REPORT ON THE EXCAVATIONS AT ALDBOROUGH (*ISURIUM BRIGANTUM*), 2017: THE *FORUM*

by Rose Ferraby and Martin Millett[1]

With contributions from Agnese Benzonelli, Richard Brickstock, Jeremy Evans, Stephen Greep, Vicki Herring, Marcos Martinón-Torres, Philip Mills, Gwladys Monteil, Jess Ogden, Dominic Powlesland, Vida Rajkovača, Donna & Gigi Signorelli, Collette Smith and Lieven Verdonck

Limited excavation revealed part of the northern range of the forum *of the Roman town of* Isurium Brigantum*, first excavated in 1770. It confirmed the accuracy of the eighteenth-century plans, and the trench showed that occupation began in the A.D. 70s, with evidence for timber structures facing the road from York. The* forum *was constructed as part of a larger programme of town planning* c. *A.D. 120. There is evidence for changed use of the building with industrial activity in the later fourth or fifth century.*

INTRODUCTION

This excavation was the second in a series undertaken as part of the Aldborough Roman Town Project that sought to further understanding of the Roman town through the re-examination of past excavation areas. These excavations were initiated as a second phase of research into the Roman town following our extensive surveys of the town (Ferraby and Millett 2020a) and the preparation for publication of the results of field-walking in its environs in the 1980s and early 1990s (Dobinson *et al.* 2018; Millett *et al.* 2018). The overall aim of this campaign was to provide a better understanding of the chronology of the Roman town through interventions that had a limited impact on the preservation of the site. They were also designed to provide new information to enable us to assess the nature and quality of previous excavations, and to evaluate the current condition of the structures exposed in them. The initial targets for re-excavation were (i) the areas around the mosaics displayed in the English Heritage site, (ii) the north range of the *forum* in front of the church, and (iii) buildings found in the 1920s in the northern part of the town. Work in 2017 concerned the second of these.

Although the site falls within the general area of the Aldborough Roman Town Scheduled Ancient Monument (SAM 1003133), our trench lay within the curtilage of the public

[1] This report is our definitive report on the site and supersedes the interim report on the excavation (Ferraby and Millett 2018) already published on-line
https://www.repository.cam.ac.uk/handle/1810/292637
OASIS ID-roseferr2-304482.

highway which is excluded from the scheduled area, so Scheduled Monument Consent was not required for this excavation. However, as the trench was located within the area defined as the highway, it was subject to tight control under the terms of a Temporary Excavation Consent granted by North Yorkshire County Council under section 171(1) of the Highways Act 1980. The digital archive for this excavation can be found on the Cambridge University Library Apollo Archive[2], and the finds archived at the English Heritage Store in Helmsley, North Yorkshire.

BACKGROUND

The excavation was located on the grass verge on the southern side of Low Road (Fig. 1), adjacent to the northern churchyard wall of St Andrew's Church, *c.* 30m east of the gate (SE 4062 6644; Ferraby and Millett 2020a, gazetteer nos 6 and 105).

Figure 1: Location of the trench.

Archaeological remains in this area were first recorded in the eighteenth century by William Stukeley in his *Itinerarium Curiosum* (1776, 73–74) where he notes that at the time of his

[2] The digital archive of this excavation is available at the Cambridge University Library Apollo Archive: https://www.repository.cam.ac.uk/handle/1810/337401
Ferraby *et al*. 2022: https://doi.org/10.17863/CAM.84093

visit to Aldborough in the earlier eighteenth century ‘There has been some very great buildings in the street before the church; for many stones were taken up there, many remain. We saw some at the church-yard gate, and at people’s doors…’. These structures were exposed and recorded during work to rebuild the churchyard wall between 16 and 20 July 1770 as reported in *The Oxford Times* for 28 July 1770. This work is recorded in two surviving plans (Figs 2 and 3). The first plan is in one of the notebooks of William Hargrove (Hargrove MS vol. III, 90) and seems to have been produced by his father, the antiquarian Ely Hargrove (as discussed by Ferraby and Millett 2020a, 17–18). The second plan, which is clearly related to the first, was published in Richard Gough’s edition of Camden’s *Britannia* (1789, vol. III, 61, Pl. III). He records that excavation ‘discovered a double row of stone walls parallel to each other and joined by transverse ones. The side walls extend nearly from the south-east to north-west above 220 feet, at the distance of 18 feet. They are all strongly cemented, and three feet thick, and five feet below the present surface. A drain crossed them nearly about the middle, the top and sides composed of tiles 16 inches by 11 ½ and one inch and half thick… At **e** was found an urn, and at **a** a gold coin of Trajan, IMP. TRAIANO AVG. GER. DAC. P. M. TR. P. COS. VI. P.P. rev. a figure standing holding in its right hand a patera, in its left an ear of corn, S. P. Q. R. OPTIMO PRINCIPI.’ The findspots noted in his text are not actually shown on his plan, but do appear on Hargrove’s. These structures clearly indicate the presence of a substantial public building, which was first recognized as the north range of the town’s *forum* by J.N.L. Myres, K.A. Steer and A.M.H. Chitty (1959, 5).

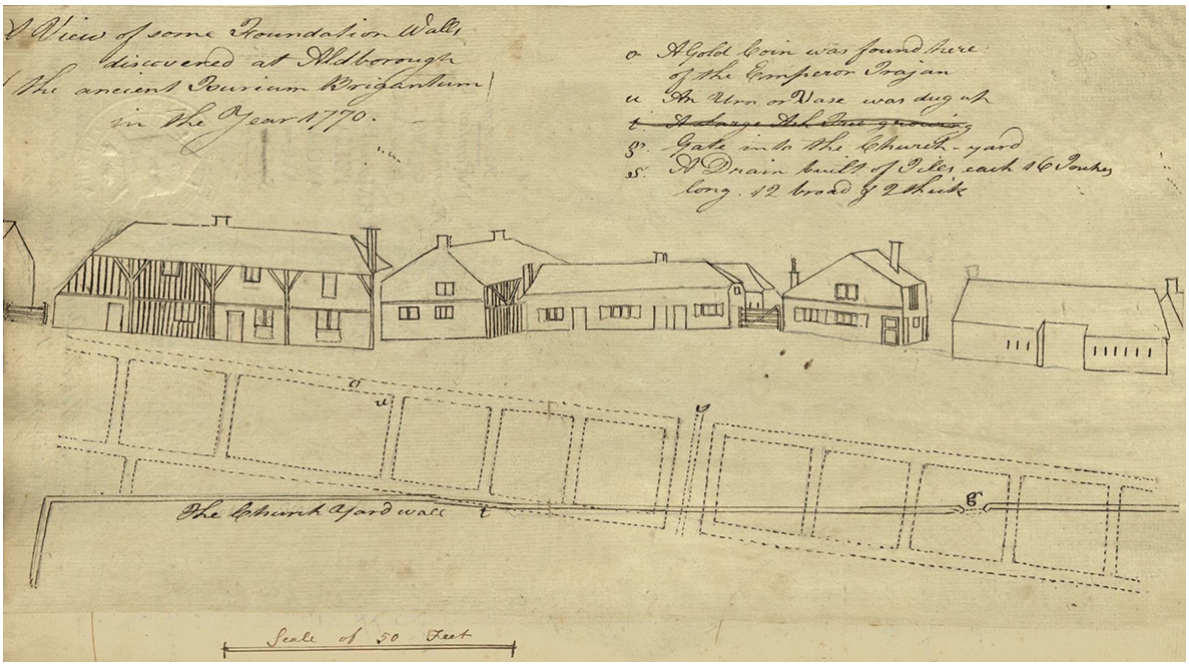

Figure 2: Plan of the forum excavation of 1770 from a manuscript by W. Hargrove. (Reproduced from an original held by City of York Council/Explore Libraries and Archives Mutual, York: Manuscript GB 192 HAR).

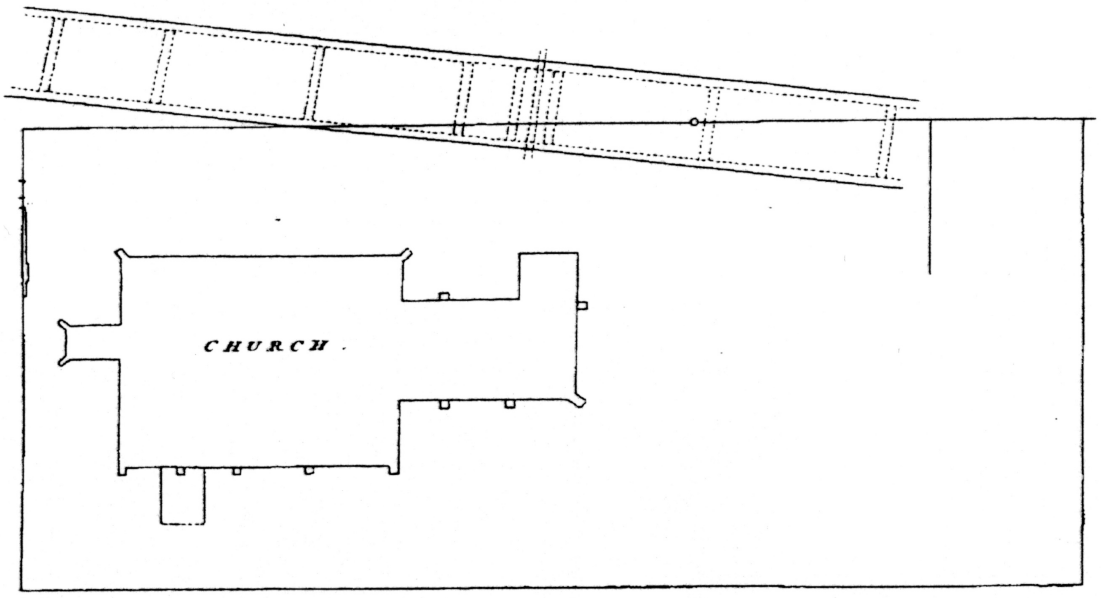

Figure 3: Plan of the forum excavation of 1770 as published by Gough 1789.

In the context of our survey of the Roman town, neither the churchyard nor the grass verge beside the road were suitable for magnetometry survey, so we instead deployed Ground Penetrating Radar (G.P.R.) (see Fig. 4). This work was undertaken in two phases, with the churchyard itself surveyed by Jess Ogden in 2012–13 and the grass verge and road surveyed by Lieven Verdonck in 2015 (available in the digital archive). The initial survey of the churchyard demonstrated that the medieval church had been constructed within the *forum* square, and identified the likely extent of the west range of the *forum* as well as its southern enclosure wall (Fig. 40). The survey in 2015 tentatively confirmed the locations of the transverse walls in the north range as recorded in 1770. This encouraged us to plan a small scale re-excavation in 2017 to examine these walls, to establish their exact orientation, and to evaluate the building's chronology. The overall results of this work have been already used as the basis for a basic reconstruction of the plan of the *forum* and its relationship to the town's development (Ferraby and Millett 2020a, 100–02, 106–07).

Figure 4: Interpretation of GPR results around St Andrew's Church. The red lines indicate walls - the lighter is a weaker signal, the darker a stronger signal. (Drawing: Rose Ferraby)

METHODS

The area available on the grass verge was highly constrained by the presence of the road, churchyard wall, and services (Fig. 5). By mapping the latter from the G.P.R. survey, we were able to select an area in which to dig a trench 12m by 1m placed to locate certain of the walls indicated in the 2015 survey. In the event, the trench had to be narrowed further to 0.60m, because of a nineteenth-century drainage pipe running along its northern edge. The trench was dug entirely by hand in order to understand the full sequence of deposits, but also to work carefully around services (Fig. 6).

The excavation was recorded using a single context recording system, drawings were made by hand and features were additionally recorded with the Total Station. The excavated trench was also recorded using photogrammetry by Dominic Powlesland (Landscape Research Centre), georeferenced using targets whose locations had been recorded using the Total Station (Fig. 7). Finds were collected for each context by hand and environmental samples were taken for flotation. Bulk finds have been recorded by weight and count. The spoil was screened by metal-detector, but owing of constraints of space it was not possible to follow our normal practice of dumping the spoil by separate contexts to allow the accurate provenancing of any such finds.

Figure 5: (top) Location of the trench, between church, road and services (facing west).
Figure 6: (left) Gigi and Donna Signorelli and Martin Millett digging (facing east).
Figure 7: (right) Gigi Signorelli and Dominic Powlesland carry out the photogrammetric survey.

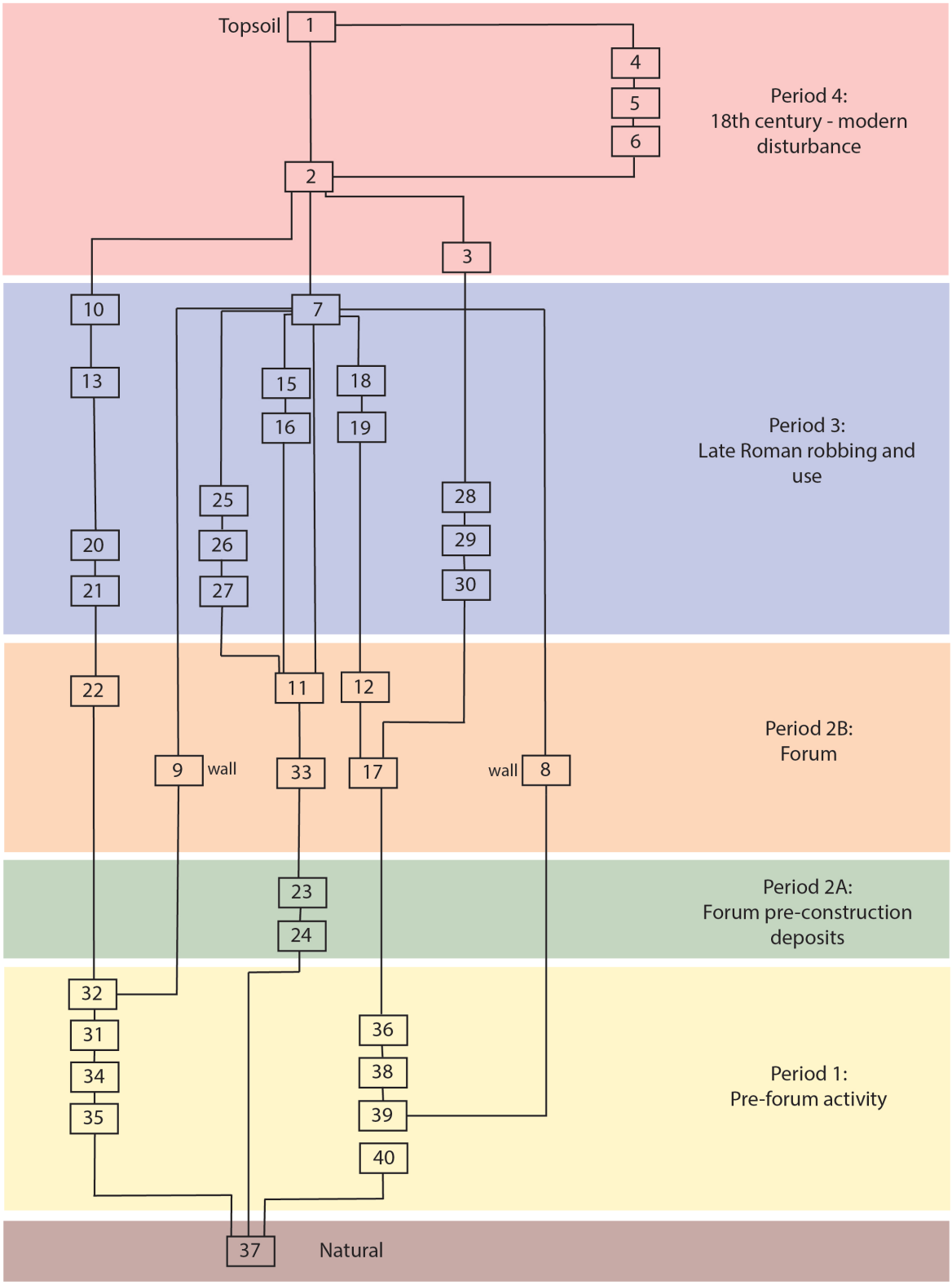

Figure 8: Stratigraphic matrix.

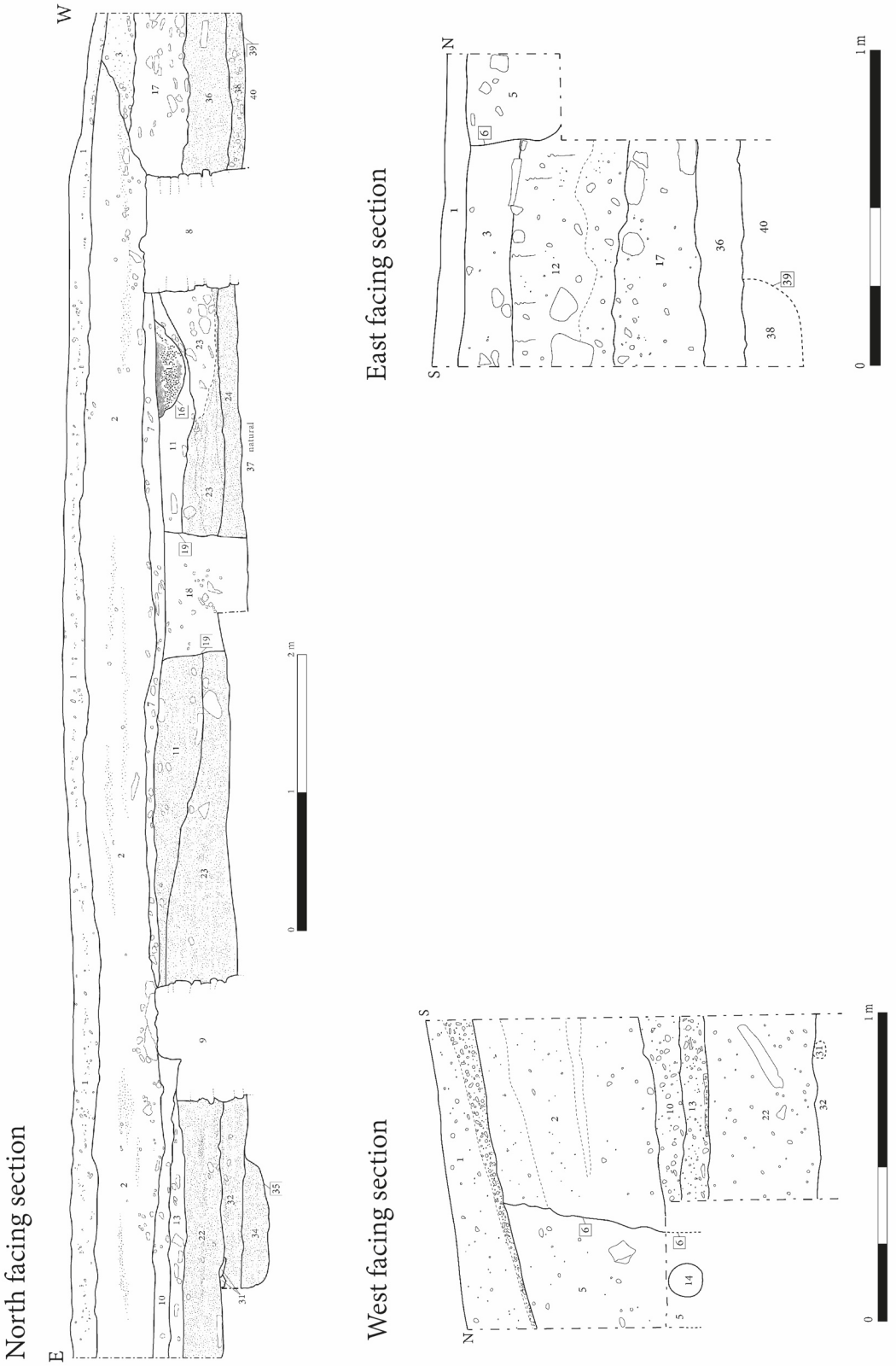

Figure 9: Main trench sections (Drawing: Rose Ferraby)

Figure 10 (top): Plan view from 3D model (Image: Dominic Powlesland).
Figure 11 (below): Section view from 3D model (Image: Dominic Powlesland).

THE EXCAVATED SEQUENCE

Despite the very constrained area, the excavation was successful in all its objectives, with more than half of the length of the trench taken down to the surface of the natural subsoil at a depth of 1.38m (*c*. 20.5m AoD). The excavated sequence is shown in the stratigraphic matrix (Fig. 8) and may be summarized as follows. It should be noted that the earlier strata were separated into three areas by the Period 2B walls. See Figure 9 for the main trench sections, and Figures 10 and 11 for the plan and section views from the 3D model.

PERIOD 1:
(see Fig. 14)
At the bottom of the sequence the mottled yellowish-red natural sand [37] was overlain by a shallow accumulation [40] and surface [32] which seems to correlate with [36] further west. The natural had been cut by two features. At the eastern end of the trench a linear cut feature [35], surrounded by a packing stones [31] and filled with sand [34], is probably a beam slot orientated with the axis of the trench (Fig. 12). At the western end of the trench another linear cut feature was located continuing under the southern side of our trench. Its cut [39] represents either the lip of a ditch or another beam slot also aligned with the axis of the trench. It was filled with clay and small stones [38]. The very small assemblage of pottery indicates that occupation began during the Flavian period.

Figure 12: Linear feature [35] with stones [31] visible on the left. The horizontal staining represents a burnt timber (seen here pre-excavation).

PERIOD 2A:

The Period 1 deposits were sealed by a thick layer of redeposited silty clay sand [23 & 24]. The lower layer [24] was level and undisturbed (see Fig. 13), the upper [23] had an uneven surface with some evidence of disturbance. These deposits seem to form a levelling preparatory to the construction of the *forum* and through which the *forum* walls were cut in Period 2B. This material is presumably redeposited as a result of terracing in preparation for the construction of the *forum* and, in this context, we may note that to the south, the creation of terrace for the *forum* square would have involved a significant cutting into the hill slope. Some of the material forming the upper deposit [23] probably also represents material derived from the cutting of the foundation trenches for the *forum* walls (Period 2B). The small assemblage of pottery is dated to no later than *c.* A.D. 120, a date that is compatible with that of the coin found in 1770 (see below).

Figure 13: Levelling layer [24] visible cut by wall [9] (looking east).

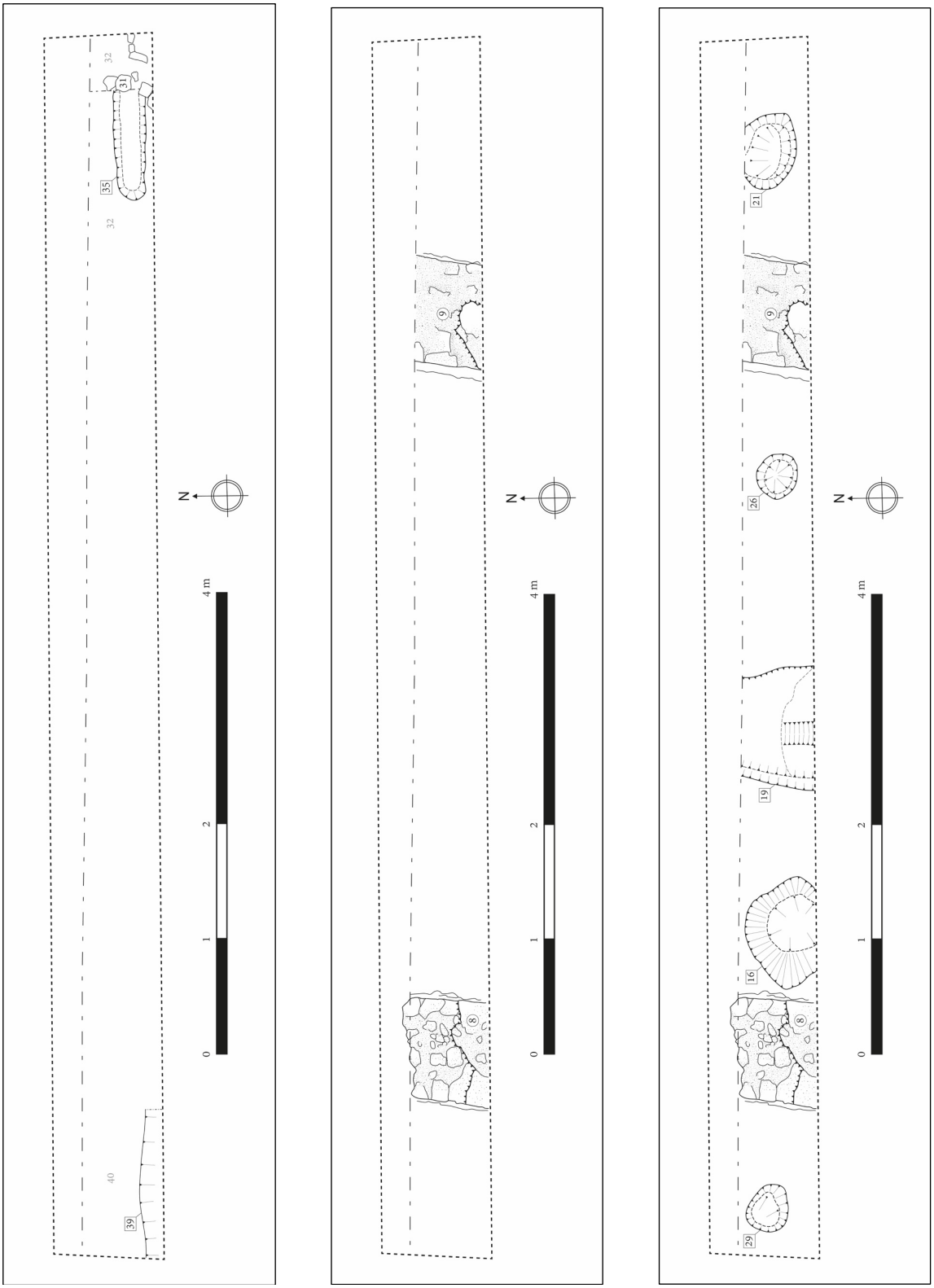

Figure 14 (top): Plan of Period 1 (Drawing: Rose Ferraby).
Figure 15 (middle): Plan of Period 2B (Drawing: Rose Ferraby).
Figure 16 (bottom): Plan of Period 3 (Drawing: Rose Ferraby).

PERIOD 2B:

(see Fig. 15)

The construction of the *forum* is represented by a pair of north–south walls [8 and 9] walls (see Fig. 15), each *c.* 0.9m wide constructed in an identical manner (see Figs. 17 and 18). Each was built in a foundation trench the base of which was lined with layers of large river cobbles. Above this, were three courses of roughly squared stone, each of which had concrete poured over it. This stone and concrete entirely filled the trench (except in one area where a gap was later infilled with darks sand). On top of this were courses of ashlar in 'petit appareil', two of which survived in the western wall [8] (Fig. 17). The stone used was a pale magnesium limestone, most likely from the Cadeby formation. These walls define three rooms, those at the east and west of uncertain width, that in the middle 5.47m wide. This compares extremely well with the 18' (*c.* 5.49m) width of the range recorded by Gough (quoted above).

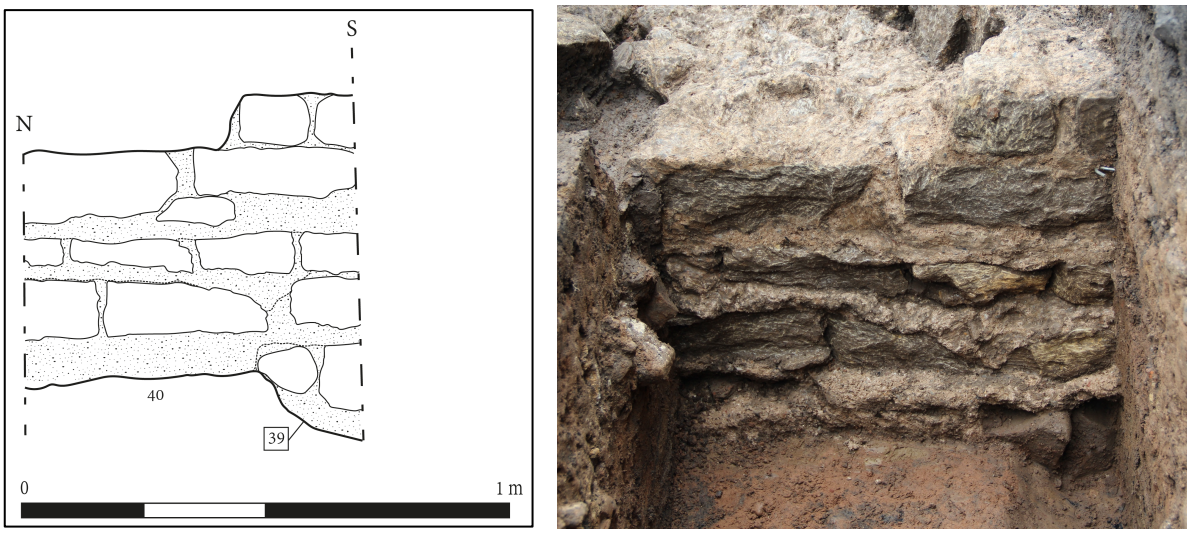

Figure 17: Wall [8] west facing section (drawing and photograph: Rose Ferraby)

Figure 18: Wall [9] west facing section (drawing and photograph: Rose Ferraby)

The Period 2A deposits survived up to the top of the foundation and overlapped the lower course of the ashlar. Above this a series of deposits [17 and 33] seem to have formed a floor make-up. Other deposits [11, 12 and 22] may form part of the same material, or might result from disturbance when the floor was later robbed out. None of the pottery from these deposits, or the others of this period, is later than *c.* A.D. 120.

The deposits of this period at the western end of the trench showed some evidence for disturbance (see Fig. 11 west section), although this was difficult to evaluate given the limited area uncovered. The *forum* entrance seems to have been was located here, under which a tile-lined drain was exposed in 1770 (see Fig. 2), presumably explaining this disturbance.

PERIOD 3:

Truncation of the deposits in the eighteen century removed any evidence for the floors or secondary alterations to the building, but there is evidence that the floor had been removed in Late Antiquity and a series of features constructed within the building (see Fig. 16). At the eastern end of the trench there was a hollow or shallow pit [13] and a single post hole [20 and 21]. Across the central area there were two further post holes [25, 26, 27 and 28, 29, 30] placed similarly with respect to the earlier walls, another pit or substantial post hole [18/19] as well as a small probable hearth [15 and 16] (see Figs. 19 and 20). Two samples of cereal grain from the fill of this hearth [15] were sent for radiocarbon dating and provided AMS dates of 1666±26 B.P. (SUERC 84781) and 1649±26 B.P. (SUERC 84782), giving a combined age of 343–421 cal. A.D. at the 95% confidence level (Fig. 40). Environmental samples from this hearth indicate that although there was probably iron working in the vicinity, this hearth was itself not used as a smithy (below p. 47). However, this indicates that the *forum* had changed use in the second half of the fourth or early in the fifth century.

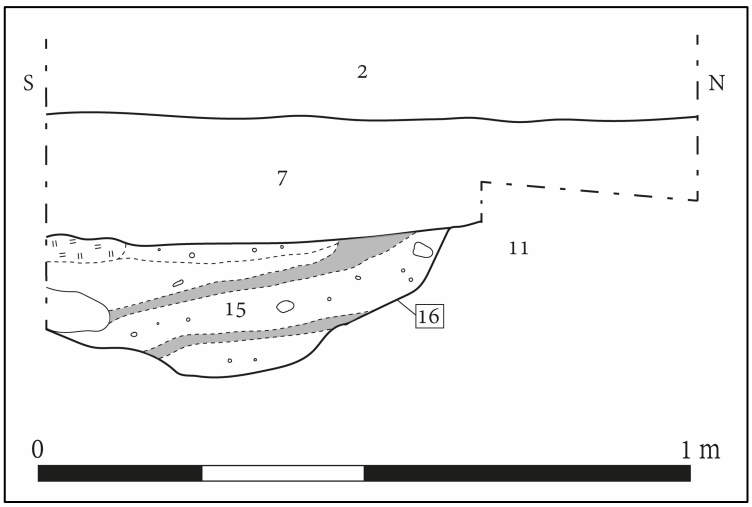

Figure 19: East facing section of hearth [16] (Drawing: Rose Ferraby)

Figure 20: Hearth [16] pre-excavation

PERIOD 4:

The upper part of the sequence was truncated by the eighteenth-century excavation and road straightening with disturbance reaching down to the level of the top of the Period 2B walls. Period 4 deposits comprised layers of redeposited soil and bands of sand. There had also been disturbance caused by the digging of drains and other utilities, so the finds assemblage contained mixed material down to the twentieth century. A trowel from the interface of the Period 3 and 4 deposits (context 7, see Small Finds Report, catalogue no. 3) perhaps relates to the eighteenth-century excavation (see Fig. 21).

THE FINDS

THE ROMAN COINS by Richard Brickstock

A single coin was recovered from metal-detecting of the spoil from the excavation. Its original context is uncertain:

ALD 2017, Trench 1, spoil heap SF 6
'Constantine I' copy of R.I.C. 7 TR 543, H.K. 66
A.D. '332-33', 'Trier mint'
16.5mm, 1.6g, DA6, ?sw/w
Obv. CONSTAN–[T]INOPLOIS – missing T indicates copy
Rev. Victory on prow/ TR.S

In addition, the gold coin recorded by Gough as having been found during work in 1770 (Xref above), the findspot of which is shown at '**a**' on Fig. 2 can be identified from the published description:

Trajan *aureus* R.I.C. 275
A.D. 114–17, Rome mint
Obv. IMP TRAIANO AVG GER DAC PM TRP COS VI PP
Rev. SPQR OPTIMO PRINCIPI Figure standing holding patera and ear of corn.

Both these coins are included in the paper summarizing the coins from Aldborough (Brickstock 2019, list 9)[3].

[3] Note that this coin was dated to AD 112–14 (Ferraby and Millett 2020a, 104, 169 note 32). The identification here follows Brickstock 2019, giving a date of AD 114–17.

THE SMALL FINDS by Stephen Greep

The excavations produced a small collection of Roman finds (Fig. 21). The most interesting is clearly the copper alloy rectangular object (SF23), from Period 2A construction deposits. The object is the subject of a separate note which follows this finds report, proposing that it may constitute a fragment broken off a larger statue or statuette.

Personal Adornment, dress and toilet implements

Toilet Implements

1. Cu alloy *ligula*. The bowl is broken, and the stem bent. It is not entirely clear whether the bowl was originally round or elongated, although the former is the most likely. 107mm long. The form of ligula is previously recorded at Aldborough (Bishop 1996, fig. 20, 205–07).
   Period 2B. SF1, context 12.

Tools and Equipment

2. A simple antler handle, iron tang running the length of the handle. The handle is well worn and has a series of lateral score (?wear) marks around its bottom half. 66mm long for the handle, which is quite small, so it probably hafted a smaller implement such as an awl.
   These forms are common throughout the Roman period and were used to haft a wide variety of implements. For a series of similar small antler handles see Greep 1985, fig. 33, 385–87.
   Period 2A. SF3, context 24.
3. Iron masons' trowel, diamond-shaped blade, cast in one with the handle. Blade 91mm long, tip missing. Tang c.70mm long, square sectioned, tapering.
   This is an exceedingly long-lived form, current in the Roman period (e.g. Crummy 1983, fig.115, 2975), but surviving through to the modern era. The trowel comes right from the interface of phase four (late Roman, fourth century and 18th century deposits). If Roman it is Manning's type 3 (Manning 1976, fig. 5) however, on the balance of probability only, it is likely to belong to the later period.
   Period 3/4. SF10, context 7.

Other Finds

4. Small, domed, glass counter. Dark blue. 12x6mm.
   Counters such as this are common finds, occurring throughout the Roman period (e.g. Brewer 1986, 155-156), although not previously recorded from Aldborough. Where found as isolated examples (such as this) their function as either gaming or accounting items has not been fully determined (e.g. Cool 2016, 236–68; Price 1995, 129–30).
   Period 3. SF4, context 28.
5. Copper-alloy object.
   See report below by Marcos Martinón-Torres, Agnese Benzonelli and Collette Smith
   Period 2A, SF 23, context 24.

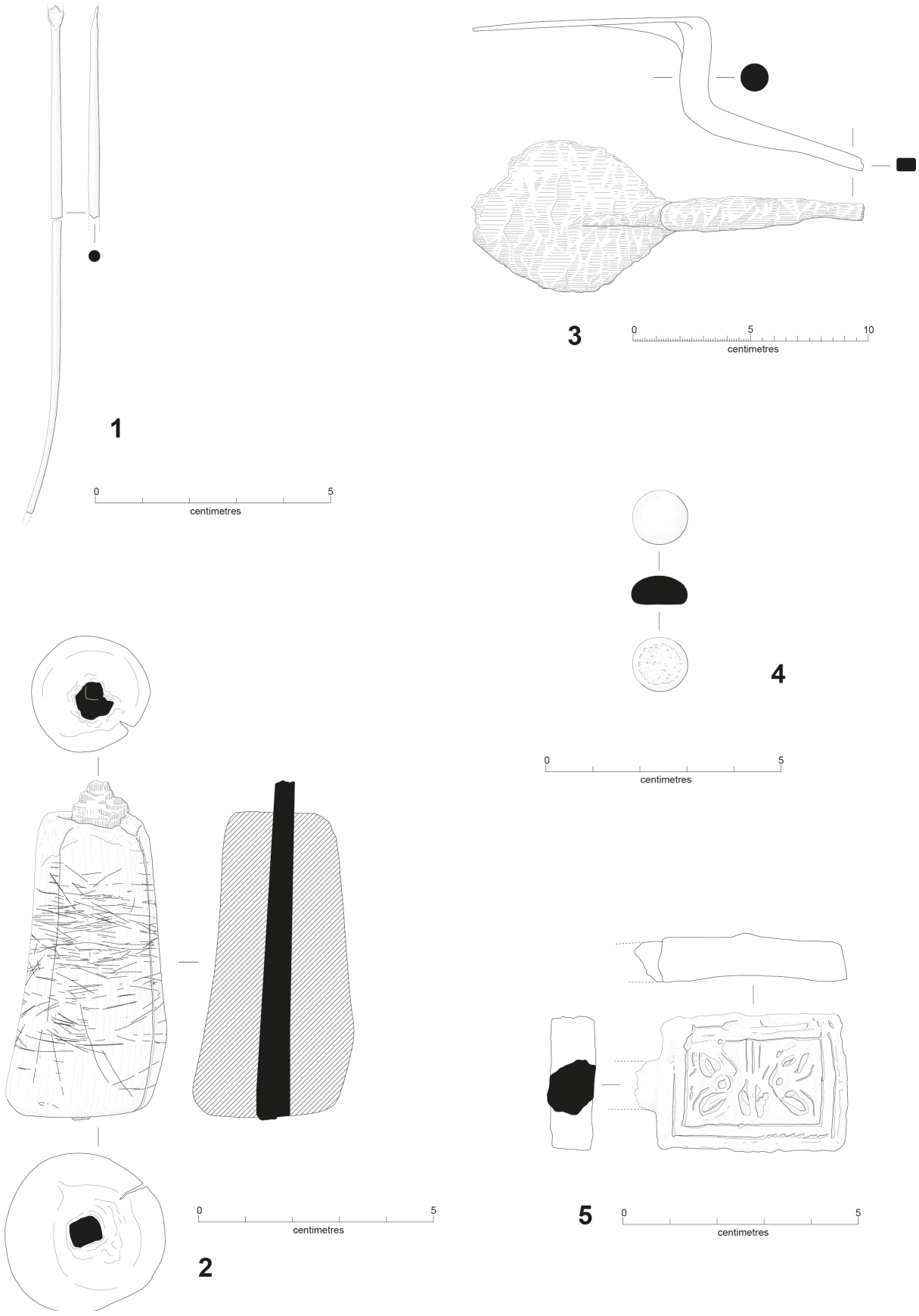

Figure 21: Drawings of small finds from the excavation (Drawings: Vicki Herring).

ANALYTICAL STUDY OF A ROMAN COPPER-ALLOY OBJECT by Marcos Martinón-Torres, Agnese Benzonelli and Collette Smith

Abstract
A small, rectangular, copper alloy-object (SF23, see Fig. 21 no. 5) recovered from an early Roman context at Aldborough, Yorkshire, was analysed using high-resolution digital microscopy and pXRF for manufacturing traits and chemical composition. One side of the object shows decorative motifs made of curved lines and oval cavities, whose shape an arrangement are consistent with manufacture by lost-wax casting. Traces of material left in some of the decoration are suggestive of the possible former presence of enamel. Compositionally, the object is a leaded bronze, unusual in its high lead content. It is proposed that this may constitute a fragment broken off a larger statue or statuette.

Introduction

A small metal object recovered from an early Roman context during excavations at the site of Aldborough, Yorkshire, England, was submitted for technological and compositional examination. The object is roughly shaped as a parallelepiped, although it shows a slight curvature. It is rectangular in plan (40 by 29 mm), with a thickness of 6–7mm. It weighs 56 g. One of the large surfaces (regarded here as 'the front') shows a decorative pattern made of incised lines and depressed ovals. One of the shorter sides has a small protuberance with a broken edge, potentially a point where this object was detached or broken off a larger one (Figs 22 – 23).

The object surfaces are mostly of a dull green colour, as typical of the copper carbonate-rich surfaces of corroded copper alloys. There are some whitish and reddish patches as well, especially on the back surface, which are suggestive of the presence of lead carbonates. While the object is corroded, it is not severely so.

Analytical protocol

The object was submitted came from the 2017 excavation Trench 1, Period 2A, context 24 (SF23), and at the Archaeological Science Laboratories, University of Cambridge, it was given the lab code CA190263.

In order to investigate its manufacture and current condition, the artefact was examined under a Keyence VH-6000 super resolution 3D microscope, which allows extensive breadth and depth of focus and automatic image stitching, hence providing high-resolution topographic information. This examination was carried out by Collette Smith and Marcos Martinón-Torres at the University of Cambridge.
In addition, chemical analyses were carried out with an Olympus InnovX Delta Premium 6000 portable X-ray fluorescence spectrometer (pXRF), equipped with a Rh tube. The analyses were carried out by Agnese Benzonelli at UCL, using an Al filter and a 3mm collimator, and operating at 40kV for a livetime of 30s. Spectra were quantified using a fundamental parameters algorithm empirically optimised for archaeological copper alloys;

results are presented as normalised percentages by weight (%). Following screening surface analyses, a spot *c.* 5mm in diameter on the back of the object was mechanically cleaned with a rotary dremel tool, in order to remove corrosion products and ensure a more reliable analysis of sound metal. As shown in Fig. 22, the spot analysed was left relatively clean of corrosion products, but we cannot guarantee that some may have remained at the microscale or the subsurface and hence affect our results.

Analyses of two certified CURM copper alloy standards are included in the Appendix to illustrate data quality. Overall, these show good precision and accuracy for all the elements reported here; the results on standard CURM 50.01.4 show lower values for lead than expected, but given the good results for this element in the other standard it is quite likely that there may have been an issue with the condition of the standard itself, rather than the instrument – it is well known that heavily leaded alloys are prone to lead segregation and loss.

Overall, while we highlight these sources of uncertainty, the elemental results are deemed valid for the purposes of this assessment.

Microscopic examination

The technological examination sought to investigate the manufacturing method as well as possible presence of enamel on the front surface.

The decoration now appears as a series of deep ovals and lines in broadly symmetrical arrangement, and encased in a double rectangular frame. Upon closer examination, it is quite notable that the depth and straightness of the lines is quite variable, in a few cases showing rather ragged edges, and that symmetry is imperfect (Figs 24 – 27). All of this is consistent with an individual design made by hand, rather than one made perhaps more carefully to be reproduced multiple times using a mould. A pertinent question here is whether this decoration was carved and chiselled into a blank metal rectangle, or whether the object was cast directly in its final, decorated shape. Considering the hardness and brittleness of the heavily alloyed metal (as presented in the next section) it would seem virtually impossible to chisel such deep and curved features without strenuous effort, and particularly without causing the metal to break. Furthermore, chiselling would have left much sharper and straight marks, as opposed to the curved and wavy lines recorded here. Overall, these features seem much more consistent with the decoration having been transferred from the mould rather than performed on the object. While evidence for the use of piece moulds is much more common in Roman Britain, we cannot exclude the possibility of this object having been cast using the lost-wax technique. The latter would more easily explain the shape, curvature and detail of the object.

Turning to the possible presence of enamel, it is notable that some of the decorative features, particularly the narrower lines, but also part of the larger cavities, appear to be filled with another material (Figs 28 – 29). This material is now largely corroded, with a surface appearance similar to that of the surrounding metal patina, which makes it difficult to resolve under the microscope. It is possible that this constitutes corroded enamel, i.e. remnants of

coloured glass once filling what we now see as hollow decoration, standing against the metallic background. However, it is not possible to assert this point conclusively, and it should be noted that some of the grooves are possibly too narrow to have held enamel. Black niello (copper and/or silver sulphide) is another potential filler – but again, not positive evidence was found.

Chemical analyses

The results of the bulk chemical analyses of the clean metal reveal a heavily leaded bronze, with an average of 13% tin and 11% lead, as well as very minor levels of zinc (0.4%) and antimony (0.1%) (Table 1). This elemental composition is not unique but it is certainly unusual for Roman copper alloys, even if we allow for our analytical uncertainty (Figs 30 – 32). The extensive analyses of Roman copper alloys from northern Britain by Dungworth (1995; 1997a; 1997b) show a bimodal distribution for tin values, with one peak towards zero (for brasses and nominally pure copper) and another one at 8–10%. Bronzes with higher tin levels are almost invariably mirrors. Dungworth's work also shows that only 25% of bronzes from Roman Britain contain lead above 1%, and even in these cases the concentrations of this element are much lower than recorded here. If we examine Dungworth's data chronologically, we can see the frequency of leaded objects increase over time, with higher frequency in the third and fourth centuries AD, but mean lead values never exceed 5%, and median values are much lower. Overall, the Aldborough artefact plots towards the edge of the main cluster of compositions (Fig. 30). The same impression is obtained if we compare the composition of this artefact to that of Romano-British brooches published by Bayley and Butcher (2004), although the latter database includes a few more lead-rich objects (Fig. 31). More recently, Jouttijärvi (2017) carried out a meta-analysis of compositional data for 8900 copper alloy objects across the Roman Empire. This more diverse dataset does reveal the presence of more leaded bronzes, particularly in statues. When the composition of the Aldborough object is plotted against those of other Roman statues, however, it can be seen that because of its relatively high tin it does not fall in any of the common clusters noted by Jouttijärvi (Fig. 32).

Discussion and conclusion

The typology, technology and composition of this leaded bronze artefact indicate that it is a cast decorative piece, possibly made using the lost-wax technique. Compositionally, the object stands out as rather unusual in its high tin and especially lead contents, particularly infrequent in the early Roman period, and comparable only to those of Roman statues. Bearing this in mind, together with the broken protuberance on one side of the artefact, it is possible that this is part of a larger artefact, perhaps a statue or statuette. Bronzes of this composition are rather brittle, and hence the fractured state should not be surprising.

The peculiar composition of the object, however, could be investigated further, and compared to those of other artefacts at the site. Given Aldborough's close proximity to very rich lead mines, and the evidence of lead working at the site, it is conceivable that more lead would make it to the pool of copper alloys possibly being cast and used (and possibly recycled) at the site. While we acknowledge the challenges created by overlapping signatures and

possible distortion through recycling, lead isotope analyses would be useful to ascertain how the isotopic signature of this object compares to those of other at the site, and whether it is consistent with the local geology.

Another potential avenue for further research is the possible filler perhaps preserved in some of the artefact's grooves. The very small and corroded nature of this material, and its location, means that direct analyses by SEM-EDS would not be very useful. Only more detailed analyses of cross-sections of samples removed from their current position might be more fruitful, but even invasive analyses might turn out to be inconclusive. If the material is niello, an X-radiograph might be helpful in its identification – but the high lead content and hence density of the object would render this approach challenging too.

Acknowledgement
We are grateful to Justine Bayley for her critical observations on an earlier version of this report, to David Dungworth for sharing ideas and data, and to Catherine Kneale for taking the photographs.

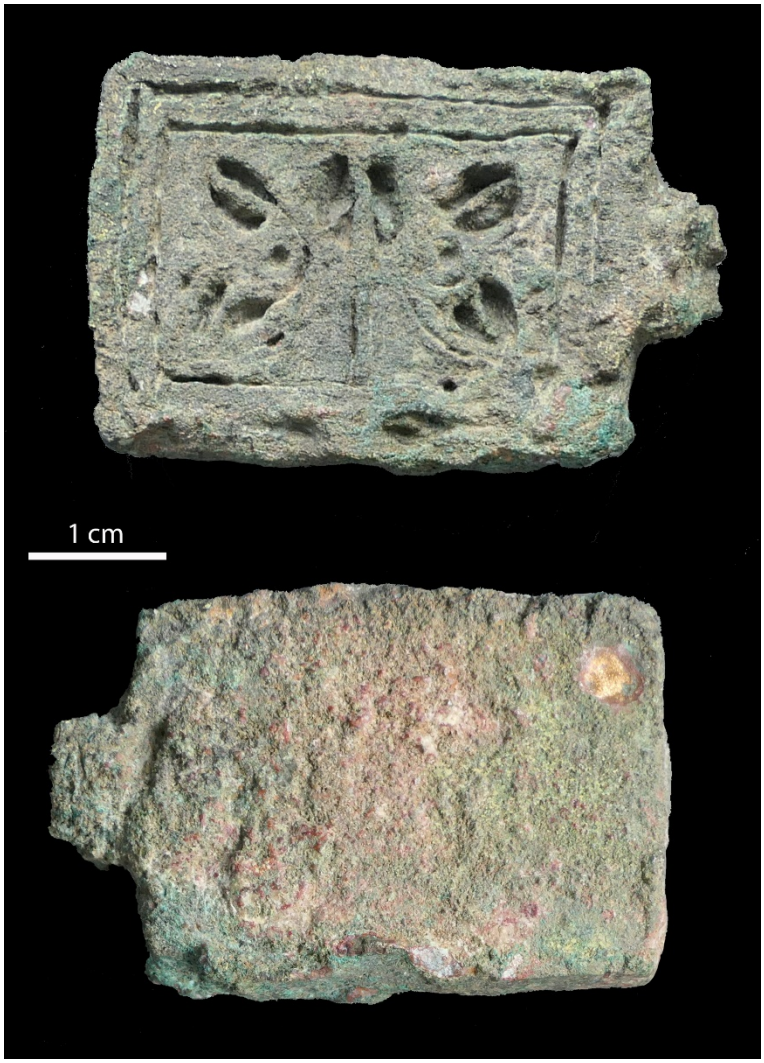

Figure 22: Front (top) and back view of the artefact. The spot where the patina was removed for XRF analysis is visible to the top left of the back side. Photographs by Catherine Kneale.

Figure 23: Side view showing curvature and broken appendix. Photograph by Catherine Kneale.

Figure 24: Composite 3D microscope image of the front of the artefact with enhanced relief.

Figure 25: Composite 3D microscope image of the front of the artefact with enhanced relief under different lighting conditions.

Figure 26: 3D detail of the artefact under the microscope. Note the ragged outline of the outer frame and the slight curvature of all the lines.

Figure 27: Interpretive sketch drawing of decoration based on examination of the object.

Figure 28: Detail of the front surface showing a half empty groove (right) with possible remains of enamel (left).

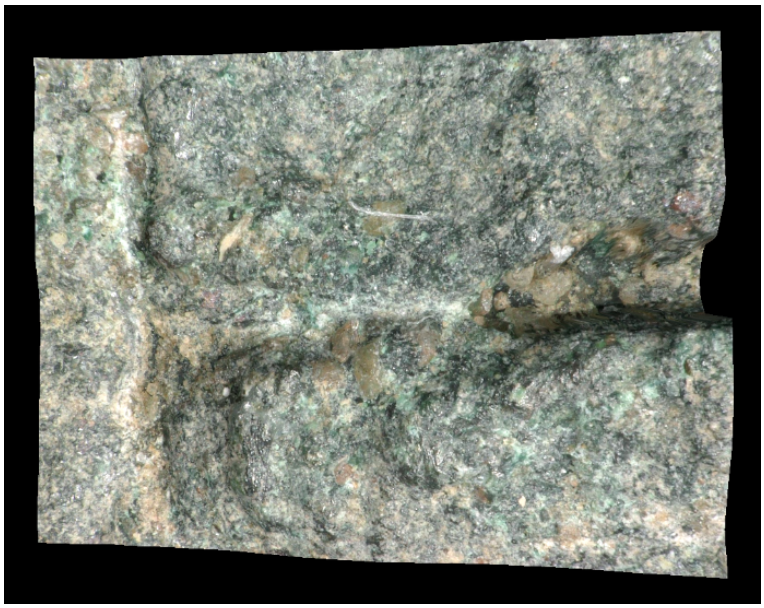

Figure 29: 3D microscope image of decorative lines showing an empty segment (right) alongside others that may still be filled with corroded enamel.

Figure 30: Scatterplots comparing the Sn and Pb contents of the Aldborough artefact with with Dungworth's (1995) dataset for Roman copper alloys, classified by date. Note that the bottom graph is in logarithmic scale, and therefore all the zero values (which are a majority for Pb) are not plotted. Data kindly provided by David Dungworth, also available at https://www.academia.edu/21760654/Dungworth1995ThesisData.

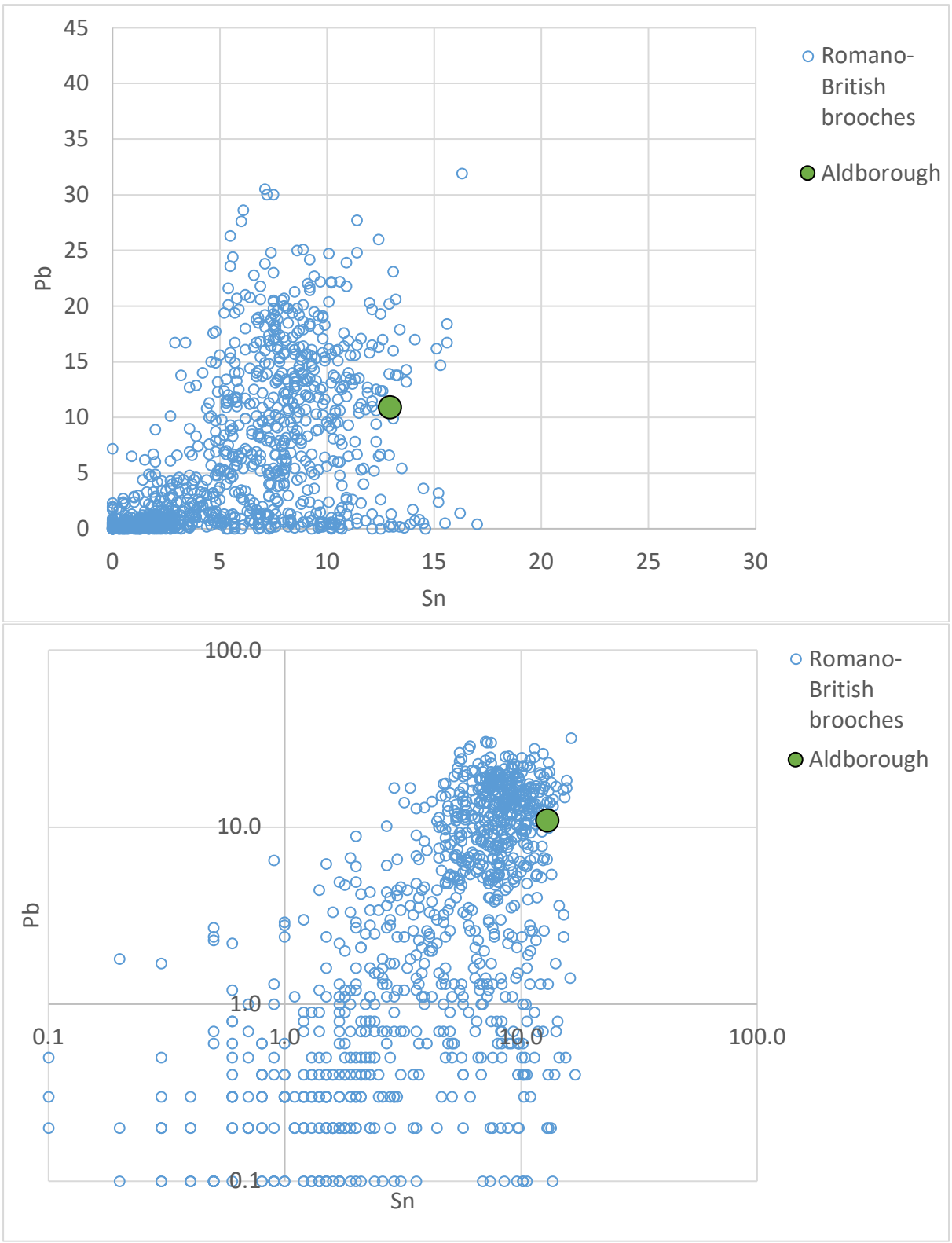

Figure 31: Scatterplots comparing the Sn and Pb contents of the Aldborough artefact with with Bayley and Butcher's (2004) dataset for Romano-British brooches. Note that the bottom graph is in logarithmic scale, and therefore all the zero values (which are a majority for Pb) are not plotted. Data available at https://archaeologydataservice.ac.uk/archives/view/68fiche/.

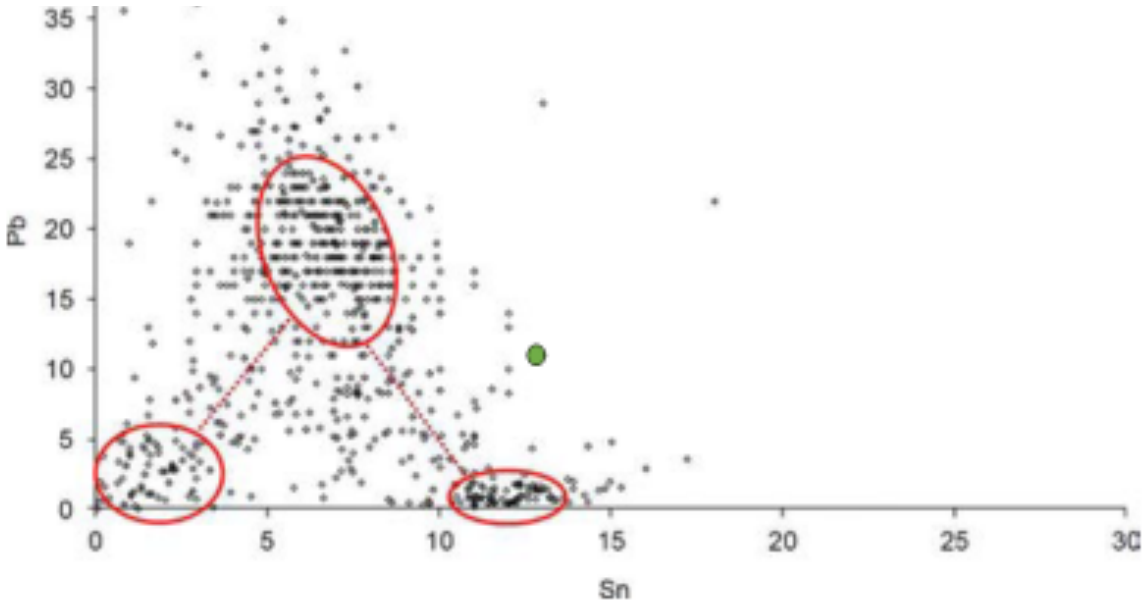

Figure 32: Scatterplot comparing the Sn and Pb contents of the Aldborough artefact (green circle) with Jouttijärvi's compilation of data for Roman statues. Background data figure from Jouttijärv (2017: Fig 8).

Appendix: Results of pXRF analysis

Sample CA190263 - clean metal	Fe	Cu	Zn	Sn	Sb	Pb	Bi
1	0.06	74.81	0.43	13.17	0.12	11.36	0.05
2	0.05	76.30	0.41	12.74	0.13	10.32	0.05
3	0.07	76.16	0.42	12.83	0.14	10.33	0.05
4	0.07	74.38	0.39	13.24	0.14	11.74	0.05
5	0.07	75.90	0.41	12.76	0.11	10.70	0.05
MEAN	0.06	75.51	0.41	12.95	0.13	10.89	0.05
StDev	0.01	0.86	0.02	0.24	0.02	0.64	0.00

Table 1: Results of the pXRF analysis of a clean spot of the metal after removing the patina

Sample CA190263 - corroded	Fe	Cu	Zn	Sn	Sb	Pb	Bi
1	0.89	7.41	<LOD	4.26	<LOD	87.44	<LOD
2	0.44	10.53	0.27	6.20	<LOD	82.56	<LOD
3	0.79	6.10	0.12	4.49	<LOD	88.47	<LOD
4	0.52	28.19	0.37	13.96	0.11	56.83	<LOD
5	0.39	11.20	<LOD	5.31	<LOD	81.69	<LOD
MEAN	0.61	12.69	<0.26	6.84	<0.11	79.40	<LOD
StDev	0.22	8.92	0.13	4.05		12.96	

Table 2. Results of the pXRF analysis of the metal on the corroded surface before removing the patina. Note the notably higher levels of lead (and, to a lesser extent, iron) and correspondingly lower values of all other elements, as common in corroded copper-alloy surfaces.

CURM 50.04.4	Mn	Fe	Ni	Cu	Zn	Sn	Sb	Pb	Bi	TOT
1	0.02	0.14	1.11	78.22	0.48	11.63	0.48	7.79	0.13	100.0
2	0.03	0.12	1.08	76.05	0.44	11.64	0.52	9.97	0.15	100.0
3	0.02	0.12	1.08	76.15	0.48	11.65	0.52	9.84	0.14	100.0
4	0.02	0.13	1.06	76.04	0.45	11.69	0.51	9.97	0.14	100.0
5	0.02	0.11	1.10	76.59	0.47	11.34	0.47	9.76	0.14	100.0
MEAN (N=5)	0.02	0.13	1.09	76.61	0.46	11.59	0.50	9.46	0.14	100.0
StDev	0.00	0.01	0.02	0.93	0.02	0.14	0.02	0.94	0.01	
Coefficient of variation %	18.22	7.25	1.77	1.21	3.34	1.20	4.55	9.93	4.70	
Reference value	0.03	0.10	1.10	76.11	0.66	11.30	0.50	9.94	0.10	99.8
Normalised reference values	0.03	0.10	1.10	76.23	0.66	11.32	0.50	9.96	0.10	100.0
Absolute error	0.01	-0.02	0.01	-0.38	0.20	-0.27	0.00	0.49	-0.04	
Relative error %	24.05	24.88	1.33	0.49	29.78	2.40	0.31	4.94	37.66	

Table 3. Results of pXRF analysis of standard CURM 50.04.4 compared to reference values

THE ROMAN POTTERY by Jeremy Evans with contributions by Gwladys Monteil

Some 246 sherds were presented for examination, weighing 4.315kg, giving an average sherd weight of 17.5g. 238 sherds, weighing 4.228kg came from stratified Roman contexts. There is too little material for quantification of the material to provide any meaningful results about supply to the site. The material is summarized in Table 4, with details in the on-line archive. This report concentrates on the evidence there is for the dating of the sequence

Methods

The pottery has been coded into 12 basic classes and into individual fabrics within these, following the basic systems of the Warwickshire County and OAU fabric type series and recording systems (Booth 2000). Sherds were recorded by count (Nosh), weight (Wt) and minimum number of rims per context (MNR), to the Class level where unstratified and in full where stratified. The fabric type series, NFABS, has been applied to a number of northern sites including Shiptonthorpe (Evans 2006), Beadlam (Evans 1996), Binchester (Evans and Rátkai 2010) and is also used for other current Aldborough excavations.

Chronology

Period 1: Pre-*forum* activity

There are just nine sherds from this period weighing 111g, giving an average sherd weight of 12.3g. There are four handmade sherds in Fabrics G297 and G298 which include a jar with an outcurving, rising rim in G297 (Fig. 33.1) of first–second century date and a cornice rimmed roughcast beaker in Fabric F27 perhaps dated *c*. A.D. 90–150, along with a bodysherd of a Noyon *mortarium*, dated *c*. A.D. 50–120. These might, possibly, suggest a late Flavian – early Trajanic *terminus post-quem* for Period 2A.

Period 2A: *forum*, pre-construction deposits

There are some 63 sherds from this phase weighing 1.560kg, giving an average sherd weight of 24.8g. The best dating evidence comes from the nine samian sherds representing eight vessels, all from La Graufesenque. There is a Dr 18 sherd and two Dr 27s dated A.D 60–110, a Dr. 18 stamped with die 5c(?) of L. Tr – Masculus, dated A.D. 85–105 (Hartley and Dickinson 2012, 92–7). There are also three Dr. 37s and a decorated bowl sherd, two dated A.D. 70–110, one dated A.D. 70–90 and one most probably with 'the ovolo used by a number of late Flavian–Trajanic potters: Albanus iii (Inv. No. 0004307), Amandus iii (Inv. No. 0004337) and one who used a rosette as a stamp (Inv. No. 0005590)" (see Monteil below) dated A.D. 90–120.

There is also a globular beaker with a stubby, horizontal everted rim in Fabric O13 (Fig. 33.2), probably of Flavian–Trajanic date. This material would give a *terminus post quem* of A.D. 90 for this phase. However, the material from Period 1 would suggest this group cannot precede the turn of the second century.

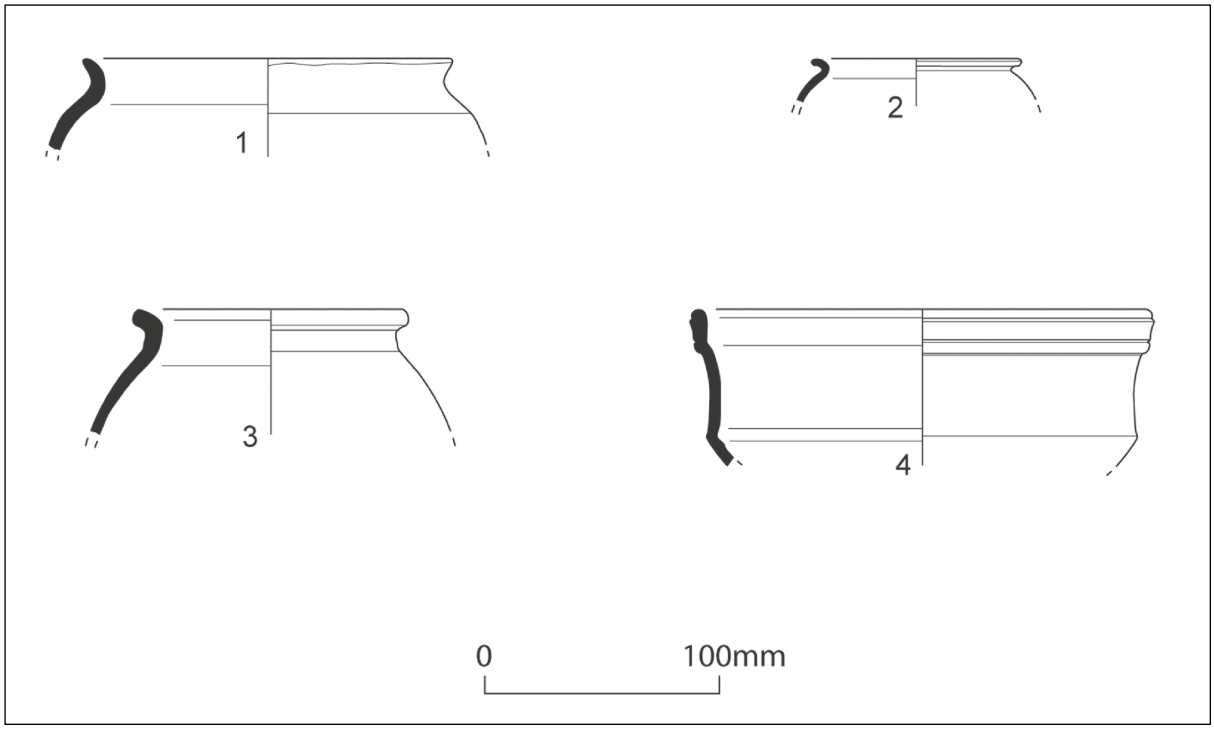

Figure 33: Drawings of Roman pottery vessels (Drawing: Vicki Herring).

Period 2B: *forum* construction

There were 43 sherds weighing 508g, amounting to an average sherd weight of 11.8g. This contained five samian sherds representing four vessels; two were from La Graufesenque, a Dr. 18 and a Dr 27 dated A.D. 60–110 and two were from Les Martres-de-Veyre, a Dr 18 and a Dr. 27, dated A.D. 100–120. There were also a greyware jar with an everted, rising, thickened rim and a bowl, perhaps a Dr. 29 copy, and perhaps dated *c.* A.D. 70–100 in Fabric R92 (Fig. 33.3–4).

Period 3: late Roman re-use

There is only a single sherd of calcite gritted ware (Fabric G01) which might be contemporary in this phase. Contexts 15 and 16 have secure radiocarbon dates A.D. 343–421 (see Excavated Sequence, above p. 10). In addition there were three small intrusive sherds of medieval pottery in context 15 and one in context 13.

Period	Fabric Code	NoSh	Nosh %	Wt	Wt %	MNR
1	F27 (Perhaps Argonne colour-coated ware)	1	11.1	1	0.9	1
1	G297 (Handmade fabric with angular white quartz temper)	1	11.1	13	11.7	
1	G297 (Handmade fabric with angular white quartz temper)	2	22.2	39	35.1	1

1	G298 (Laminar, handmade reduced fabric, probably from Tees Valley)	1	11.1	1	0.9	
1	M091? (Noyon, buff *mortarium* fabric)	1	11.1	45	40.5	
1	O04 (Very hard orange fabric)	1	11.1	1	0.9	
1	R06 (Grey fabric with soapy feel)	1	11.1	3	2.7	
1	R114 (Reduced fabric with mid grey core)	1	11.1	8	7.2	
	Total	**9**		**111**		**2**
2A	A61 (Buff-white amphora fabric)	17	27.0	1069	68.5	
2A	G201 (Fairly hard handmade reduced fabric)	1	1.6	3	0.2	
2A	G40 (Reduced soft handmade fabric with vegetable temper)	1	1.6	10	0.6	
2A	M091? (Noyon, buff *mortarium* fabric)	1	1.6	45	2.9	
2A	O04 (Very hard orange fabric)	4	6.3	30	1.9	
2A	O13 (Hard, buff wheel-made oxidized ware)	2	3.2	8	0.5	1
2A	O13? (Hard, buff wheel-made oxidized ware)	8	12.7	80	5.1	
2A	O16 (Hard orange fabric; abundant sand temper)	5	7.9	23	1.5	
2A	016? (Hard orange fabric; abundant sand temper)	1	1.6	1	0.1	
2A	R10 (Hard grey fabric)	2	3.2	18	1.2	
2A	R11 (Hard grey ware)	4	6.3	34	2.2	
2A	R114 (Reduced fabric with mid grey core)	3	4.8	19	1.2	
2A	R13 (Very hard grey fabric with a 'crisp' fracture)	2	3.2	23	1.5	
2A	R13? (Very hard grey fabric with a 'crisp' fracture)	1	1.6	1	0.1	
2A	R133? (Hard, reduced fabric)	1	1.6	1	0.1	
2A	S00 (samian)	1	1.6	1	0.1	
2A	SAMLG (La Graufesenque samian ware)	9	14.3	194	12.4	2
	Total	**63**		**1560**		**3**
2B	G107? (Reduced gritted ware)	1	2.3	16	3.1	
2B	G27 (Handmade grey fabric)	1	2.3	24	4.7	
2B	O04 (Very hard orange fabric)	3	7.0	19	3.7	
2B	O27 (Ebor Ware fabric 2)	1	2.3	36	7.1	
2B	R11 (Hard grey ware)	3	7.0	12	2.4	1
2B	R114 (Reduced fabric with mid grey core)	2	4.7	28	5.5	
2B	R133 (Hard, reduced fabric)	1	2.3	4	0.8	
2B	R16 (Hard, darkish grey fabric; common whitish coarse sand)	1	2.3	5	1.0	
2B	R381 (Hard greyware with mid grey surfaces)	1	2.3	4	0.8	
2B	R92 (Greyware with mid grey surfaces)	23	53.5	347	68.3	3
2B	SAMLG (La Graufesenque samian ware)	2	4.7	7	1.4	1
2B	SAMMV (Les Martres de Veyre samian ware)	3	7.0	5	1.0	1
2B	W01? (Hard white fabric)	1	2.3	1	0.2	

	Total	**43**		**508**		**6**
3	A02 (Baetican Dressel 20 amphora)	3	2.5	700	33.8	
3	A11 (Pelichet 47 amphora fabric)	2	1.6	42	2.0	1
3	A61 (Buff-white amphora fabric)	2	1.6	176	8.5	
3	B01 (BB1 SE Dorset fabric)	4	3.3	81	3.9	2
3	F27? (Perhaps Argonne colour-coated ware)	1	0.8	3	0.1	
3	F82 (Oxidised mica dusted fabric)	1	0.8	11	0.5	
3	F82? (Oxidised mica dusted fabric)	3	2.5	73	3.5	1
3	G01 (Calcite gritted ware)	1	0.8	16	0.8	
3	G92 (Reduced fabric with mid-grey core, perhaps North Lincolnshire)	3	2.5	28	1.4	
3	M023 (Aldborough whiteware *mortarium*)	1	0.8	23	1.1	
3	M196 (Verulamium region *mortarium* fabric)	1	0.8	104	5.0	
3	O04 (Very hard orange fabric)	22	18.0	130	6.3	
3	O062? (Hard oxidised fabric with an orange-brown core and surfaces)	1	0.8	4	0.2	
3	O09? (Oxidised fabric with yellow buff surfaces)	1	0.8	13	0.6	
3	O13 (Hard, buff wheel-made oxidized ware)	6	4.9	21	1.0	
3	O13? (Hard, buff wheel-made oxidized ware)	1	0.8	10	0.5	
3	O16 (Hard orange fabric; abundant sand temper)	1	0.8	2	0.1	
3	O181 (Oxidised fabric with orange surfaces and a 'crisp' fracture)	3	2.5	27	1.3	
3	O28? (Oxidised fabric with yellow brown surfaces with a 'crisp' fracture)	3	2.5	28	1.4	
3	O42? (Oxidised fabric with pale brownish surfaces)	2	1.6	12	0.6	
3	O50 (Amphora stopper in buff fabric)	3	2.5	4	0.2	2
3	R064 (Reduced fabric with grey surfaces and a fairly 'crisp' fracture)	2	1.6	15	0.7	
3	R09 (Crambeck grey ware)	1	0.8	10	0.5	1
3	R10 (Hard grey fabric)	13	10.7	131	6.3	1
3	R11 (Hard grey ware)	3	2.5	25	1.2	1
3	R11? (Hard grey ware)	1	0.8	1	0.0	
3	R13? (Very hard grey fabric with a 'crisp' fracture)	1	0.8	13	0.6	
3	R115 (Greyware with a mid-grey core and pale grey surfaces)	1	0.8	13	0.6	1
3	R16 (Hard, darkish grey fabric; common whitish coarse sand)	16	13.1	171	8.3	1
3	R30 (Very hard grey fabric and a 'crisp' break)	9	7.4	124	6.0	1
3	SAMLG (La Graufesenque samian ware)	7	5.7	45	2.2	6
3	W50 (Cam 113 butt-beaker whiteware fabric)	2	1.6	15	0.7	1

	Total	**121**		**2071**		**19**
4	F70 (Crambeck parchment ware)	1	16.7	34	53.1	1
4	O04 (Very hard orange fabric)	1	16.7	7	10.9	
4	R10 (Hard grey fabric)	1	16.7	6	9.4	
4	R16 (Hard, darkish grey fabric; common whitish coarse sand)	1	16.7	4	6.3	
4	SAMLG (La Graufesenque samian ware)	2	33.3	13	20.3	
	Total	**6**		**64**		**1**

Table 4: Summary of occurrence of Roman pottery fabrics

The date of the commencement of occupation

Evidence for the date of the first occupation of the site comes from both the material in Period 1 and the earliest material in the overall site assemblage. The excavated South Gaulish samian list is small, but it includes four Dr. 37s and not a single Dr. 29. Amongst the fieldwalked material Mills noted 'The earliest vessel identified is a scrap from a Dr. 29 bowl, possibly of a pre-Flavian date, but the sherd is too small to be certain (Millett *et al.* 2018, 26). The other first century material is most likely to be Flavian...'. The early decorated bowl Dr. 29 is out-numbered by Dr. 37 which was introduced around A.D. 70 and with the exception of a sherd from the flange of a Ritterling 12 or Curle 11 bowl, which if from a Ritterling 12 may be pre-Flavian in date, no other pre-Flavian wares are evident.

Amongst the other recently excavated pottery there is one sherd of Eggshell *Terra Nigra*, Fabric F32, from the 2018 Excavation (context 24), and two butt-beaker rimsherds, one from Period 3, context 13 and the other from the 2018 Excavation, context 9 (Ferraby and Millett forthcoming).

The *Terra Nigra* has a late Neronian–early Flavian date, whilst the butt-beakers are likely to be pre-Flavian. However, although there may be a slight hint of earlier activity, good evidence for occupation does not precede the late Flavian period and further evidence of the earliest groups is clearly needed.

Samian Ware: Decorated and stamps catalogues by Gwladys Monteil

Decorated catalogue

The following catalogue lists and identifies the decorated pieces recovered from the site that could be attributed to individual potters or groups of potters. The catalogue is organized by context and each entry gives the excavation context number with details of the decoration. The Inventory Numbers (Inv. No.) quoted are taken from *European intake of Roman Samian ceramics.* http://www.rgzm.de/samian/home/frames.htm

1. Period 3, context 13. One rim sherd, Dr. 37, La Graufesenque, 31g, RE=0.08. The ovolo with a large rosette ending tongue is most probably the one found on a bowl with a signature by Calvinus i (Inv. No. 0004402) and countless bowls by Mercator i (Inv. Nos. 0005139, 0005118). The ovolo and perhaps the stag are together on a bowl from La Graufesenque (Inv. No. 2002360). Late Flavian-Trajanic.
2. Period 2A, context 24. One body sherd, Dr. 37, La Graufesenque, 2g. Although partial the ovolo has quite a distinct shape and trident ending tongue. It is most probably the ovolo

used by a number of late Flavian–Trajanic potters: Albanus iii (Inv. No. 0004307), Amandus iii (Inv. No. 0004337) and one who used a rosette as a stamp (Inv. No. 0005590). A.D. 90–120.

3. Period 2A, context 24. One body sherd, Dr. 37, La Graufesenque, 6g. Similar but not identical cupids and medallions appear on Dr. 29s with internal stamp by Cabucatus (Inv. No. 0000230), Severus iii (Inv. No. 0002262) but also on Dr. 37s including one from Cala Culip with a stamp by C. Iulius Sa- (Inv. No. 0005414). Probably A.D. 70–90.

Catalogue of samian potters' stamps

The following catalogue lists the potters identified in alphabetical order. Each entry gives the excavation context number; phase, potter's name (i, ii *etc*, where homonyms are involved); die form; form type, reading, pottery of origin, a reference to published drawing (where available) and date. Ligatured letters are underlined.

1. Period 2A, context 23. *L. Tr- Masculus*, 5c, Dr. 18, La Graufesenque, A.D. 85–105 (Hartley and Dickinson 2012, 92–7). 176g, BE = 0.97, diam = 76mm. The high stop between the F and MA does not always register apparently (Hartley and Dickinson 2012, note 54, 97).

THE CERAMIC BUILDING MATERIAL by Philip Mills

There were 148 fragments of Roman tile, weighing a total of 19450g presented for assessment. The material was recorded in context groups to fabric and form types, recorded by number of fragments (N), weight in grams (Wt) and no of corners (CNR). A summary of the assemblage is given in Tables 5 and 6 with the full data in the on-line archive.

	Period 4	Period 3	Period 2B	Period 2A	Period 1		Total (N)	Total (Wt)
T11 (N)	1 (7%)	12 (24%)	15 (28%)	9 (31%)	0		37 (25%)	
T11 (Wt)	248 (20%)	1495 (45%)	3502 (28%)	209 (9%)	0			5454 (28%)
T12 (N)	10 (67%)	37 (73%)	25 (47%)	19 (66%)	0		91 (62%)	
T12 (Wt)	708 (56%)	1525 (46%)	5021 (39%)	1823 (79%)	0			9077 (47%)
T13 (N)	3 (20%)	2 (4%)	10 (19%)	1 (3%)	0		16 (11%)	
T13 (Wt)	262 (21%)	296 (9%)	3983 (31%)	288 (12%)	0			4829 (25%)
T21 (N)	1 (7%)	0	3 (6%)	0	0		4 (3%)	
T21 (Wt)	52 (4%)	0	209 (2%)	0	0			261 (1%)
Suggested dating								
Total (N)	15	51	53	29	0		148	
Total (Wt)	1270	3316	12715	2320	0			19450

Table 5: Fabrics present in the Ceramic Building Material assemblage.

Dating

The majority of the material was Roman in date, although there was only one marker, a half tegula with a Warry 2006 type C.54 lower cutaway from Period 2B, context 11 (which may have some later disturbance). This has a suggested date range of A.D. 160–260, although earlier examples of this cutaway are reported in London (Betts pers. comm.).

There was a quantity of post medieval material including pan tiles of C18+ date from (002). (003) and (007).

Function

	Period 4	Period 3	Period 2B	Period 2A	Period 1	Total (N)	Total (Wt) g
B/T (N)	1 (7%)	8 (16%)	20 (38%)	14 (48%)	0	43 (29%)	
B/T (Wt)	31 (2%)	239 (8%)	501 (4%)	382	0		1153 (6%)
Brick (N)	9 (60%)	27 (53%)	12 (23%)	4 (14%)	0	52 (35%)	
Brick (Wt)	677 (53%)	1010 (32%)	5288 (42%)	1037	0		8012 (41%)
Flat (N)	1 (7%)	0	0	0	0	1 (1%)	
Flat (Wt)	151 (12%)	0	0	0	0		151 (1%)
Imbrex (N)	3 (20%)	1 (2%)	10 (19%)	9 (31%)	0	23 (16%)	
Imbrex (Wt)	163 (13%)	65 (2%)	852 (7%)	790	0		1870 (10%)
Tegula (N)	1 (7%)	15 (29%)	11 (21%)	2 (7%)	0	29 (20%)	
Tegula (Wt)	248 (20%)	1831 (58%)	6074 (48%)	111	0		8264 (42%)
Total (N)	15	51	53	29		148	
Total (Wt)	1270	3145	12715	2320			19450

Table 6. Breakdown of form proportions. B/T refers to unidentifiable CBM; Flat are fragments of Roman CBM which could be tegula or brick; Brick includes both Roman and Medieval and later brick.

Table 6 shows the breakdown of the Roman CBM by form types. There is a high level of *imbrex* compared to *tegula* in Periods 2A and 2B consistent with rubble associated with building works – here presumably breakages during construction. In Phase 3 the much lower level of *imbrex* is typical of groups following disuse of a structure where *imbrex* are more likely to be removed for reuse. There was a nail hole in tegula fragments from Period 2A, context 24. The bricks range between *c.* 36–50mm which is typical of the range for *pedalis* or *lydion* bricks. The absence of flue tile suggest that this material derives from ceramic bonding layers of a wall.

Markings

There is a possible edge of a stamp of a probable tegula fragment in fabric T13, 28mm thick 171g, from Period 3, context 18 (Fig. 34) and a signature fragment from a CBM fragment in fabric T12, 49g from Period 2A, context 24 (Fig. 35).

Figure 34: Possible stamp fragment from Period 3, context 18.

Figure 35: Signature fragment from Period 2A, context 24.

Discussion

This is a relatively small assemblage of CBM from excavations at Aldborough of Roman and post medieval character. The group is large enough to suggest that the Roman material derives from the works associated with a structure, presumably as breakages during construction in the earlier phases used as hardcore. In Period 3 the pattern is what would be expected from CBM discard where *imbrex* are much less frequent, presumably as they are

selected for reuse. The presence of bricks but no flue tile suggests that some of this material is from a ceramic bonded wall.

Appendix 3 Fabric descriptions

T11**:** a yellowish red tile fabric, which is hard with a sandy feel and irregular fracture. It has inclusions of some rounded quartz and occasional organic voids.

Figure 36: Fabric T11 fresh break 6mm across

T12: a reddish yellow fabric which is hard with an irregular fracture and harsh feel. It has common angular flint and quartz inclusions.

Figure 37: Fabric T12 fresh break 6mm across

T13: a tile with red surfaces and margins and a grey core. It is hard, with a sandy feel and irregular fracture. It has inclusions of common quartz, some flint and occasional black iron stone.

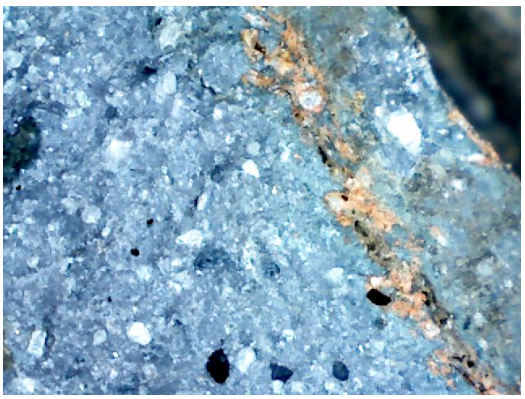

Figure 38: Fabric T13 fresh break 6mm across

T21: a dark red fabric which is hard with a harsh sandy feel. It has inclusions of abundant lime *c.* 0.4mm with occasional coarser examples with moderate white quartz at 0.8mm.

Figure 39: Fabric T21 fresh break 6mm across

THE ROMAN GLASS by Vicki Herring

All of the pieces of Roman glass from the 2017 excavation are undiagnostic body fragments from vessels. Most are probably parts of bottles.

1. L: 18.9mm. W: 18mm. T: 0.9mm. Vessel. Unknown type. Colourless. Undiagnostic body fragment. Thin opalescent patina. Period 3, context 13, SF 12.
2. L: 46.5mm. W: 13.8mm. T: 2.2mm. Vessel. Bottle? Pale blue/green. Undiagnostic body fragment. Thin opalescent patina. Period 3, context 10, SF 42.
3. L: 44.8mm. W: 12.2mm. T: 2.7mm. Vessel. Bottle? Pale blue/green. Undiagnostic body fragment. Thin opalescent patina. Same vessel as no. 2 above. Period 3, context 10, SF 42.
4. L: 34.9mm. W: 23.7mm. T: 3.9mm. Vessel. Bottle? Pale blue/green. Undiagnostic body fragment. Thin opalescent patina. Period 3, context 10, SF 42.
5. L: 38.7mm. W: 18.3mm. T: 2.5mm. Vessel. Bottle? Pale blue/green. Undiagnostic body fragment. Thin opalescent patina. Period 3, context 10, SF 42.

THE FAUNAL REMAINS by Vida Rajkovača

The faunal assemblage amounted to some 341 assessable specimens, only 116 of which were assigned to species level (34%). Although a range of post-Roman contexts generated animal bone, the bulk of the material comes from the Roman period.

Methods

Identification, quantification and ageing

The zooarchaeological investigation followed the system implemented by Bournemouth University with all identifiable elements recorded (NISP: Number of Identifiable Specimens) and diagnostic zoning (amended from Dobney and Reilly 1988) used to calculate MNE (Minimum Number of Elements) from which MNI (Minimum Number of Individuals) was derived. Identification of the assemblage was undertaken with the aid of Schmid (1972), and reference material from the Cambridge Archaeological Unit. Most, but not all, caprine bones are difficult to identify to species however, it was possible to identify a selective set of elements as sheep or goat from the assemblage, using the criteria of Boessneck (1969) and Halstead (Halstead *et al.* 2002).

Age at death was estimated for the main species using epiphyseal fusion (Silver 1969) and mandibular tooth wear (Grant 1982; Payne 1973). Where possible, the measurements have been taken (Von den Driesch 1976). Sexing was only undertaken for pig canines, based on the bases of their size, shape and root morphology (Schmid 1972, 80). Withers height calculations follow the conversion factors published by Von den Driesch and Boessneck 1974.

Preservation was assessed on a scale of 1 to 5, with reference to Behrensmeyer (1978), where ‘1’ denotes a bone surface with no cracking or flaking and ‘5’ indicates that the fragment is disintegrating into splinters. Refitting fragments were counted as one specimen. Taphonomic criteria including indications of butchery, pathology, gnawing activity and surface modifications as a result of weathering were also recorded when evident. Butchery marks were located by zone, position of the cut and direction of the mark, multiple occurrence, depth and the implement type, and the function of the mark was assessed. Undiagnostic fragments were assigned to a size category.

Character, provenance and the chronology of the material

Overwhelming majority of material was disarticulated waste recovered from a range of contexts, originating from contexts associated with pre-*forum* deposits, *forum* construction, later Roman activity and a small quantity of bone waste was recovered mixed with more recent material.

Preservation, fragmentation and taphonomy

Preservation ranged from moderate to good, with a minimal number of specimens recorded with any signs of weathering or surface erosion. Two specimens were charred and eight were

recorded as porous, suggesting some younger individuals were represented in the assemblage. Gnawing was observed on 16 specimens, a relatively low figure indicative quick deposition. A total of 67 specimens were recorded as butchered. This corresponds to 13.3% of the assemblage, a relatively high figure showing that material was heavily processed. Although a small proportion of marks were noted on what is clearly a more recent (Post-medieval) material, a series of typically Roman butchery actions were also observed. This high degree of processing and the general character of material affected the assemblage – the only two complete specimens were of chicken.

Period 1: Late first century contexts

Early Roman material came from a range of contexts associated with the origins of the town, fills associated with Pre-*forum* structures and associated layers dated to the late first century. Sheep/ goat and pig were recorded in similar numbers and this was mirrored in the high numbers of sheep-sized elements (Table 7), a sign that the settlement is perhaps not fully Romanised at this stage. The general preference for beef is believed to have come from the Continent with Roman legions populating Britain (e.g. King 1978). Notable is the (small) contribution of poultry to the diet, as chickens were only introduced in the Late Iron Age / Early Roman period.

Period 2: *c.* A.D. 120

This material comes from two distinct sub-phases were recorded (Periods 2A and 2B). Though sheep/ goat continue to be represented in relatively high numbers, cattle (Table 7) are also recorded, clearly reflective of the rise of importance of this animal in the period. Aside from being the main providers of meat, cattle must have been used as a beast of burden in agriculture. Though much smaller, sheep/ goat, pig and poultry appear to have also played an important part in the diet.

	Period 1			Period 2A			Period 2B			Period 3			Period 4		
	Contexts [32], [34] and [36]			*Contexts [23] and [24]*			*Contexts [11], [17] and [22]*			*Contexts [7], [10], [13], [15], [18] and [20]*			*Contexts [2] and [3]*		
Taxon	NISP	%NISP	MNI	NISP	%NISP	MNI	NISP	%NISP	MNI	NISP	%NISP	MNI	NISP	%NISP	MNI
Cow	.	.	.	8	*28.6*	1	4	*33.3*	1	18	*40*	2	7	*31.9*	1
Sheep/ goat	3	*33.3*	1	13	*46.4*	1	2	*16.7*	1	11	*24.5*	2	9	*41*	1
Sheep	.	.	.	.	.	.	.	.	.	1	*2.2*	1	.	.	.
Pig	3	*33.3*	1	1	*3.6*	1	5	*41.7*	1	7	*15.6*	1	3	*13.6*	1
Horse	.	.	.	.	.	.	.	.	.	1	*2.2*	1	.	.	.
Dog	.	.	.	.	.	.	1	*8.3*	1	.	.	.	1	*4.5*	1
Cat	.	.	.	.	.	.	.	.	.	1	*2.2*	1	.	.	.
Rabbit	.	.	.	.	.	.	.	.	.	.	.	.	1	*4.5*	1
Roe deer	1	*11.1*	1	.	.	.	.	.	.	.	.	.	.	.	.
Chicken	2	*22.3*	1	2	*7.1*	1	.	.	.	4	*8.9*	1	.	.	.
Galliformes	.	.	.	3	*10.7*	1	.	.	.	2	*4.4*	1	1	*4.5*	1
Anseriformes	.	.	.	1	*3.6*	1	.	.	.	.	.	.	.	.	.
Sub-total to species	**9**	*100*	**.**	**28**	*100*	**.**	**12**	*100*	**.**	**45**	*100*	**.**	**22**	*100*	**.**
Cattle-sized	1	.	.	12	.	.	3	.	.	48	.	.	22	.	.
Sheep-sized	7	.	.	33	.	.	9	.	.	32	.	.	7	.	.
Rodent-sized	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mammal n.f.i.	.	.	.	1	.	.	10	.	.	12	.	.	18	.	.
Bird n.f.i.	1	.	.	.	.	.	1	.	.	7	.	.	.	.	.
Total	**19**	.	.	**74**	.	.	**35**	.	.	**144**	.	.	**69**	.	.

Table 7: Number of Identified Specimens and the Minimum Number of Individuals for all species from all contexts– breakdown by context/ phase; the abbreviation n.f.i. denotes that the specimen could not be further identified.

The sub-set appears to be dominated by the joints corresponding to high meat value, with a number of scapulae and leg joints present in the assemblage. This is evident from the cattle

and sheep/ goat cohorts. While distal limb elements and teeth were recorded from the assemblage, this could be taken to suggest meat was brought in to site as ‘dressed’ joints. The later component of this sub-set, with slightly higher pig and cattle numbers, might suggest the site is becoming more Romanized.

Period 3: Later Roman

The bone recovered from these fourth-century contexts not only showed a greater variety of species, but we also see an increase in volume of bone waste. Cattle become fully established as the main meat provider, followed by the rest of the domestic cohort. Again, we see a focus on ‘dressed joints’ of beef, obvious were the cattle scapulae. Of 18 cattle elements, four were scapulae, with a typically Romano-British butchery trait – scapulae had perforation in blades and, in case of specimen from [10], the origin of spina articularis was trimmed. This butchery action has been recorded all across the Empire, as a sign that beef was cured. Trimming of spina was carried out in case of scapulae submerged in salt brine, to allow for the salt to penetrate the meat.

Period 4: Post-medieval

Albeit based on a small sub-set, the material seems to favour the consumption of mutton, as the importance of sheep starts to rise again in the Medieval and later periods, probably associated with the significance of wool. Rabbit, chicken (chicken family) and dog complete the range of domestic species, though unusual is the absence of horse.

MARINE RESOURCES

Hand-collected shells were recovered as shown in Table 8

Context	Period	Oyster	Mussel
13	3	2	1
22	2B	0	3
23	2A	4	0
24	2A	4	0

Table 8: Marine shell

THE ENVIRONMENTAL SAMPLES by D. James Rackham and John A. Giorgi

Introduction

A series of samples were received for assessment and analysis (Table 9). Five of these were 'general' (GBA) samples for biological and archaeological study, one for potential radiocarbon dating, <2>, and one taken <5> for possible evidence for metalworking. A small proportion of clay sample <4> was washed, and the remaining samples were treated as for environmental analysis (see below).

Sample	Context	Period	Vol. in l.	Wt kg	Description
1	15	3	38	50	GBA
2	15	3	2	1.95	Charcoal for C14
4	13	3	0.4	0.485	Clay (silty clay) clay analysis
5	24	2A	32	46	Metalwork?
9	17	2B	14	20	GBA
10	34	1	32	46	GBA
11	36	1	21	28	GBA
12	24	2A	7	10	GBA

Table 9: List of samples.

Methods

The soil samples were processed in the following manner. Sample volume and weight was measured prior to processing. The samples were washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.5mm mesh and an internal wet sieve of 1mm mesh for the residue. Both residue and flot were dried and the residues of most of the samples subsequently re-floated to ensure the efficient recovery of charred material. The dry volume of the flots was measured and the volume and weight of the residue recorded.

The residues were sorted by eye, and environmental and archaeological finds picked out, noted on the assessment sheets and bagged independently. A magnet was run through each residue in order to recover magnetized material such as hammerscale and prill and a count made of the number of flakes or spheroids of hammerscale collected. The residue was then discarded. The flot of each sample was studied using x30 magnifications and the presence of environmental finds (i.e. snails, charcoal, carbonized seeds, bones etc.) was noted and their abundance and species diversity recorded on the assessment sheet. The flots were then bagged and along with the finds from the sorted residue, constitute the material archive of the samples. The individual components of the samples were then identified and the results are summarized below in Tables 10 and 11.

Results

The samples washed down to a residue of round and smooth pebbles, with a little flat sandstone in sample <1> and mainly sandstone in <11>, plus coarse sand (grits) with occasional quartz with a small proportion of charcoal, fired earth, ceramic building material, bone, etc. The site lies on superficial deposits of the Vale of York formation comprising predominantly a glacial till of sandy clays, clay with gravel and boulders with interbedded

sands, gravels and laminated clays (http://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=VYORK) and overlies at a depth of perhaps 10m Sherwood sandstones. The mixed pebbles and plated stone probably derives from weathered till and material brought onto the site for construction. The three stone samples comprise burnt calcareous mudstone with no evidence for working and a large piece of 'Roman' concrete in context 23.

Archaeological finds sorted from the residue (Table 10) included pottery (including occasional small chips of post-medieval china that have probably moved down through the soil), ceramic building material, fired earth, corroded iron and hammerscale, with occasional finds of flint, slag, glass, fuel ash slag, mortar, copper alloy slag/prill? and a little coal. The environmental finds (Table 11) include charred cereal grains, chaff, weed seeds, charcoal, domestic animal, small vertebrate and fish bones, marine shell and very occasional snail shells.

It is evident from the frequency of hammerscale in most of the samples that there has been iron smithing in the immediate vicinity. The concentration of hammerscale in <1> and <2> is high but probably not as high as it would be within the smithy itself, that in <10> fairly high while the other samples may merely include material derived from the smithy by windblow or on the feet, or bioturbation after burial. All this material could have derived from one smithy in one particular phase of activity, perhaps the same phase as context 15 (<1> and <2>, Period 3), and possibly context 34 (<10>, Period 1). There are numerous small fragments of fuel ash slag (vitrified silicaceous material) in sample <1> (Period 3, context 15) which might derive from a smithy hearth. The quantity of pottery, iron finds, charred cereals and animal bone all suggest a significant 'domestic waste' component in the deposits, particularly contexts 15 (Period 3) and 24 (Period 2A).

The larger animal bone includes cattle, pig, sheep/goat, roe deer and cf. chicken, plus a single human tooth in context 36 (Period 1). Probable chicken eggshell is present in three samples. Perch and shad have been identified from the fish bones indicating a freshwater fishery, presumably using the nearby river Ure. Both these species were found in Roman deposits at Tanner Row, York (O'Connor 1988), where a freshwater fishery was also indicated. There is a little evidence for trade with the coast in the form of fragments of common mussel and also in two samples the fibrous debris that survives when mussel shells become very degraded. Bones of several small wild vertebrates have been identified including field vole, frog or toad and cf. grass snake. Just a few snail shells have survived the soil conditions in context 15, while a single fragment of *Cecilioides acicula* in sample <9> is almost certainly a recent shell since this species can burrow to up to 1m depth in soil.

Sample	Context	Period	Vol. in l.	Residue (>1mm) vol. in ml	Pot No/wt	Fe no./wt.	Flint no./wt.	CBM wt g.	Burnt stone wt g.	Mag-netic wt. g.	Hammer-scale no.	Slag wt.g. #	Fired earth wt.g.	Bone wt g.	Comment
1	15	3	38	6200	11/3.2	12/12		181		22.6	200+fl, 20+sph			59.6	Mortar-3.8g; large round pebble (306g) unworn! Glass – 15/0.4g – some post-med?; fuel ash slag in flot; includes post-med china chips
2	15	3	2	410				1	+	2	19fl		+	7	a little mortar; a little fuel ash slag in flot; residue with lots of heated stone and concretions.
4	13	3	0.48	20	1/0.5	2/1		+			2 fl			+	Marine shell fragments present; corroded iron
5	24	2A	32	2500	23/52	10/31.8	1/0.4	21		8	19 fl, 2 sph		8	57.8	Glass – 3/0.1g some post-med?; includes post-med china chips
9	17	2B	14	1000	2/5.4			27		1.6	11 fl,	<1g	23	3.6	Mortar – 4.4g; Glass – 1/<0.1g; a little coal in flot
10	34	1	32	1400	5/1	5/11.4		1		5.2	99fl, 5sph		5	17.8	Corroded Cu slag/prill?
11	36	1	21	2000	1/1					2.8	14fl	<1g	9	10.8	
12	24	2A	7	800	2/3.8			9	1	1.8	3fl, 1 sph		1	8	Mortar – 0.5g;

- P = present in magnetic residue/flot; + present in very small quantities and not weighed; fl – flakes hammerscale; sph – spheroids of hammerscale.

Table 10: Archaeological finds from the processed samples, arranged in sample order.

Sample	Context	Period	Vol. in l.	Flot vol. (ml)	char coal */<2*	charred grain *	chaff *	charred seed *	water logged seeds*	bone *	snails *	comment
1	15	3	38	55	4/5	3	2	3	2	3	1	Charred grain (*Triticum dicoccium/spelta, Hordeum vulgare*, cf. *Avena*) chaff (*Triticum spelta* glume bases/rachis fragments, *Triticum* glume bases, spikelet bases), weed seeds (*Sherardia arvensis, Plantago lanceolata, Medicago/Trifoilum, Rumex, Anthemis cotula, Corylus avellana* shell,) occ. coleoptiles, culm node fragments; uncharred *Sambucus* seeds; mussel shell fibres; pig, sheep size, cattle size, frog/toad, field vole, rodent, burnt bone; cf. chicken eggshell,; marine mussel; snails – *Discus rotundatus, Trichia hispida, Aegopinella nitidula, Cochlicopa* sp,
2	15	3	2	55	3/5	3	2	3			1	Charred grain (*Triticum dicoccium/spelta, Hordeum vulgare*, cf *Avena*) chaff (*Triticum spelta* glume bases/rachis fragments), charred weed seeds, grasses, *Corylus avellana* shell; indet. mostly burnt bone, vole; cf. chicken eggshell; snails – *Vallonia excentrica, Vallonia costata;* charcoal generally fairly comminuted.
4	13	3	0.2	2	3/4					1		Charcoal only plus a little indet. animal bone and marine shell; cf. chicken eggshell
5	24	2A	32	48	5/5	2	1	2	1	2	-	Charred *grain (*cf *Triticum aestivum, Triticum, Hordeum, Avena*); chaff *(Triticum spelta* glume base); weed seeds (*Galium aparine*, Fabaceae (large), *Ranunculus, Carex*, Poaceae (small), *Corylus avellana* shell); cattle size, sheep size, pig, frog/toad, rodent, cf. chicken, cf. perch; mussel shell fibres;
9	17	2B	14	3^	5/5	1			1	2	1	Charred *Hordeum*, indet grains; charred Poaceae (small); uncharred seeds (*Polygonum aviculare, Rubus*); indet bone-mainly burnt, rodent skull; snails – *Cecilioides acicula*;
10	34	1	32	40	4/5	1		1	1	2	-	Charred *Hordeum* grain; charred seeds *(Atriplex, Medicago/Trifoilum*, Cyperaceae); cattle, indet bone, including burnt, rodent, cf. grass snake, shad – *Alosa* sp.; mussel shell fibres;
11	36	1	21	6^	3/4	1		1		2	-	Charred grain, indet, cf. *Pisum*, Cyperaceae; uncharred seeds (*Carex*) sheep/goat, human tooth, roe deer phalange, frog/toad;
12	24	2A	7	1^	1/2	1		1		2	-	Charred *Triticum aestivum* grain, charred seeds (*Carex*); sheep/goat, indet bone some burnt

/ frequency of charcoal recovered from first flot/second flot - frequency 1=1-10; 2=11-50; 3=51-150; 4=151-250; 5=>250) ; *frequency 1=1-10; 2=11-50; 3=51-150; 4=151-250; 5=>250;
^ one flot only!

Table 11: Environmental finds from the processed samples

The shells in <1> Period 3, context 15 (Table 11) are too few for interpretation but include species of woodland/shade and catholic habit, while the two shells from <2> from the same context are typical of short turved grassland.

The Charred Plant Remains

The eight samples produced variable amounts of charred plant remains with the best assemblages being in samples <1>, <2> and <5> with only occasional finds in four samples and only charcoal in the small sample from context 13. Preservation was variable but generally poor with the remains consisting mainly of grains in seven flots, small amounts of chaff in three flots and small to modest amounts of wild plant/weed seeds in seven flots. The charred grains included wheat (*Triticum*) with evidence for hulled emmer/spelt wheat (*Triticum dicoccum/spelta*) in samples <1> and <2> (both Period 3, context 15), chaff fragments showing the presence of spelt wheat in samples <1>, <2> and <5> (Period 2A, context 24), and occasional free-threshing wheat (*Triticum aestivum/turgidum*) grains in samples <5> and <12> (Period 2A, context 24). There were also occasional barley (*Hordeum vulgare*) grains in five samples and a few oat (*Avena*) grains in three flots. Some of the grains in sample <1> had germinated with the same sample also producing a few loose cereal coleoptiles. There was a range of potential arable weed seeds particularly in samples <1> and <2> including *Sherardia arvensis* (field madder), *Anthemis cotula* (stinking chamomile), *Galium aparine* (cleaver), *Medicago/Trifoilum* (medick/trefoil), *Carex* (sedge), *Bromus* (brome) and small and large seeded wild grasses (Poaceae). Possible pea (cf. *Pisum*) was noted in sample <11> (Period 1, context 36) while there were a few hazel (*Corylus avellana*) nutshell fragments in samples <1> and <5>.

The charred remains may provide information on crop husbandry during the Roman period from the range of crops being grown and used, to the types of soils being cultivated (*Sherardia arvensis* and *Anthemis cotula* suggesting the use of calcareous soils) and sowing times, *Galium aparine* pointing to autumn sown crops. The composition of the two richer samples may also provide an indication of crop-processing and other activities on site.

Discussion

The samples have produced a range of finds with both domestic and 'industrial' evidence present. There is clear evidence for iron smithing on the site with the highest concentrations of hammerscale in context [15]. The C14 sample, <2>, from context [15] had a particularly high burnt small stone and fired earth component in the residue, with burnt bone and a relatively high density of charcoal suggesting perhaps a dump of hearth material or *in situ* burning. Hammerscale is more concentrated in this context but not sufficiently to suggest a smithing hearth. The fuel ash slag indicates vitrified silicaceous material suggesting a fairly high temperature. Contexts [15] and [24] both produced a mix of finds suggesting domestic rubbish, but [15] also includes smithing debris and possibly some crop processing debris since charred cereal chaff and weed seeds are relatively abundant. In samples <9> to <12> the charred plant assemblages were much less rich, but the deposits still include a range of 'domestic' debris in addition to a very light scatter of iron smithing hammerscale. A single human tooth from context 36 could just be accidental loss and need not indicate a burial.

Charred cereals, pulses, nuts and weed seeds have survived well, although many of the grains were too 'exploded' to identify to species, and can be expected to allow a consideration of some of the plant foods available at the site and their relative importance, while the weed assemblages may reflect aspects of the crop husbandry. Spelt wheat, barley, possibly oats and peas, and hazelnuts were food items. Spelt and barley are the typical major crops of the Roman period (Grieg 1991). The animal bone indicates consumption on site of beef, mutton, pork, fowl and possibly venison, with evidence for eggs also being consumed and probably local freshwater fish. The only evidence for foodstuffs that must have come some distance, in this case the coast, are the few fragments of marine mussel shell.

Small vertebrates and snail shells can be used to identify the local environment but their density in these samples is low, and the context within a Roman settlement makes this aspect of the environmental study perhaps less important. The grass snake is perhaps unexpected in such a context.

Sample 2 was taken for potential radiocarbon analysis of the charcoal. None of the charcoal in this deposit is particularly suitable for dating, but the deposit contains charred cereal grains which were dated (Xref above).

These initial samples have indicated that the potential of samples from the site is high with industrial, domestic and crop processing evidence all being found. The different densities of these elements means that the samples may also supply information on the spatial distribution of this debris and permit the identification of activity areas, so sampling should be undertaken across all excavated areas. The mussel shell has degraded in some of the deposits so it may not be possible to quantify these remains and presence/absence data may be all that can be recovered in each context. Further work should at some stage be undertaken on the charred plant remains to specifically identify and quantify the remains. The animal bone from the samples offers a control against the hand collected animal bone from the site and its fragmentation, identification and weight in the samples can be used to assist in the interpretation of the hand collected assemblage, while the small bones of fish and fowl and the bird eggshell will only be recovered by sampling. Bird eggshell can now be specifically identified using the ZooMS technique (Stewart *et al.* 2013) and this may be appropriate if significant quantities are recovered.

Acknowledgements
We should like to thank Trude Maynard and Angela Bain for the processing of the samples, and Alison Locker for identifying the fish bones.

DISCUSSION

It should be recognised at the outset that this was a very small excavation, even though one which has produced excellent information, so we need to be cautious in drawing broader conclusions about the town from the excavated sample. Several of the issues addressed here have already been discussed in our volume on the survey of Roman Aldborough, especially in the discussion of the *forum* and its relationship to the town plan (Ferraby and Millett 2020a, 100–08).

The trench reached the base of the sequence over a comparatively small area, but this did provide evidence for early structures, albeit of uncertain plan and function. It should however be noted that both features shared the east–west orientation of the trench (Fig. 14). This is significant and provides tangible support for the suggestion that Low Road follows the approximate line of the primary Roman routeway that led from York to the fort and river crossing to the west of Aldborough at Roecliffe (Ferraby and Millett 2020a, 98, figs 4.2 and 4.5). If the Roman road did follow this route, it would have passed a *c.* 5m to the north of our trench, and was later fronted by the *forum*, which we have suggested may have had a portico along this façade. If the earlier line of the road followed this course, then the Period 1 features may well also relate to timber buildings fronting it.

The material from Period 1 deposits, along with those of Periods 2A and 2B which represent redeposited material much of which probably derives from the levelling of the slope to create the *forum* platform, provides information about the character of the early settlement. The evidence from the flotation samples indicates a variety of economic activity including iron-working and crop-processing, with clear evidence of a developed supply system of arable products and dressed joints of meat, as well as newly introduced species such as chicken, and the exploitation of the river for fishing. In addition, the enigmatic copper alloy object from the trench analysed by Marcos Martinón-Torres and colleagues (above p. 19ff.) may relate to the working of non-ferrous metals on the site at this period as suggested by the results of our 2019 excavation (Ferraby and Millett 2020b). All this in consistent with the knowledge that is accumulating for the rapid development of a sophisticated centre on the site in the latter part of the first century A.D., focused on the interface between the river and the Roman road, that was extended to connect to the northern Roman frontier during this period.

The date of the origin of this settlement still remains a little uncertain, although it must lie in the 70s A.D. We have previously argued for a date early in this decade (Ferraby and Millett 2020a, 94–98), although Evans (above, p. 34) and Brickstock (2019, 55–58) both favour a slightly later date. It is probably not going to be possible to resolve this difference of opinion until we have a better sample of material from early deposits on the site, but it is worth noting here that the ratios of samian vessels of form Dr. 29 to those of from Dr. 37 discussed above by Evans, are difficult to interpret for two reasons. First, although the Dr. 37 was actually introduced earlier than A.D. 70 (Millett 1987, 104) there seem to have been significant local variations in the volume of supply of different vessel forms. For instance, the Roecliffe fort

(occupied *c.* A.D. 70–80/85; Ferraby and Millett 2020a, 92) has a Dr. 29:Dr. 37 ratio of 9:4 (Bishop 2005, 164) whilst the fort at Hayton, occupied *c.* 70–89/97 (Millett 2015, 508-14), has a ratio of 1:8 (Willis 2004, table 6). Secondly, it seems certain that this ratio will vary depending on both the length and intensity of occupation. The overall Aldborough ratio (Table 12) is thus likely to be biased heavily in favour of the later Dr. 37 as a result of continuous and increasingly intensive occupation late in the period of South Gaulish supply around the end of the first century A.D. This contrasts with the pattern seen on the fort at Roecliffe that ceased occupation in the early–mid 80s. We clearly need better evidence, but at present the exact date of commencement of occupation at Aldborough within the decade AD 70 to AD 80 remains unclear.

Site (Gazetteer no from Ferraby and Millett 2020a)	**Dr. 29**	**Dr. 37**
G39 (F. Oswald in Myres *et al.* 1959, 37)	1	0
G43 (F. Oswald in Myres *et al.* 1959, 72–73)	0	3
G49 (S.H. Willis in Snape *et al*. 2002, 70–71)	0	2
G53 (S.H. Willis in Snape *et al*. 2002, 71–76)	0	2
2017 Excavation	0	4
2018 Excavation	0	1
Total	1	12

Table 12: ratio of South Gaulish samian Dr. 29 to Dr. 37 bowls known from the walled area of Aldborough

By contrast the evidence for the date of the construction of the *forum* seems reasonably secure. Although much of the Period 2 material must be re-deposited and is dominated by Flavian material, there is a consistent element that dates to the period A.D. 100–120, indicating construction in the Hadrianic period. This would be consistent with the date of the gold coin of A.D. 114–17 found in 1770 which is arguably a deliberate foundation deposit (Brickstock 2019, 58).

The excavation definitively established the orientation of the walls planned in 1770. They were shown to share the same orientation as the street grid, thus disproving our earlier suggestion that the the *forum* may have related to an earlier phase of planning. As fully discussed elsewhere, the construction of the *forum* is most likely associated with a replanning of the town, the laying out of the street grid and the construction of a new bridge across the river Ure (Ferraby and Millett 2020a, 100–08). The scale of terracing required for the construction of the *forum* alone indicates a very major engineering project which has significant implications for our understanding of the economic and political importance of the settlement.

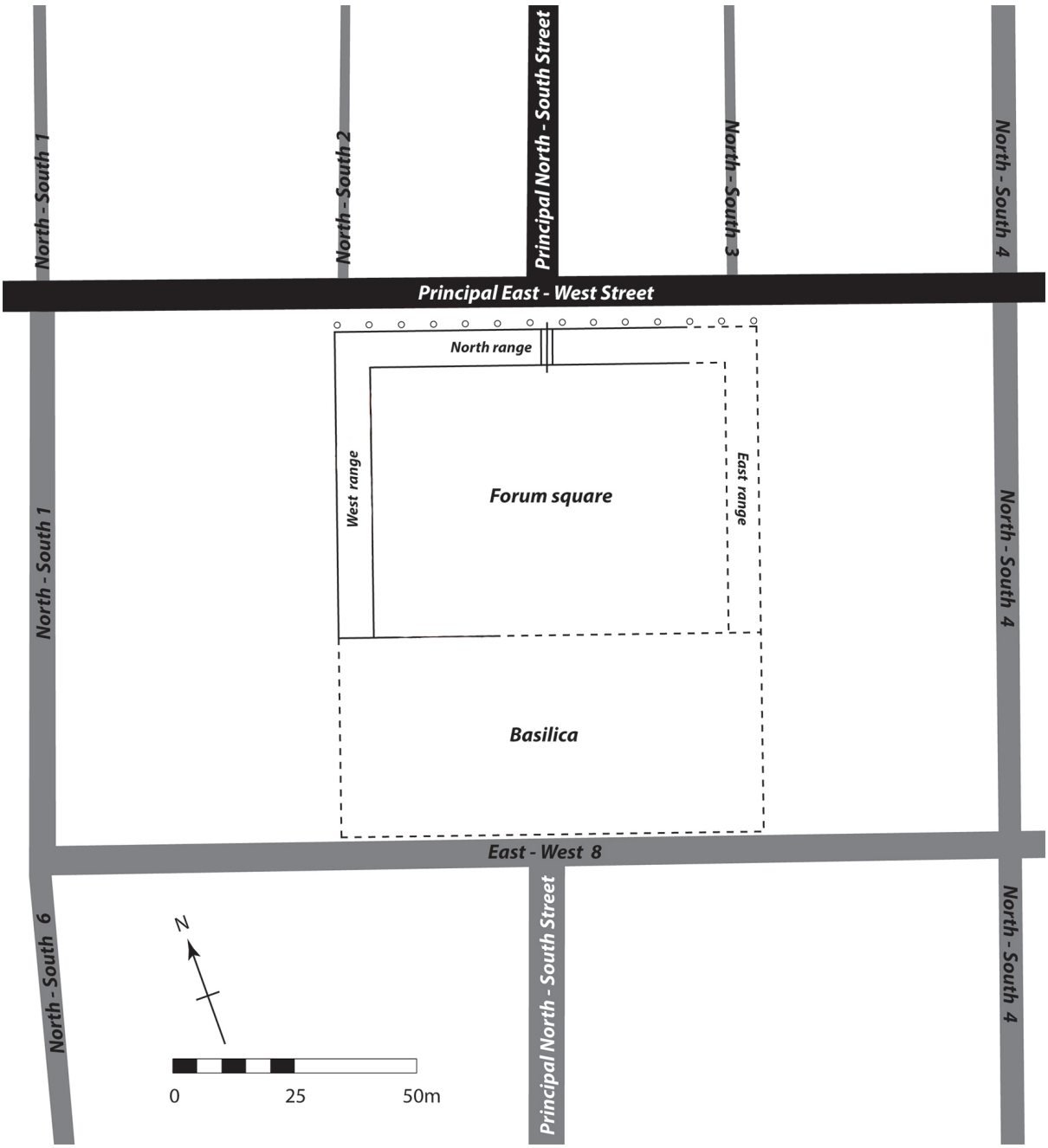

Figure 40: Plan of the forum, basilica and surrounding streets as plotted from geophysical surveys and the excavation. (Drawing: Rose Ferraby).

The evidence from the excavation confirms the accuracy of the plans of the northern range of the *forum* made in the eighteenth century (above, pp. 2–4) whilst also showing that the building was monumental and well-constructed. The area explored by our trench can be shown to cover part of the northern entrance to the *forum*, and the two rooms to its east. The 1770 account indicates that a substantial tile-covered drain flowing north passed beneath the entrance, presumably accounting for the slightly different stratigraphic sequence we noted in this room. The entrance and sewer were aligned with the principal North–South Street which forms the axis of the street grid, leading directly to the North Gate, thence to the new bridge over the river Ure. The Principal East–West Street (beneath Low Road), which linked the East and West Gates, formed a T-junction with the Principal North–South Street immediately

outside the *forum* entrance. Given the estimated position of the frontage along the Principal East–West Street (which can be reasonably accurately inferred from previous discoveries), we suggest that there was a portico or colonnade along this frontage.[4] In this context we may note that Stukeley's account refers to the discovery of two pieces of pillars here, one of which was of the Doric order if his reference to a *hypotrachelion* (necking groove) is technically accurate (Stukeley 1776, 73–74). There are no surviving pieces of Doric column from the site, and indeed this order is apparently absent from the architectural repertoire of Roman Britain where the Tuscan order was the norm (Blagg 2002). This indicates that the column seen by Stukeley is unlikely to have been Doric. However, there is a fragment of unfluted gritstone column with a necking groove amongst the architectural fragments now in the grounds of Aldborough Manor (Ferraby and Millett 2020a, appendix 4 no. 25) which may well be the piece he describes. Its diameter (*c.* 0.48m) is amongst the largest of the surviving columns from the site, and would indicate a height in the range 3.36m–3.84m, which allowing for base, capital, entablature and stylobate, would imply an overall height of approximately 5m–5.5m. Given that the width of the north range is recorded as 18 feet (*c.* 5.5m), it seems likely that this column does come from this colonnade (see Fig. 41).

Conventionally, one would expect the excavated range of rooms to have formed *tabernae* (shops) that faced inwards, opening on to the *forum* square. In this case, the suggested presence of an external colonnade allows two alternative reconstructions, with the *tabernae* opening either to the street or onto the square. Architecturally, the latter is the more likely, leaving a blank wall behind the roadside colonnade.

The walls themselves were built of blocks of dressed Cadeby limestone in 'petit appareil'. This would have produced a very striking impression, especially when combined with the red tile of the roofing, contrasting with the more general use of red sandstone in other buildings within the town. This stone of Permian age, previously referred to as the Lower Magnesian Limestone, was widely exploited in buildings in Roman York (Buckland 1988). It outcrops along the western flank of the Vale of York where there were several possible quarry sources. Perhaps the most likely lie to the west of Tadcaster, *c.* 25km to the south of Aldborough, which was easily accessible via the rivers that seem most likely to have been used for the transport of large quantities of stone. The Roman name for Tadcaster (*Calcaria* – Rivet and Smith 1979, 288–89), probably reflects its importance as a source of limestone. However, that settlement lies not on the Cadeby outcrop, but on the Brotherton Formation, the stone from which was less suitable for building, but may have been used for making lime (Gaunt and Buckland 2002). An alternative source of Cadeby limestone for Aldborough may be the quarry that has been partly excavated at Well, *c.* 20km to the north-west. Here there is secure evidence for the exploitation of the stone in the period from *c.* A.D. 70–120, albeit on a modest scale (Gilyard-Beer 1951, 38, 40), although stone from here would have had to be transported by land. Whatever the source, the transport of huge quantities of building stone to Aldborough is indicative of the significance of the building project to the town.

[4] A small excavation undertaken in 2021 by On-Site Archaeology adjacent to the front of the Ship Inn uncovered part of a wall foundation that is most likely to have supported this colonnade (Emerick, *pers. comm.*).

We have no indication of the internal finish of the building or the nature of the original flooring as a result of the repurposing of the structure in Period 3. There are indications that the floor was removed and this part of the building being reused, perhaps for industrial activity. Although the excavated hearth was not itself used for iron working, the environmental samples provide clear evidence for the presence of blacksmithing nearby. Such changes in use have been documented at a series of other *fora*, although in most other cases the evidence comes from excavated basilicas, rather than from *tabernae* (Rogers 2011, 130–34).

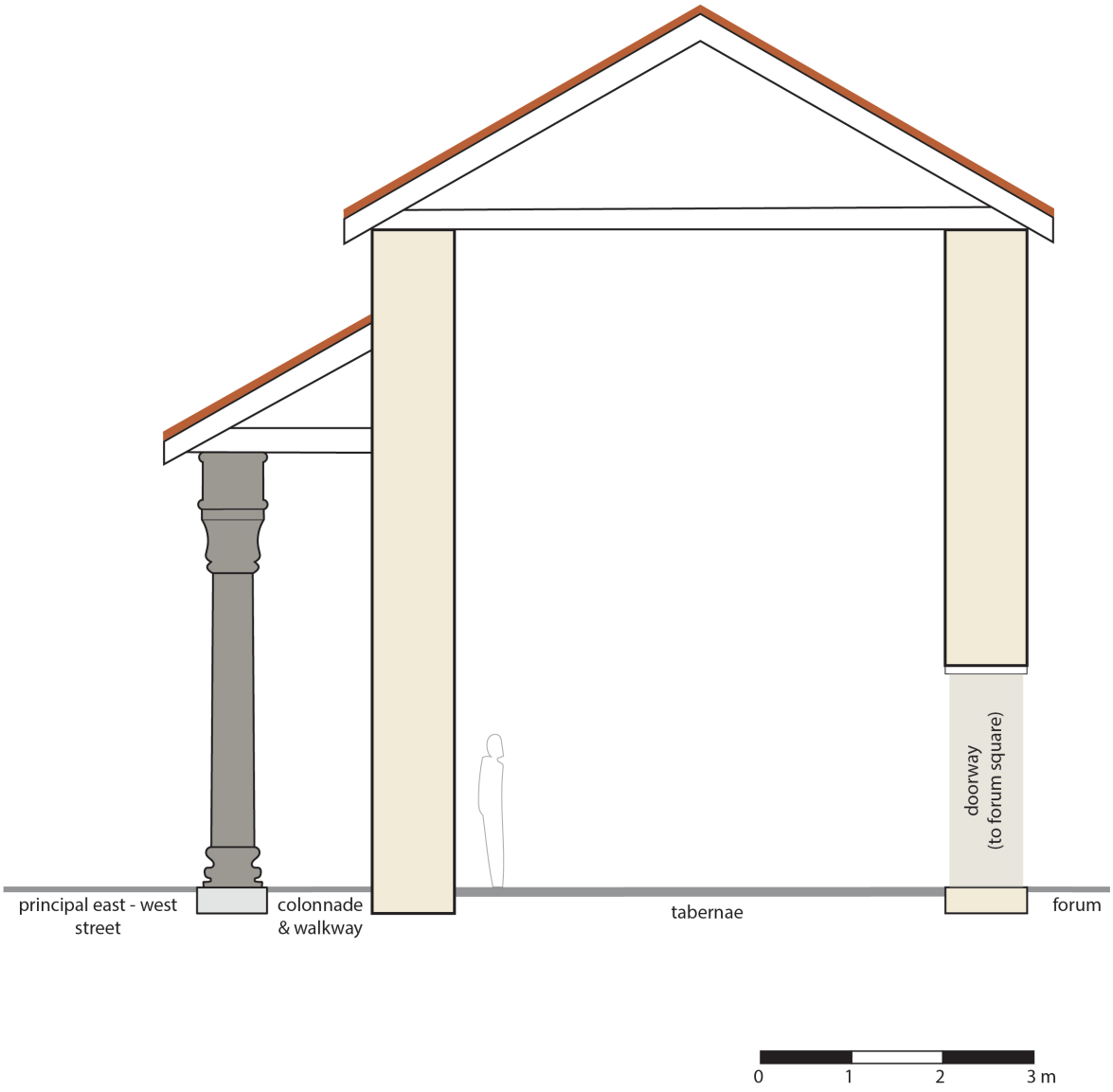

Figure 41: Reconstruction drawing of the cross section through the excavated rooms of the north range of the forum, facing east. (Drawing: Rose Ferraby).

The exact date of this change of use remains uncertain. It is firmly fixed within a broad range by the two radiocarbon dates from the hearth (context 15) as each sample was from a single

grain of cereal with a one-year life-span, and the two dates are almost identical (1666±26 B.P. [SUERC 84781] and 1649±26 B.P. [SUERC 84782]). When calibrated and combined this gives an age range of 343–421 cal. A.D. at the 95% confidence level (Fig. 42). This is compatible with the evidence of the pottery, but leaves open the possibility of the activity having taken place either in the second half of the fourth century or the first quarter of the fifth, with the historical significance of these different dates being entirely different. There are increasing signs that activity at Aldborough continued into the fifth century (Ferraby and Millett 2020a, 120–21), with emerging evidence of a complex and long-running occupation sequence in the 2019 excavation near the North Gate (Ferraby and Millett 2020b). Frustratingly, at present one cannot tell whether the reuse of the *forum* formed part of this activity and indicates the continuation of a vibrant settlement into the sub-Roman period, or if it relates to an earlier phase, evidence of a decline of the civic centre during an urban transformation in the fourth century.

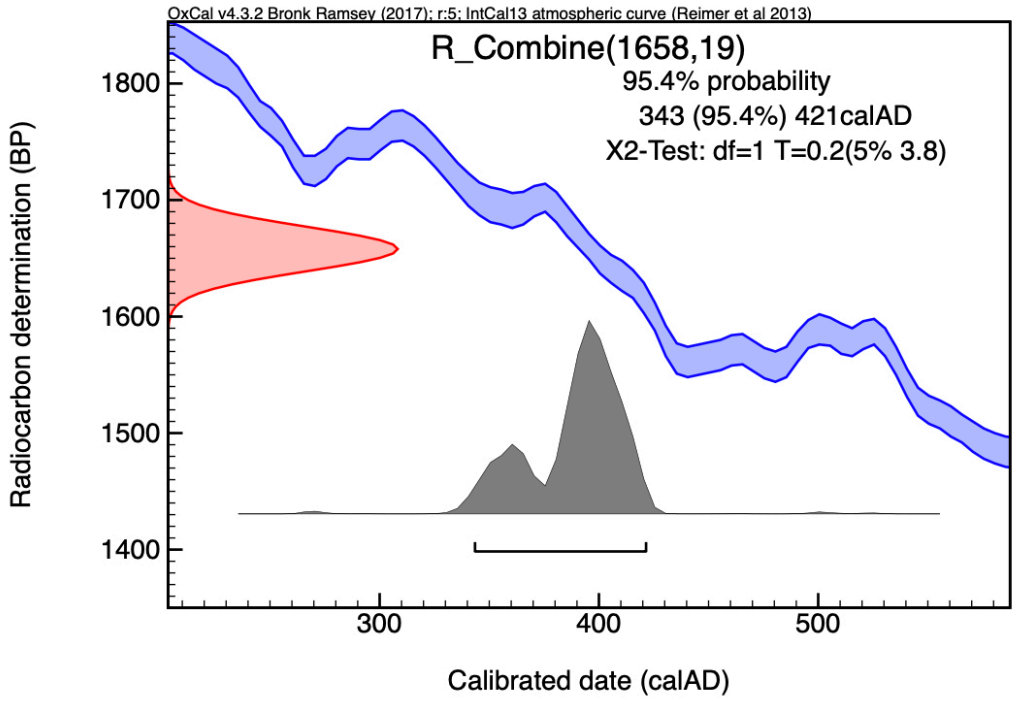

Figure 42: Calibration of the combined radiocarbon dates 1666±26 B.P. (SUERC 84781) and 1649±26 B.P. (SUERC 84782) from the hearth (context 15).

ACKNOWLEDGEMENTS

We are owe a huge debt of thanks to Andrew Lawson-Tancred for his assistance with permissions and logistics for this excavation. Our thanks also to Aldborough Parish Council, in particular Aidan Foster, Sean Hynes and Nick Kirkwood. Donna and Gigi Signorelli were key team members on site, and we are particularly grateful for their hard work in establishing the correct highways protocols. Jason Lucas and Hanneke Reijnierse-Salisbury both gave up their free time to come and help with the excavation, and we are very grateful to Jason for his survey work. Our thanks to Dominic Powlesland (Landscape Research Centre) for his ongoing advice, for carrying out the photogrammetric survey and creating 3D models of the trench. Many thanks to Dave Haldenby, Roy Doughty and Chris Hannard for volunteering their metal detecting expertise. Being in such a central and visible location, our many thanks go out to the residents of Aldborough for their patience, interest and enthusiasm during the excavation, and to Elaine and Brian at the Ship Inn for refreshments. As ever, we are grateful to the trustees of FORA for publicising the work and organising the annual talk. The excavation was funded by a grant from the McDonald Institute for Archaeological Research and a generous donation from Chris and Jan Martins.

Figure 43: Gigi Signorelli, Donna Signorelli, Hanneke Reijnierse-Salisbury and Arwen at the end of a digging day (looking east).

REFERENCES

Abbreviations:

H.K. = Hill and Kent, Part I in R.A.G. Carson, P.V. Hill and J.P.C. Kent *Late Roman Bronze Coinage,* London 1960

R.I.C. = *Roman Imperial Coinage*

Works cited:

Bayley, J. and Butcher, S. 2004. *Roman Brooches in Britain: a technological and typological study based on the Richborough Collection.* London, Society of Antiquaries Research Report 68.

Behrensmeyer, A.K., 1978 Taphonomic and ecologic information from bone weathering. *Paleobiology* 4(02): 150–62.

Bishop. M. C. 1996 *Finds from Roman Aldborough: a catalogue of small finds from the Romano-British town of Isurium Brigantum.* Oxford, Oxbow Monograph 65.

Bishop, M. C. 2005 A new Flavian military site at Roecliffe, North Yorkshire, *Britannia* 36: 135–223

Blagg, T.F.C, 2002 *Roman architectural ornament in Britain*. Oxford, BritishArcaheological reports no. 329.

Boessneck, J. 1969 Osteological difference between Sheep (*Ovis aries* Linné) and Goat (*Capra hircus* Linné). In D.R. Brothwell and E.S. Higgs (eds) *Science in Archaeology: a survey of progress and research* (2nd edition): 331–58. London, Thames and Hudson.

Booth P., 2000 *The Oxford Archaeology Roman Pottery Recording System: an introduction.* Unpublished Oxford Archaeology Manual.

Brewer, R. 1986 The Glass Gaming Counters. In J.D. Zienkiewicz *The Legionary Fortress Baths at Caerleon. Vol. II: The Finds*: 155–56. Cardiff, National Museum of Wales.

Brickstock, R. 2019 Roman Coins from Aldborough: a re-assessment and overview, *Yorks Archaeol J,* 91: 49–70.

Buckland, P.C. 1988 The stones York: building materials in Roman Yorkshire. In J. Price and P.R. Wilson (eds) *Recent Research in Roman Yorkshire*: 237-87. Oxford, British archaeological reports no. 193.

Cool, H.E.M. 2016 *The Small Finds and Vessel Glass from Insula VI.1 Pompeii: Excavations 1995–2006.* Oxford, Archaeopress Roman Archaeology 17.

Crummy, N. 1983 *The Roman Small Finds from Excavations in Colchester, 1971–9*. Colchester, Colchester Archaeological Reports 2.

Dobney, K., and Reilly, K., 1988 A method for recording archaeological animal bones: the use of diagnostic zones, *Circaea* 5 (2): 79–96.

Dobinson, C., Ferraby, R., Lucas, J., Millett, M. and Wallace, L. 2018 Archaeological field-survey in the environs of Aldborough (*Isurium Brigantum*), *Yorkshire Archaeological Journal* 90: 29–58.

Dungworth, D. 1995. *Iron Age and Roman Copper Alloys from Northern Britain.* PhD thesis, University of Durham.

Dungworth, D. 1997a. Iron Age and Roman Copper Alloys from Northern Britain. *Internet Archaeology* 2, https://doi.org/10.11141/ia.2.2

Dungworth, D. 1997b. Roman copper alloys: analysis of artefacts from northern Britain. *Journal of Archaeological Science* 24, 901–10.

Evans, J., 1996 The Roman pottery. In D.S. Neal *Excavations on the Roman villa at Beadlam, Yorkshire*: 69–92. Leeds, Yorkshire Archaeological Report 2.

Evans, J., 2006 The Roman pottery. In M. Millett *Shiptonthorpe, East Yorkshire: archaeological studies of a Romano-British roadside settlement*: 126–201. Leeds, Yorkshire Archaeological Report 5.

Evans, J., and Rátkai, S., 2010 Roman coarse pottery. In I. Ferris, I (ed.) *The Beautiful Rooms are Empty: excavations at Binchester Roman fort, County Durham, 1976–1981 and 1986–1991*: 113–217. Durham, Durham County Council.

Ferraby, R., and Millett, M. 2018 *Excavations at Aldborough (Isurium Brigantum) 2018: Interim Report*. https://doi.org/10.17863/CAM.39573

Ferraby, R. and Millett, M. 2020a *Isurium Brigantum: an archaeological survey of Roman Aldborough,* London, Society of Antiquaries Research Report no. 81.

Ferraby, R. and Millett, M. 2020b *Excavations at Aldborough (Isurium Brigantum) 2019: Interim Report*. https://doi.org/10.17863/CAM.63239

Ferraby, R., Millett, M., Dunbar, E., Evans, J., Giorgi, J., Lucas, J., Mills, P., Monteil, G., Powlesland, D., Rackham, J., Rajkovača, V., Signorelli, G., Verdonck, L. 2022. Aldborough Roman Town Project: 2017 Excavations [dataset] https://doi.org/10.17863/CAM.84093

Gaunt, G.D. and Buckland, P.C. 2002 Sources of building material in Roman Yorkshire. In P. Wilson and J. Price (eds) *Aspects of Industry in Roman Yorkshire and the North*: 133–44. Oxford, Oxbow Books.

Gilyard-Beer, R. 1951 *The Romano-British Baths at Well.* Leeds, Yorkshire Archaeological Society.

Gough, R 1789 *Britannia: or, a chorographical description of the flourishing kingdoms of England, Scotland, and Ireland, and the islands adjacent; from the earliest antiquity. By William Camden. Translated from the edition published by the author in MDCVII. Enlarged by the latest discoveries*, London, John Nichols.

Grant, A. 1982 The use of tooth wear as a guide to the age of domestic animals. In B. Wilson, C. Grigson and S. Payne (eds) *Ageing and sexing animal bones from archaeological sites*: 91–108. Oxford, British Archaeological Reports, British Series 109.

Greig, J. 1991 The British Isles. In W. van Zeist, K. Wasylikowa and K.-E. Behre (eds) *Progress in Old World Palaeoethnobotany*: 229–334. Rotterdam, Taylor and Francis.

Halstead, P. Collins, P and Issakidou, V. 2002 Sorting the sheep from the goats: morphological distinctions between the mandibles and mandibular teeth of adult *Ovis* and *Capra, Journal of Archaeological Science* 29: 545–53.

Hargrove MS Manuscripts of William Hargrove 1777–1825. (Eight Vols). York Record Office manuscript no. GB 192 HAR

Hartley, B.R., and Dickinson, B.M. 2012 *Names on Terra Sigillata: Volume 9 (T to Ximus)*, Bulletin of the Institute of Classical Studies Supplement 102-08. Institute of Classical Studies, University of London, London

Jouttijärvi, A. 2017. Roman alloying practice, *Materials and Manufacturing Methods* 32: 813–26.

King, A.C. 1978 A comparative survey of bone assemblages from Roman sites in Britain, *Bulletin of the University of London Institute of Archaeology* 15: 207–32.

Manning, W. H. 1976 *Catalogue of Romano-British Ironwork in the Museum of Antiquities Newcastle upon Tyne*. Newcastle, Museum of Antiquities.

Millett, M. 1987 Boudicca, the first Colchester Potter's Shop and the dating of Neronian Samian, *Britannia* 18: 93–124

Millett, M. 2015 Archaeological studies of the Hayton data. In P. Halkon, M. Millett and H. Woodhouse (eds) *Hayton, East Yorkshire: archaeological studies of the Iron Age and Roman landscapes*: 498–541. Leeds, Yorkshire Archaeological Report no. 7,

Millett, M and Ferraby, R 2016 *Aldborough Roman Town*. London, English Heritage Guidebooks.

Millett, M. J., Dobinson, C., Ferraby, R., Wallace, L., and Lucas, J. 2018 *Research data supporting the publication of "Archaeological field-survey in the environs of Aldborough (Isurium Brigantum)"* [Dataset]. https://doi.org/10.17863/CAM.21743

Myres, J.N.L., Steer, K.A., and Chitty, A.M.H. 1959 The defences of Isurium Brigantum (Aldborough), *Yorkshire Archaeological Journal* 40: 1–77.

O'Connor, T.P. 1988 *Bones from the General Accident site, Tanner, Row*. *Archaeology of York 15/2*. London, Council for British Archaeology.

Payne, S. 1973 Kill off patterns in sheep and goats: the mandibles from the Asvan Kale, *Anatolian Studies* 23: 281–303.

Price, J. 1995 Glass Counters and Gaming Pieces. In W.H. Manning *Report on the Excavations at Usk 1965–1976. The Roman Small Finds*: 129–34. Cardiff, University of Wales Press.

Rivet, A.L.F. and Smith, C. 1979 *The place-names of Roman Britain.* London, Batsford.

Rogers, A. 2011 *Late Roman towns in Britain: rethinking change ad decline.* Cambridge, Cambridge University Press,

Schmid, E. 1972 *Atlas of animal bones*. Amsterdam: Elsevier.

Snape, M., Bidwell, P., and Croom, A. 2002 Aldborough Roman town: excavations by Miss D. Charlesworth, 1961–73, and by RCHME, 1959–60, *Yorkshire Archaeological Journal* 74: 29–111.

Stewart, J.R.M., Allen, R.B., Jones, A.K.G., Penkman-Mathew, K.E.H. and Collins, M.J. 2013 ZooMS: making eggshell visible in the archaeological record, *Journal of Archaeological Science* 40/4: 1797–1804.

Stukeley, W 1776 *Itinerarium Curiosum; or an account of the antiquities and remarkable curiosities in nature or art observed in travel through Great Britain*, (2nd edition). London, Baker and Leigh.

Von den Driesch, A. 1976 A guide to the measurement of animal bones from archaeological sites, *Peabody Museum Bulletin* 1. Cambridge Mass., Harvard University.

Von den Driesch, A. and Boessneck, J., 1974 Kritische anmerkungen zur widerrist höhenberechnung aus Langenmassen vor- und frühgeschichtlicher Tierknochen, *Saugetierkundliche Mitteilungen* 22: 325–48.

Warry, P. 2006 *Tegulae, Manufacture, Typology and Use in Roman Britain,* Oxford, Archaeopress: BAR British Series 417.

Williams, D. 1973 Flotation at Siraf, *Antiquity* 47: 198–202.

Willis, S. 2004 Samian Pottery: a resource for the study of Roman Britain and beyond: the results of the English Heritage funded Samian Project. An e-monograph, *Internet Archaeology 17*. https://doi.org/10.11141/ia.17.1