by the left leg and two pairs of hobnailed boots which were clearly placed adjacent to the feet. Inhumation D had a coin near the skull.

Coins

The placing of coins in graves is known across Britain. While the reason for placing coins in graves is not entirely understood, it may relate to the use of a coin to pay Charon to ferry the dead soul across the River Styx (Philpott 1991, 212). In general coins became more common with inhumations in the mid-late 2nd century, are rare in the early-mid 3rd century, increasing again after c. 260, and continuing into the 4th century, reflecting the greater number of small denomination coins in circulation (Philpott 1991, 211).

Examples of burials with coins include is a burial at Malton, North Yorkshire (Philpott 1991, 56, 148-9) and a coin by the leg of an elderly male, and a burial associated with six coins at Colchester, Essex (Crummy et al. 1993, 129). At the Eastern cemetery of London 21 burials were associated with coins (Barber and Bowsher 2000, 322) as were twenty burials in the late Roman cemetery at Poundbury, Dorset (Farwell and Molleson 1993, 67). A number of burials in York are also associated with coins, including 42 coins associated with burials from Trentholme Drive (Wenham 1968, 50), three graves at Hungate (YAT archive project code 5000, document 1), a burial at Nunthorpe, four at The Mount, two at Walmgate, one at Holgate, one at Marygate, one at the Old Station and four at the Railway Station (RCHMY 1962, 70, 80-2, 84, 86, 91, 96-7, 99, 101 and 108).

There is no standard position for the placing of coins within graves. A good example of this is the Eastern Cemetery, London, where coins were found by the throat, head, to the left hand side of the body, by the knees, at the ankles and by the feet (Barber and Bowsher 2000, 143, 201-2, 210, 223, 225 and 228). At Poundbury, Dorset, while 13 coins were located in the mouth, there was one was by the right clavicle, one at the foot end of the grave, one by the right hand, one by the right arm, one to the right of the neck, one by the legs, one by the left clavicle and one by the hip (Farwell and Molleson 1993, Table 8).

The two coins recovered at 16-22 Coppergate are also clearly in different positions within the grave, with the coin associated with Inhumation C being located by the right femur, and that associated with Inhumation D being underneath the skull. The latter may suggest that the coin was placed in the grave prior to the interment of the coffin.

The coin associated with Inhumation C dated to c. AD 300-310 and would clearly have been in circulation when the cemetery was in use. The same may not be true of the coin associated with Inhumation D, which dated to AD 117-138, approximately 220 years prior to the commencement of burial at 16-22 Coppergate. Either this coin was in circulation for a considerable period of time, or an old coin was deliberately chosen for inclusion with the burial.

Hone

The presence of a hone in association with Inhumation A at 16-22 Coppergate is unusual; none are reported among the many burials described in RCHMY (1962), or at Trentholme Drive (Wenham 1968), and none were present in the Roman cemetery at Hungate (YAT archive project code 5000, document 2). Philpott (1991, 186) does not report any hones associated with burials, but does mention whetstones for two graves at Norton, North Yorkshire, and one at Burbage, Wiltshire.

Glass beads

Examples of glass beads associated with burials include West Tenter Street, in the Eastern Cemetery at London (Philpott 1991, 145; Barber and Bowsher 2000, 219), at Poundbury, Dorset, where one of the graves had a bracelet of glass beads on the upper arm (Farwell and Molleson 1993, 16, 23, 67), and at Lankhills, Winchester, where there were four graves with strings of beads present, which were mainly of glass, but a coral bead and five stone beads were also present (Booth et al. 2010, 47). The presence of glass beads is also known from cemeteries in York including 16 glass beads from the Trentholme Drive cemetery (Wenham 1968, 98-9), a burial with a bracelet of glass beads and two marbled glass beads from Sycamore Terrace (RCHMY 1962, 73) and four burials with glass beads at Hungate (YAT archive project code 5000 documents 1-2).

Across Britain beads in graves are usually accompanied by other forms of jewellery, notably bracelets and rings (Philpott 1991, 147). Inhumation A at 16-22 Coppergate conforms to this pattern having both glass beads and a jet finger-ring present.

Bead necklaces could either be worn by the deceased, as in a grave at West Tenter Street, London, or placed within the coffin or grave as at Icklingham (Philpott 1991, 145, 147). The 16-22 Coppergate burial is of the latter type.

Finger Ring

Across Britain there are 24 sites where a finger-ring was clearly worn by the deceased, being located around a finger bone (Philpott 1991, 142). For example, rings were present on the fingers of burials in cemeteries at West Tenter Street in London, in Norton, North Yorkshire, at St Pancras, Chichester, and at Dunstable, Bedfordshire (Philpott 1991, 142, 144). In other cases, the finger-rings were clearly not worn by the deceased, but placed in the grave, as at Norton, North Yorkshire and St Bartholomew's Hospital, London (Philpott 1991, 147). The example from 16-22 Coppergate was clearly not worn, being recovered from near the skull of the burial.

While the burial with a ring at 16-22 Coppergate is female, the wearing of rings was not exclusive to females, as there is an example from Ilchester of a male burial wearing a finger ring (Philpott 1991, 144).

While the overwhelming majority of finger rings associated with burials were of metal, a few are of jet, as with the example from 16-22 Coppergate. Jet originated from Whitby, 72km to the north-east of York, the Romans probably collecting the stone from the shore as opposed to mining (RCHMY 1962, 141). In common with amber, jet becomes electric when rubbed, and in antiquity is had the aura of being magical (RCHMY 1962, 141). Both Pliny and Galen attributed healing properties to the stone (Allason Jones 1996, 15). British jet is first referred to by Gaius Julius Solinus who wrote in the late 2nd or 3rd century, stating

> *'jet is found in abundance and of very fine quality…black and like a jewel: as to its nature it burns in water and is extinguished in oil: as to its power, when made warm by rubbing it attracts things brought near to is as amber does'* (Allason-Jones 1996, 9)

Jet was used for the manufacture of a variety of jewellery items including rings, beads, bracelets, pendants and hair-pins. While jet may have been worked in 2nd century York, it became suddenly more popular in the 3rd century (Allason-Jones 1996, 9). Many examples of jet jewellery have been recovered from inhumation burials of 3rd to 4th century date, in particular in the area of the Railway Station, York (RCHMY 1962, 142, Plates 68-70).

Inhumation A at 16-22 Coppergate contained a jet finger ring. Within York jet rings are known from a burial at Hungate (YAT archive project code 5000 document 2), from two burials at York Station and one burial at Monkgate (RCHMY 1962, 71, 81, 85). A jet ring was also present at Trentholme Drive but this was too thick to have been a finger-ring, and was presumably a pendant (Wenham 1968, 98).

Footwear

Footwear associated with burials is known from 120 inhumation cemeteries across Britain which range in date from the mid-1st/2nd century onwards, with footwear in graves becoming more common from the late 2nd-early 3rd century onwards, with the majority of examples being 4th century in date (Philpott 1991, 167, 458-9). The evidence for shoes usually comprises hobnails, but in the 4th century cemetery of Lankhills, Winchester, 20 of the 112 burials with footwear had boot plates as opposed to hobnails (Booth et. al 2010, 45).

Burials in York associated with footwear include a burial of uncertain sex dating to c. 200-325 at 35-41 Blossom Street (Ottaway 2011, 298), a 2nd-3rd century male inhumation at 129

Holgate Road (Ottaway 2011, 334), 14 burials with shoes at Hungate, and a further ten graves associated with hobnails (YAT archive project code 5000 document 1).

The presence of footwear in graves implies that it was believed the dead would need shoes for their journey in the afterlife. Burials with shoes occur most frequently at smaller towns, rural sites and villas, being less common in the cemeteries of major towns and legionary fortresses; this may suggest that strong nailed footwear was more appropriate in rural areas where the population was engaged in rigorous activities, as opposed to the use of less substantial stitched shoes which would have been more appropriate in a town or within the home (Philpott 1991, 167, 171, 458-9). It should be noted that footwear which was entirely stitched would usually leave no trace, so it is possible that many more burials were originally associated with shoes.

Shoes could either be worn by the deceased, or placed within the grave, though from the mid-2nd to early 3rd century onwards shoes tended not to be worn (Philpott 1992, 168). For example, at the 3rd-4th century cemetery at Butt Road in Colchester the ratio of unworn to worn shoes is 3:1 (Philpott 1991, 168). At Lankhills, Winchester, 14 inhumations wore their shoes, a further 53 had scatters of nails at the feet suggestive of shoes being worn, but in 38 cases the shoes were unworn (Booth el al. 2010, 47). In the case of Hungate cemetery, York, two burials were clearly wearing the shoes, most of the remaining shoes were by the feet of the burial, though one example had the shoes by the left leg, one by the right leg, one by the right knee, and one beneath the feet and lower legs, while one example had the shoes in a separate box and one had shoes outside the coffin (N. Rogers pers. comm.).

Unworn shoes are usually at the foot end of the grave, as with Inhumation C at 16-22 Coppergate, where the shoes were at the foot end of the grave, though examples are known where the shoes are placed by the head, as at Kelvedon, Essex, or behind the knees as at Dunstable, Bedfordshire (Philpott 1991, 167). At Lankhills, Winchester, the shoes were usually placed adjacent to the legs within the coffin, though in 17 cases the shoes were outside the coffin and in one case the shoes were by the feet and a single hobnail was within held the left hand of the skeleton (Booth el al. 2010, 47). At Poundbury, Dorset, 43 graves had hobnails, which were usually at the feet, though four were in other locations within the grave, including by the head, by the left hand, a burial with a group near the knee and pelvis, and one with three groups of hobnails by the feet and along both upper arms (Farwell and Molleson 1993, 21, 99).

As it would be difficult to shroud a body wearing heavy boots, the placing of the shoes at the side of a burial may imply that it was wrapped in a shroud prior to interment. The use of shrouds, coupled with the increasing organisation of some late 4th century cemeteries, this has been taken as possible evidence for the use of semi-professional undertakers (Philpott 1991, 172).

Inhumation C at 16-22 Coppergate was buried with has two pairs of shoes, and again there are parallels elsewhere in Britain, with examples known with two and three pairs of shoes, including the example from Poundbury, Dorset already cited, and one early-mid-3rd century burial at Bredon Hill having six pairs of shoes placed by the feet, pelvis and head (Philpott 1991, 168).

The sex of the skeleton at 16-22 Coppergate adds to the known pattern of hobnail boots being largely associated with male burials. Nationally the majority of burials with hobnail boots are male, females accounting for just 31.4% of the total (Philpott 1991, 169).

The presence of both a coffin and hobnailed boots at 16-22 Coppergate is also paralleled elsewhere in Britain, for example at Lankhills, Winchester, and Fordington High Street, Dorset (Philpott 1991, 170).

5.4   Concluding remarks

The global interest which surrounded the Anglo-Scandinavian archaeology of 16–22 Coppergate has often masked the other periods of activity on the site. Some elements, such as the Coppergate Helmet, were able to generate interest and publicity due to a combination of their rarity and visual impact, but this was not always possible.

The Roman archaeology of the site is less well-known, only stratigraphic sequence at the site being published in 2011 (Ottaway 2011), though this publication did not include any osteological analysis. By providing all the evidence for the cemetery, including the osteological analysis, together with an analysis of the cemetery layout and burial rites in relation to other Roman cemeteries in York and elsewhere in Roman Britain it is hoped that the present report will highlight the small but significant cemetery at the 16-22 Coppergate site.

6   BURIAL CATALOGUE

The following section catalogues the information known for each burial, combining the site records, information from Hall et al. (2011, 213-6) and Mays (2003). For clarity the original site plans of the burials were digitised.

Inhumation A

Grave cut: 27957

Orientation: North-south. Shape: Sub-oval. Dimensions: approximately 1.7m x 0.8m, 0.25m deep. Base of grave at: 10.12m OD. Truncated, cut away at north end by later pit, south end of grave lies beyond limit of excavation.

Coffin: An iron nail (SF11006) adjacent to the knee of the skeleton.

Skeleton:

Skeleton Context(s): 31006/27447. Posture/ arm position: On left side, legs flexed. Sex: Female. Age: about 20-30 years (dental wear - Brothwell 1981). Completeness of skeleton: 40-60%. Preservation: Poor.

Pathology: The 4th and 5th lumbar vertebrae are ankylosed at their pedicles. Probably congenital block vertebrae.

There is a fissure in the superior part of the joint surface of the left acetabulum; this may represent a fracture of the joint surface. There are degenerative changes to the femoral head on this side, in the form of marginal osteophytes. The right acetabulum is partly in-filled with new bone and the joint surface is rather bumpy. The reason for these changes is obscure, but they may, like those at the other hip, reflect trauma. The right femur head is missing.

Dental information:

Dental formula skeleton 31006/27447

LEFT								RIGHT							
.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **- =** tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth

Grave goods:

1. Jet finger ring (SF9800). Recovered from context 27402, close to the skull.
2. Hone stone (SF10652). Sandstone hone recovered from context 27956. Dimensions 136 x 30mm, thickness: 20mm.
3. Glass bead (SF19142). Green glass bead recovered from context 31007. Dimensions 7mm in length. Diameter 9mm.
4. Glass bead (SF19143). Blue glass bead recovered from context 31007. Dimensions 8mm in length. Diameter 6mm.
5. Glass bead (SF19144). Blue glass bead recovered from context 31007. Dimensions 8mm in length. Diameter 10mm.
6. Glass bead (SF19145). White glass bead recovered from context 31007. Dimensions 5mm in length. Diameter 7mm.

7. Glass bead (SF19146). Glass bead recovered from context 31007. Dimensions 7mm in length. Diameter 10mm.
8. Glass bead (SF11677). Glass bead recovered from context 27402. Dimensions 6mm in length. Diameter 9mm.

Figure 10   Inhumation A. Scale 1:20
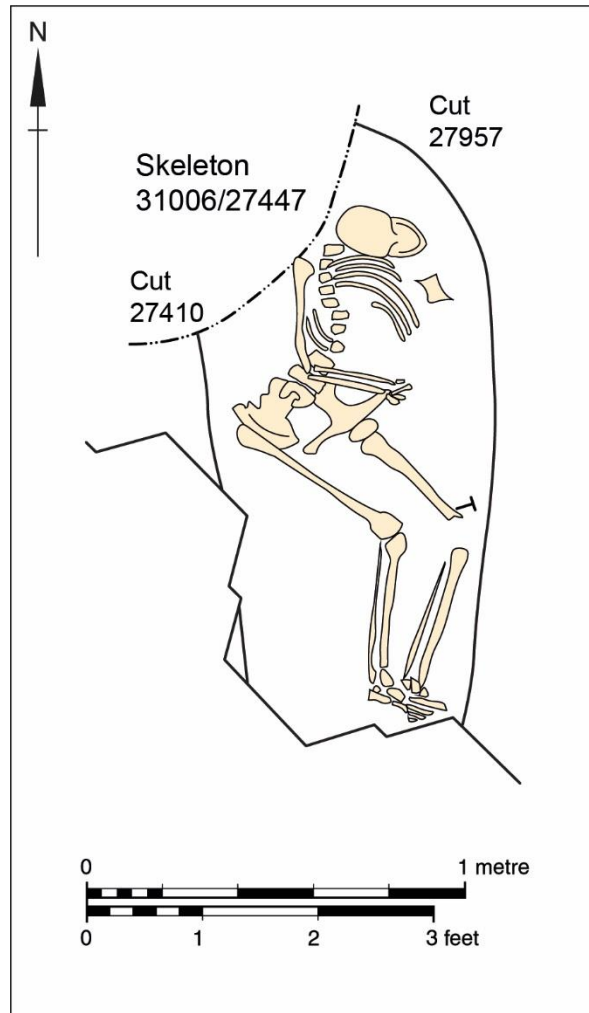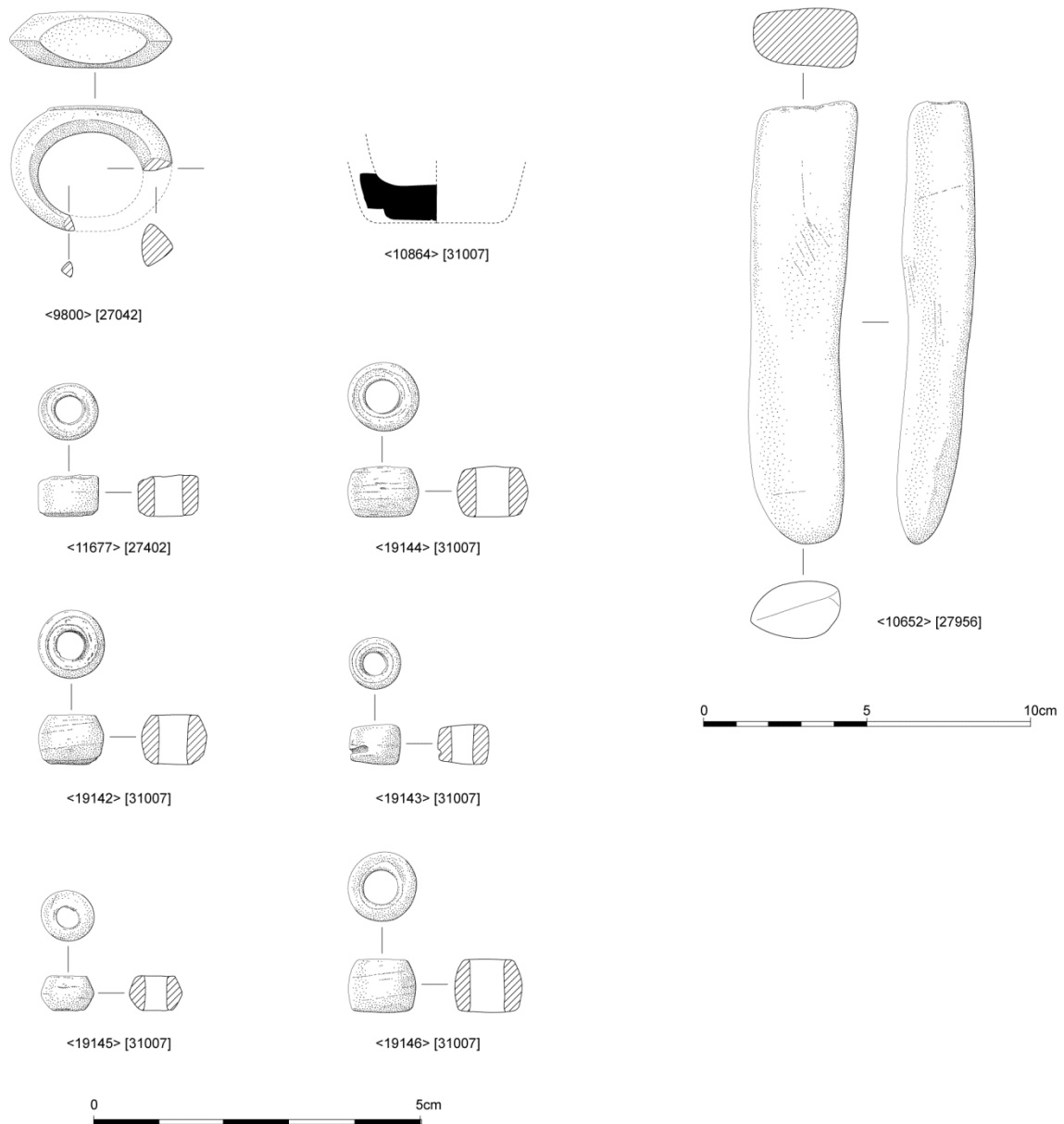
<9800> [27042]

<10864> [31007]

<11677> [27402]

<19144> [31007]

<19142> [31007]

<19143> [31007]

<19145> [31007]

<19146> [31007]

<10652> [27956]

0   5   10cm

0   5cm

Figure 11 Grave goods associated with Inhumation A

Inhumation B

Site plan 6103 showing burial

Grave cut: 34133

Orientation: South-west / north-east. Shape: Sub-rectangular. Dimensions: approximately 1.48m x 0.58m, 0.45m deep. Base of grave at: 8.81m OD. Truncated at south-west end by later pit, context 27478, from which a complete skull, almost certainly belonging to the skeleton, was recovered.

Coffin:

Represented by stain (34138). Estimated >1.34m x 0.45m. Also nails x 3 (SF12677) located at north corner of coffin close to the feet.

Skeleton:

Skeleton Context(s): 34147A and 27749 (skull). Posture/arm position: Supine, legs extended and parallel, both arms crossed over the pelvis. Sex: Probable Female. Age: about 20-30 years (dental wear - Brothwell 1981). Stature: 1.57m. Completeness of skeleton: 40-60%. Preservation: Well preserved.

Pathology: Congenital absence of both left and right upper and lower third molars.

Dental information:

Dental formula skeleton 37273/27749/34147A

LEFT								RIGHT							
0	X	.	X	X	X	X	X	X	X	X	X	.	.	.	0
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
0	X	.	.	.	X	X	X	X	X	X	X	X	.	X	0

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **-** = tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth

Grave goods:

No grave goods present.

Figure 12 Skeleton 34147A in Grave 34166, facing north-west, scale unit 0.2m
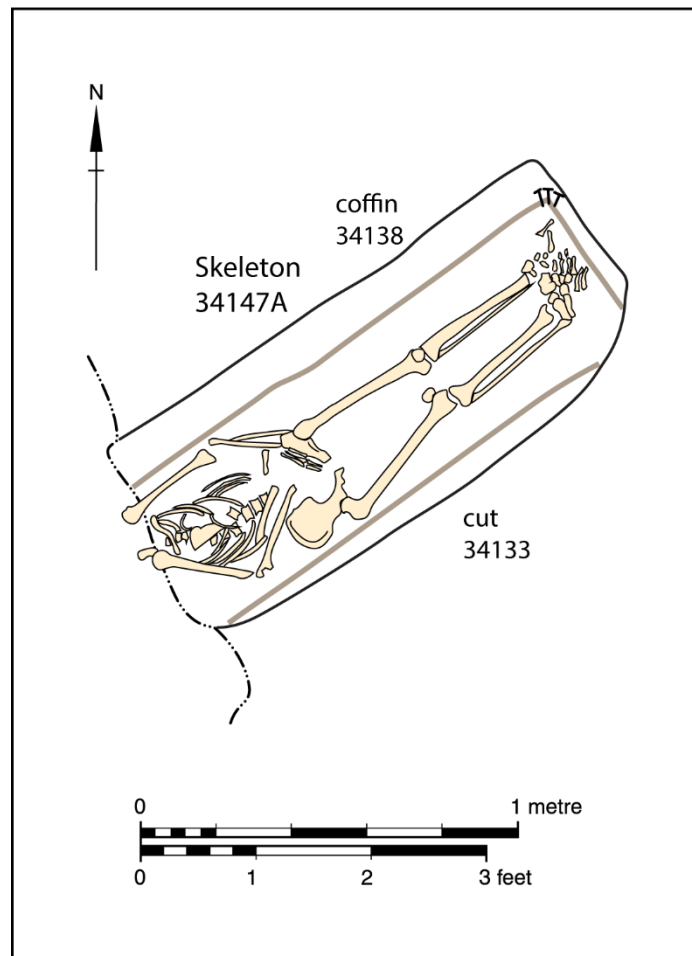
Figure 13 Inhumation B. Scale 1:20

Inhumation C

Grave cut: 34089

Orientation: South-west / north-east. Shape: Rectangular. Dimensions: approximately 1.84m x 0.48m, 0.2m deep. Base of grave at: 8.61m OD. Burial intact.

Coffin:

Iron nails x 8 (SF12659-60, SF12666-69, SF12684 and SF12694) suggest the body was have been contained in a wooden coffin.

Skeleton:

Skeleton Context: 34092. Posture/arm position: Supine, arms extended, legs extended and parallel. Sex: Male. Age: About 19 years (dental development - Mays 1998, Fig. 3.9). Stature: 1.62m. Completeness of skeleton: Almost complete. Preservation: Well preserved almost complete skeleton.

Pathology: A healed crush fracture is present to the 4th lumbar vertebra. The 6th cervical vertebra shows unilateral, right sided spondylolysis. The faces of the defect are smooth. The neural arch in the area of the pars interarticularis on the right side is much more slender than on the left. Cribra orbitalia of the porotic type is present in the eye orbits (Brothwell 1981, Fig. 6.17).

Dental information:

Dental formula skeleton 34092/34028

	LEFT							RIGHT						
X	.	.	.	.	X	X	.	X	X	.	X	.	.	.	X
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
.	.	.	.	.	.	.	X	.	X	X	.	.	.	.	.

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **-** = tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth

Grave goods:

1. Coin (34092, SF12639). An illegible copper alloy coin dated to c. AD 300–310 was recovered from close to the right femur of the skeleton. Dimensions: 22.5mm diameter. Weight 4.9g. This coin was too badly preserved to merit illustration.
2. Hobnailed shoes (34090). Remains of two pairs of shoes represented by iron hobnails. Found together to left of left foot at north-east end of the grave.
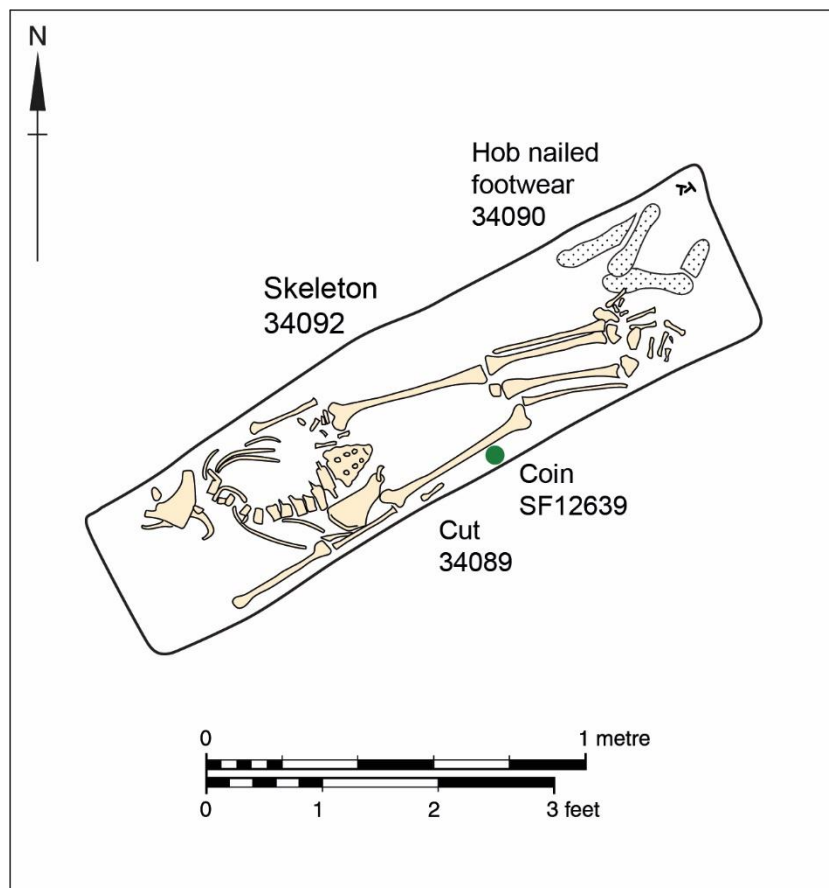
Figure 14   Inhumation C. Scale 1:20

Figure 15   Skeleton 34092 in Grave 34089, facing north-west, scale unit 0.2m

Figure 16 Grave 33089, two pairs of Hobnailed shoes 34090 by feet of Skeleton 33092, facing north-east, scale unit 10mm

Inhumation D

Grave cut: 33215

Orientation: South-west / north-east. Shape: Rectangular. Dimensions: approximately 2.6m x 1.1m, 1m deep. Base of grave at: 8.00m OD. Burial intact.

Coffin:

Represented by stain (33216). Estimated 2m x 0.35m and 0.25m deep.

Skeleton:

Skeleton Context: 33217. Posture/arm position: Supine, legs extended and parallel, both arms crossed over the pelvis. Sex: Probably male. Age: about 20-25 years (epiphysial fusion - Mays 1998, Fig. 3.11; dental wear - Brothwell 1981). Stature: 1.68m. Completeness of skeleton: Almost complete. Preservation: Well preserved.

Dental information:

Dental formula skeleton 33217

LEFT								RIGHT							
0	X	.	.	.	X	X	X	X	X	X	.	.	.	X	0
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
X	X	X	.	X	.	.	.	.	.	.	.	.	.	.	.

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **-** = tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth

Grave goods:

Copper alloy coin (33216, SF14088). An As, dated to AD 117-138, recovered from beneath the skull. Dimensions: 28.5mm diameter.

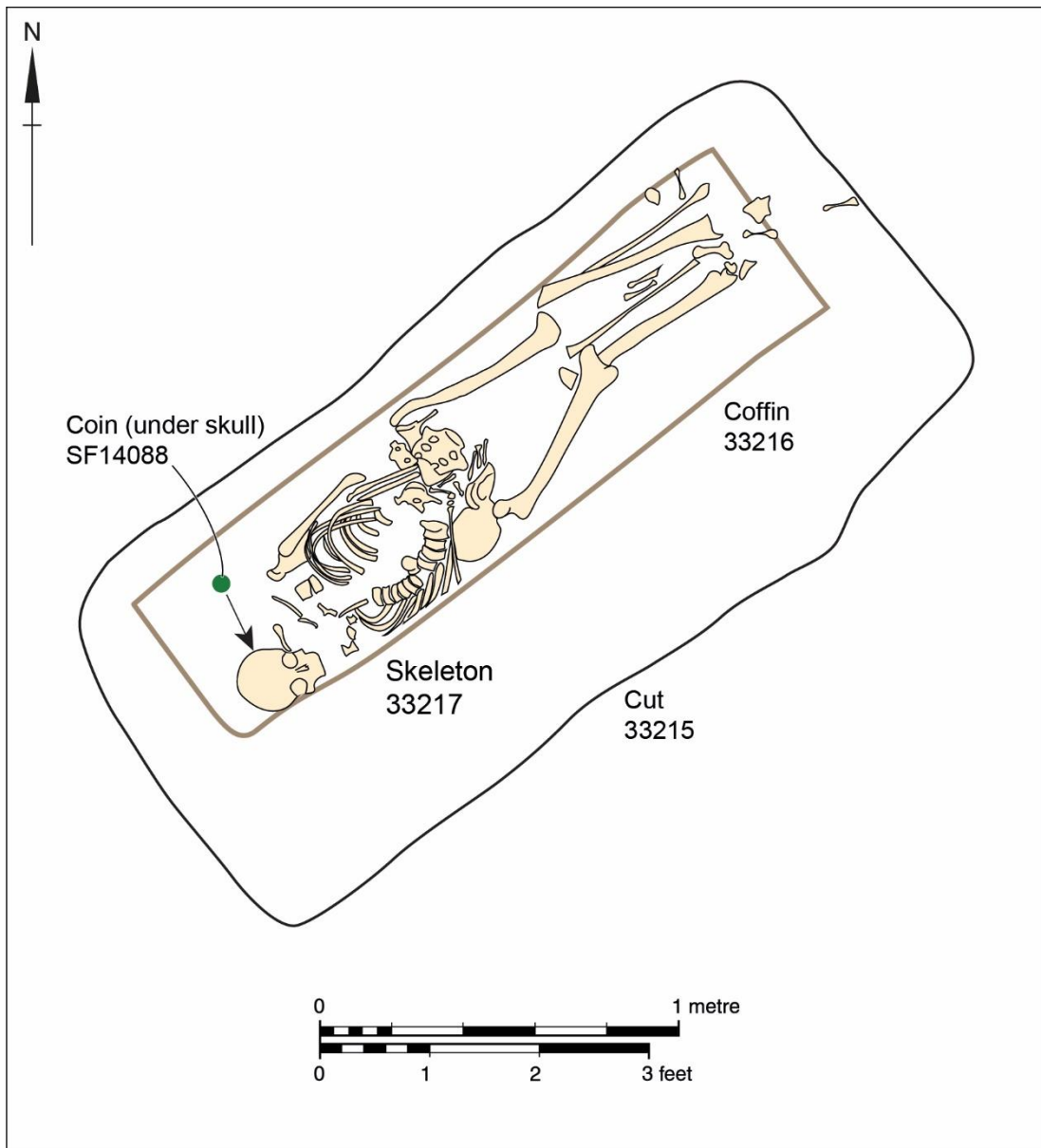**Figure 17   Skeleton 33217 in Grave 33215, looking S-W, 0.1m scale units**

Figure 18   Inhumation D. Scale 1:20

Figure 19   Obverse and Reverse of coin SF14088

Inhumation E

Grave cut: 33092

Orientation: South-west / north-east. Shape: Rectangular. Dimensions: approximately 2.3m x 0.8m, 0.5m deep. Base of grave at: 8.92m AOD. Truncated by later intrusions to the east.

Coffin:

Iron nails x 4 suggest the body may have been contained in a wooden coffin.

Skeleton:

Skeleton Context: 33104. Posture/arm position: Supine, left arm extended, right arm flexed at elbow with lower arm bent across pelvis, legs extended with left leg slightly flexed and turned out to left. Sex: Male. Age: about 35-45 years (dental wear - Brothwell 1981). Stature: 1.79m. Completeness of skeleton: Almost complete. Preservation: Well preserved.

Pathology: The right humerus lacks its medial epicondyle and its distal joint surface is enlarged compared with its counterpart on the normal left humerus. This may represent an avulsion injury of the epicondyle: either a fracture, or an epiphysial separation during the growth period (Resnick and Niwayama 1988, 2970-72). The increased size of the distal joint surface on the affected side could be viewed as compensatory remodelling.

The right 11th rib shows a fracture at its angle. It is firmly united, with little deformity.

The left mandibular condyle is enlarged and concave, with the normal, smooth joint surface replaced by sclerotic bone. The condylar fossa on the left temporal bone is partly filled with well-remodelled bone. The left side of the mandible equals the right in robusticity and there is no sign of a reduction in dental wear in the dentition of the left side. Therefore, the left TMJ pathology would seem not have interfered with mastication on this side. The cause of these changes is uncertain, although an aseptic necrosis of the mandibular condyle (Norman and Painter 1990) is one possible option.

There are large, articulating osteophytes on the left sides of the bodies of the 9th and 10th thoracic vertebrae. The lumbar vertebrae also bear similar, though somewhat smaller osteophytes. These are probably early changes associated with diffuse idiopathic skeletal hyperostosis, although they are insufficiently advanced to meet Rogers et al.'s (1987) criteria for diagnosing the disease in archaeological material.

The right 5th metatarsal is missing its tubercle, and the bone here is very roughened and irregular. Probably an avulsion fracture rather than an os vesalium

Dental information:

Dental formula skeleton 33104

		LEFT									RIGHT					
		A														
		C							C			C				
*	*	.	*	.	.	X	*	*	.	.	.	.	*	.	*
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
.	.	.	*	X	X	.	.	.	.	.	.	*	.	.	0

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **-** = tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth

Grave goods:

None.

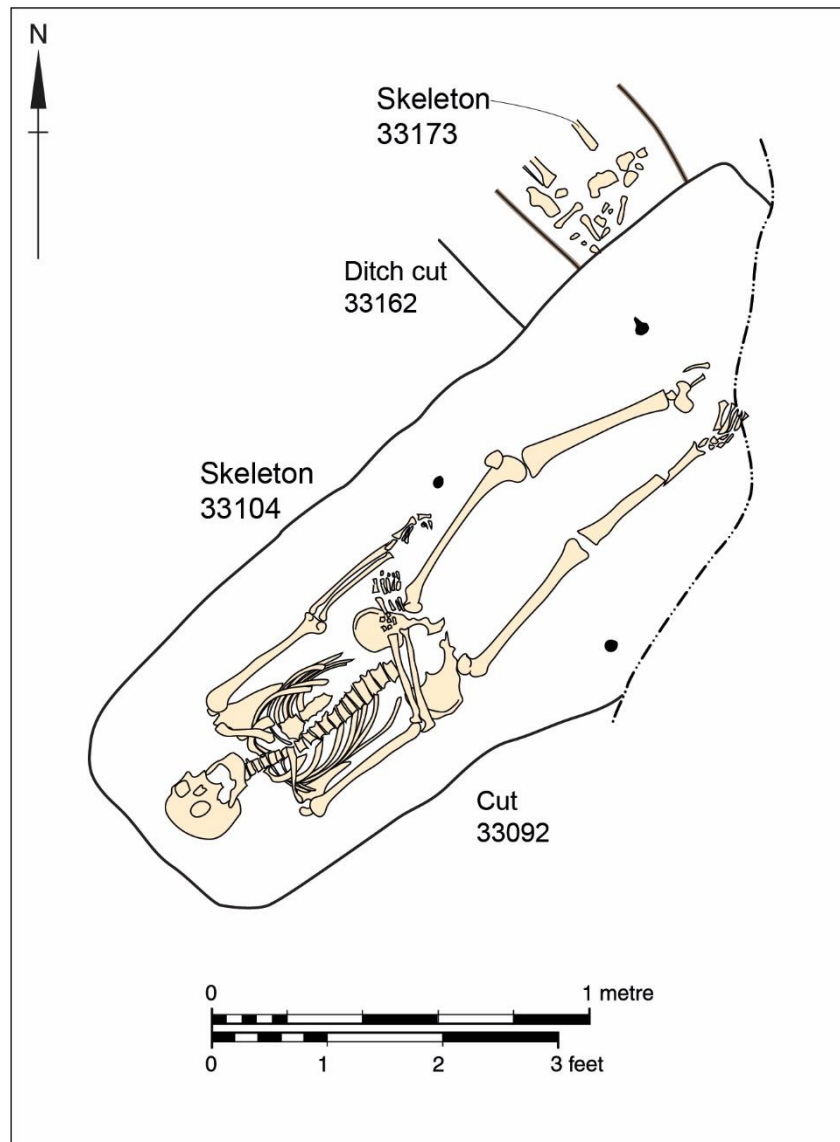**Figure 20   Skeleton 33104 in Grave 33092, facing south-west, scale unit 0.2m**

Figure 21   Inhumation E. Scale 1:20

Inhumation F

Grave cut: 33183

Orientation: North-west / south-east. Shape: Rectangular. Dimensions: approx. 1.9m x 0.5m, 0.25m deep. Base of grave at: No height data available. Truncated to south-east by grave 33092 and by later intrusions to east.

Coffin:

Represented by stain (33172), and iron nails x 2 (SFs 13720-21). Estimated approximately 1.9m x 0.4m and 0.25m deep.

Skeleton:

Skeleton Context: 33173. Posture/arm position: Supine, legs extended and parallel, both arms crossed over the pelvis. Sex: Male. Age: 17-18 years (dental development - Mays 1998, Fig. 3.9). Completeness of skeleton: Almost complete. Preservation: Well preserved.

Pathology:

The fifth lumbar vertebra shows unilateral spondylolysis on the right side. The faces of the defect are of pitted, porous bone. The lamina on the affected side is more slender than on the left.

Dental information:

Dental formula skeleton 33173

LEFT								RIGHT							
X	.	.	.	X	.	X	X	X	X	X	X	X	.	.	.
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
.	.	.	X	X	X	X	X	X	X	X	X	X	X	.	.

Key: **0**=congenital absence of tooth; **.**=tooth present in socket; **X**= tooth lost post-mortem; **U**= unerupted tooth; **-** = tooth and socket missing post-mortem; **C**= caries cavity; **A**= periapical void; **E**= erupting tooth
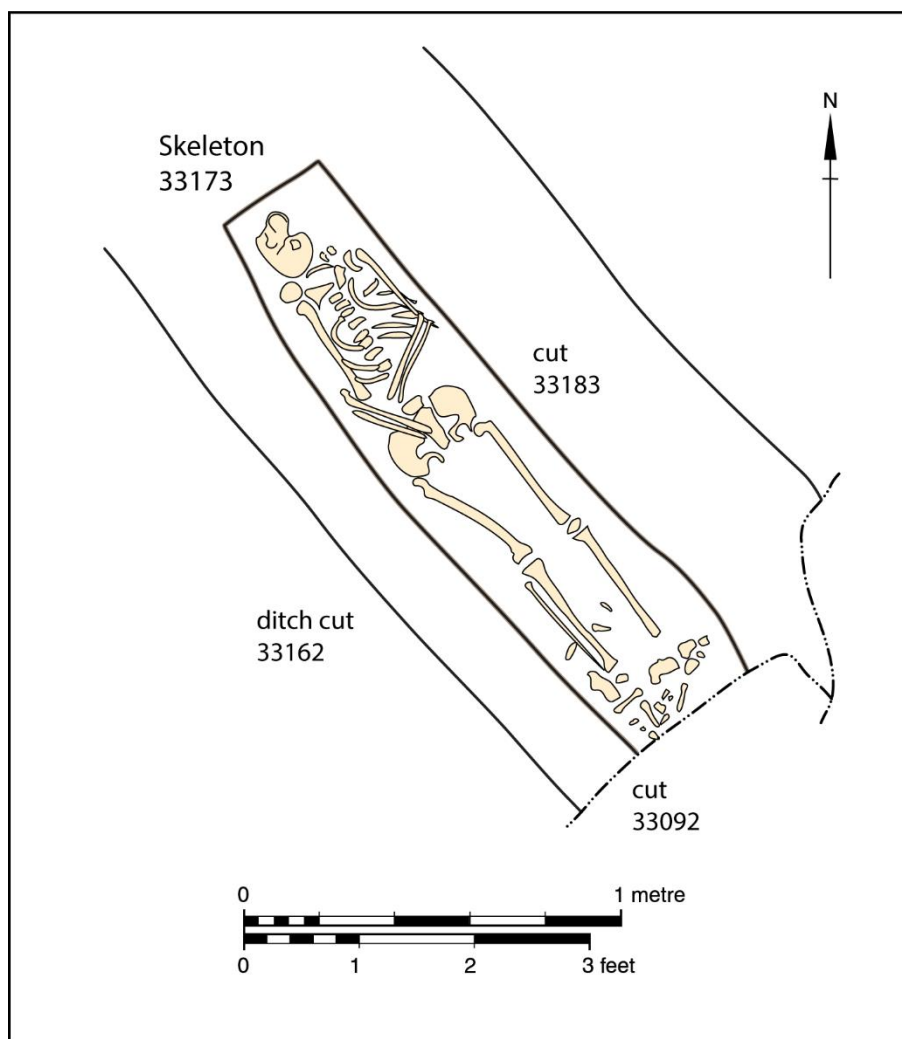
Grave goods:

None.

Figure 22   Inhumation F. Scale 1:20

Figure 23   Skeleton 33173 in Grave 33183, facing south-west, scale unit 0.l2m

REFERENCES

Documentary sources

Manuscripts

Evans, D. T., 1997. *16–22 Coppergate Excavations, 1976–81, Roman Contexts*, Unpublished Level III Archive Report, York Archaeological Trust

Mays, S., 2003. *The Roman and Saxon Burials from York Coppergate*, Ancient Monuments Laboratory report prepared for YAT.

Archive documents

1. YAT project 5000 document 'human bones.xlsx'

2. YAT project 5000 document 'burials searchable 1st draft.xlsx'

3. YAT project 5000 document 'Block H Roman burials_final.ai'

The YAT site archive for project 5000 was also consulted, namely all the context cards relating to coffins.

Published works

Alcock, J., 1996. *Life in Roman Britain* (London)

Allason-Jones, L., 1996. *Roman Jet in the Yorkshire Museum* (York)

Barber, B. and Bowsher, D., 2000. *The Eastern Cemetery of Roman London Excavations 1983-1990*, MOLAS Monograph **4** (London)

Berry, A. C. and Berry, R. J., 1967. 'Epigenetic Variation in the Human Cranium', *Journal of Anatomy* **101**, 316–379

Booth, P, Simmonds, A., Boyle, A., Clough, S., Coole H. E. M. and Poore, D., 2010. *The Late Roman Cemetery at Lankhills, Winchester, Excavations 2000-2005*, Oxford Archaeology Monograph **10** (Oxford)

Brinklow, D., Hall, R. A., Magilton, J. R. and Donaghey, S., 1986. *Coney Street, Aldwark and Clementhorpe, Minor Sites, and Roman Roads,* The Archaeology of York **6/1** (London)

Brothwell, D.R., 1981. *Digging Up Bones 3rd edition* (Oxford)

Carver, M. O. H., Donaghey, S. and Sumpter, A. B., 1978. *Riverside Structure and a Well in Skeldergate and Buildings in Bishophill*, The Archaeology of York **4/1** (London)

Crummy, N., Crummy, P. and Crossman, C., 1993. *Excavations of Roman and Later cemeteries, churches and monastic sites in Colchester 1971-88*, Colchester Archaeological Report **9** (Colchester)

Farwell, D. E. and Molleson, T. I., 1993. *Poundbury, Volume 2, The Cemeteries*, Dorset Natural History and Archaeological Society Monograph Series Number **11** (Dorchester)

Finnegan, M., 1978. 'Non-Metric Variation of the Infracranial Skeleton', *Journal of Anatomy* **125**, 23-37

Gustavsen, L., 2002. *Archaeological Investigation Former TVA Compound, Hungate, York*, Field Archaeology Services Preliminary Report

Hall, R. A., Evans, D. T., Hunter-Mann, K. and Mainman, A. J., 2014. *Anglo-Scandinavian Occupation at 16-22 Coppergate: Defining a Townscape,* The Archaeology of York **8/5** (York)

Hall, R.A., Evans, D. T. and Ottaway, P., 2011. '16-22 Coppergate', in P. Ottaway *Archaeology in the Environs of Roman York: Excavations 1976–2005*, The Archaeology of York **6/2** (Dorchester), 199-221

Lodwick, L. A., 2017. 'Evergreen plants in Roman Britain and beyond : movement, meaning and materiality', *Britannia* **48**, 135-173

Mackinder, A., 2000. *A Romano-British Cemetery on Watling Street: Excavations at 165 Great Dover Street, Southwark, London*, MOLAS Archaeology Studies Series **4** (London)

Macnab, N. and McComish. J. M., 2000. *Hungate Development, York, Report on an Archaeological Evaluation*, York Archaeological Trust Fieldwork Report **2000/27**

Mainman, A., 2019. *Anglian York* (Pickering)

Mays, S., 1998. *The Archaeology of Human Bones* (London)

McComish, J. M., 2012. *An Analysis of Roman Ceramic Building Material from York and its Immediate Environs*, MA dissertation, The University of York

Merbs, C. F., 1996. 'Spondylolysis and Spondylolisthesis: A Cost of Being an Erect Biped or a Clever Adaptation? ', *Yearbook of Physical Anthropology* **39**, 201-228

Monaghan, J., 1997. *Roman Pottery from York*, The Archaeology of York **16/8** (York)

Norman, J. E. and Painter, D. M., 1990. 'Unusual Surgical Diseases and Disorders', in J. E. Norman, and P. Bramley (eds), *A Textbook and Colour Atlas of the Temporomandibular Joint* (London)

Ottaway, P., 1996. *Excavations and Observations on the defences and Adjacent Sites, 1971–1990,* The Archaeology of York **3/3** (York)

Ottaway, P., 1999. 'York: The Study of a Late Roman Colonia', in H. Hurst (ed.), *Journal of Roman Archaeology Supplementary Series Number Thirty-Six, The Coloniae of Roman Britain New Studies and a Review Papers of the conference held at Gloucester on 5-6 July, 1997* (Gloucester; Rhode Island), 136-150.

Ottaway, P., 2011. *Archaeology in the Environs of Roman York: Excavations 1976–2005*, The Archaeology of York **6/2** (York)

Ottaway, P., 2013. *Book of Roman York* (Stroud)

Pearce, J. 2011. 'Marking the dead: Tombs and Topography', in M. Carroll and J. Rempel (eds) *Living Through the Dead Burial and Commemoration in the Classical World* (Oxford and Oakville), 134-58

RCHMY, 1962. *An Inventory of the Historical Monuments in the City of York: Vol.1: Ebvracvm. Roman York* (London)

Resnick, D. and Niwayama, G., 1988. *Diagnosis of Bone and Joint Disorders 2nd edition* (London)

Rives, J. B., 2007. *Religion in the Roman Empire* (Oxford)

Rogers, J., Waldron, T., Dieppe, P. and Watt, I., 1987. 'Arthropathies in Palaeopathology: The Basis of Classification According to Most Probable Cause', *Journal of Archaeological Science* **14,** 179-193

Swan, V. G. and McBride, R. M., 2002. 'A Rhineland Potter at the Legionary Fortress of York', in M. Aldhouse-Green and P. Webster (eds), *Artefacts and archaeology: aspects of The Celtic and Roman world* (Cardiff), 190-215

Waldron, T., 1992. 'Unilateral Spondylolysis', *International Journal of Osteoarchaeology* **2,** 177-181

Weston, S., 2003. *An Excavation in the Western Cemetery of Roman London, Atlantic House, City of London*, MOLAS Archaeology Studies Series **7** (London)

Wiltse, L. L., Widell, E. H. and Jackson, D. W., 1975. 'Fatigue Fracture: The Basic Lesion in Isthmic Spondylolisthesis', *Journal of Bone and Joint Surgery* **57A**, 17–22

Internet References

British Geological Survey (BGS), http://www.bgs.ac.uk, accessed 04/01/18

Constitution Society, https://www.constitution.org/sps/sps01_1.htm, accessed 04/01/18

Vatican state, https://www.vaticanstate.va/it/monumenti/musei-vaticani/cortili-vaticani.html, accessed on 10/01/2020

ACKNOWLEDGEMENTS

YORK ARCHAEOLOGICAL TRUST

York Archaeological Trust undertakes a wide range of urban and rural archaeological consultancies, surveys, evaluations, assessments and excavations for commercial, academic and charitable clients. We manage projects, provide professional advice and fieldwork to ensure a high quality, cost effective archaeological and heritage service. Our staff have a considerable depth and variety of professional experience and an international reputation for research, development and maximising the public, educational and commercial benefits of archaeology. Based in York, Sheffield, Nottingham and Glasgow the Trust's services are available throughout Britain and beyond.

© York Archaeological Trust