



Plate 1. Overall View of Kiln. Facing East.



Plate 2. Floor of Flue Channel 034. Facing North.



Plate 3. Eastern Wall of Flue. Facing East.



Plate 4. Western Wall of Flue. Facing West.



Plate 5. Flue Structure 026. Facing North.



Plate 6. Half-section of Lining 028. Facing West.



Plate 7. Slots in western wall of Kiln. Facing West.



Plate 8. Kiln Floor 037. Facing West.



Plate 9. Secondary Floor of Kiln. Facing West.

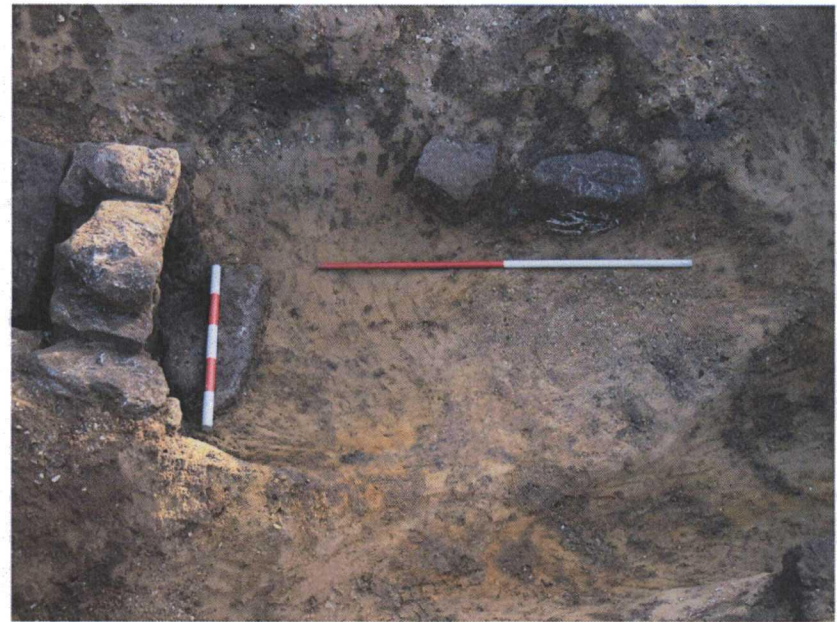


Plate 10. Stoke-hole and Flue Arch. Facing East.



Plate 11. Ditch Segments 009 and 010. Facing East.

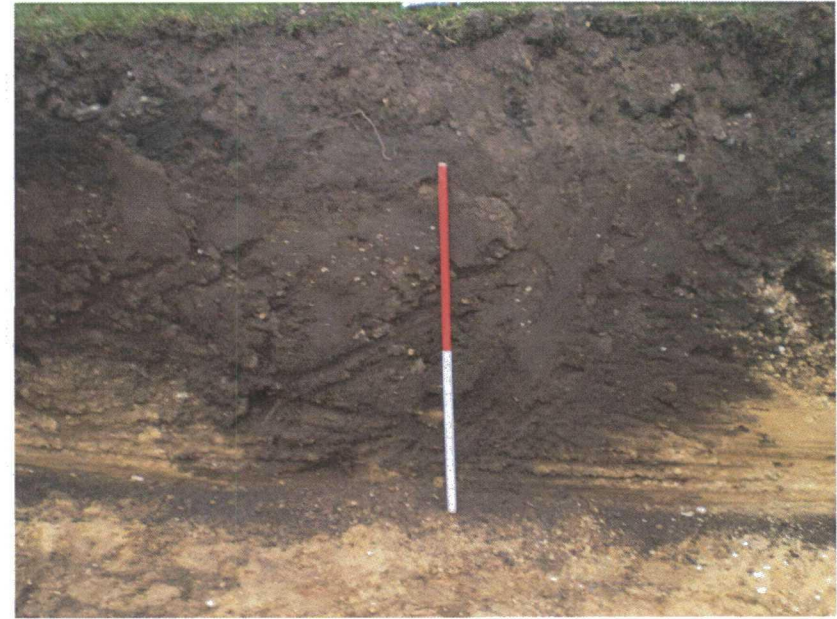


Plate 12. Ditch Segment 025. Facing East.



Plate 13. Ditch 021 plus Stoke-hole and Flue. Facing North.



Plate 14. Ditch 021 plus Stoke-hole and Flue. Facing South.



Plate 15. Furrow 023. Facing South.



Plate 16. General view of Kiln excavation. Facing South.

APPENDIX 1

Context Listing

Norton Community Primary School - 10.66.2012

Context No.	Type	Description
001	Deposit	Tarmac playground surface
002	Deposit	Hardcore; bedding for 001
003	Deposit	10YR 4/3 Brown, Silty sand; subsoil (Area A)
004	Deposit	Gravel; ?surface
005	Deposit	10YR 4/2, silty loam; topsoil
006	Deposit	10YR 4/3, silt sand; subsoil (Area B)
007	Deposit	10YR 4/2, silty sand; fill of ditch seg 010
008	Deposit	10YR 8/6, silty sand; fill of recut 009
009	Cut	Recut of Ditch 010
010	Cut	NW-SE aligned Ditch Segment
011	Structure	Master context for Pottery Kiln
012	Deposit	10YR 4/2, silty sand; uppermost fill of Kin
013	Deposit	5YR 4/6, silty sand: ?dumping into Kiln
014	Deposit	10YR 4/1, silty fine sand; fill of Kiln
015	Deposit	10YR 4/1, silty sand; fill of Kiln
016	Deposit	10YR 6/5, sandy silt; fill of Kiln
017	Deposit	10YR 4/2, silty sand; uppermost fill of flue
018	Deposit	5YR 4/6, silty sand; fill of flue and stokehole
019	Deposit	10YR 3/1, fine silty sand; basal fill of stokehole
020	Deposit	10YR 4/2, silty medium sand; fill of Ditch Seg 021
021	Cut	NW-SE Ditch cut segment
022	Deposit	10YR 4/2, silty medium sand; fill of Ditch Seg 023
023	Cut	N-S Ditch cut seg
024	Deposit	10YR 4/2, silty sand; fill of ditch seg 025
025	Cut	NW-SE Ditch cut segment
026	Structure	Stone-lining of flue
027	Deposit	10YR 3/1, fine silty sand; basal fill of firing chamber
028	Deposit	Clay lining of Kiln
029	Cut	Construction cut of Kiln
030	Deposit	10YR 3/1, fine silty sand; fill of flue (same as 016 + 019)
031	Deposit	Patch of clay lining at junction of flue and firing chamber
032	Deposit	10YR 3/1, burnt coarse sand; floor of firing chamber
033	Deposit	5YR 3/3, gritty coarse sand; basal fill of kiln
034	Structure	Stone floor of flue

APPENDIX 2

Finds Catalogue

Norton Community Primary School - 10.66.2012

Context No	Type	Total	Description	Weight (kg)	Spot Date
003	Pottery	18	12 Body Sherds 4 Rim Sherds 2 base sherds	0.230	C3 + med.
006	Pottery	44	12 Body Sherds 11 Rim Sherds 2 base sherds	2.639	AD270+
	Animal bone	19	Fragments	0.714	
007	Pottery	105	71 Body Sherds 22 Rim Sherds 11 Base Sherds 1 Handle	1.916	AD225+
	Animal Bone	38	Fragments	1.490	
012	Pottery	46	28 Body Sherds 7 Rim Sherds 11 Base Sherds	0.780	C3
	Animal Bone	4	Fragments	0.106	
013	Pottery	27	16 Body Sherds 6 Rim Sherds 5 Base Sherds	0.706	C3
014	Pottery	228	158 Body Sherds 45 Rim Sherds 23 Base Sherds 2 Handle Sherds	5.027	C3
	Animal Bone	1	Fragment	0.003	
015	Pottery	141	70 Body Sherds 47 Rim Sherds 24 Base Sherds	3.539	C3
	Animal Bone	2	Fragments	0.020	
016	Pottery	217	139 Body Sherds 50 Rim Sherds 25 Base Sherds 3 handle Sherds	7.106	C3
	Animal Bone	1	Fragment	0.006	

017	Pottery	158	83 Body Sherds 43 Rim Sherds 32 Base Sherds	3.865	
	Animal Bone	9	Fragments	0.242	
018	Pottery	39	29 Body Sherds 7 Rim Sherds 3 Base Sherds	0.794	C3
019	Pottery	255	149 Body Sherds 72 Rim Sherds 33 Base Sherds 1 Handle Sherd	6.316	C3
	Animal Bone	20	Fragments	0.188	
020	Pottery	224	149 Body Sherds 34 Rim Sherds 33 Base Sherds 1 Lid Sherd	3.927	AD270+
	Animal Bone	30	Fragments	1.004	
024	Pottery	213	151 Body Sherds 33 Rim Sherds 28 Base Sherds 1 Lid Sherd	5.466	C3
	Animal Bone	7	Fragments	0.198	
027	Pottery	138	107 Body Sherds 21 Rim Sherds 12 Base Sherds	4.011	C3
	Animal Bone	1	Fragment	0.002	
030	Pottery	167	104 Body Sherds 39 Rim Sherds 23 Base Sherds 1 Handle Sherd	5.458	C3

APPENDIX 3

Drawing Archive Listing

Norton Community Primary School - 10.66.2012

Drawing No	Scale	Type	Description
1	1:10	Section	W-facing section Ditch 010
2	1:20	Plan	Plan of Ditch 010
3	1:10	Section	W-facing section Ditch 025
4	1:10	Section	E-facing section through Kiln chamber
5	1:100	Plan	Location plan of Ditches 010 and 025
6	1:10	Section	W-facing section Deposit 017 and Ditch 020
7	1:10	Section	SE-facing section of Ditch 021
8	1:10	Section	E-facing section through Flue
9	1:10	Section	N-facing section through Ditch 023
10	1:10	Section	N-facing section through Ditch 021 and Flue
11	1:20	Plan	Plan of Ditch 021
12	1:10	Section	E-facing section Deposit 019
13	1:10	Section	Plan of Deposit 027
14	1:20	Plan	Plan of Flue Structure 026
15	1:10	Section	Plan of Kin 011
16	1:50	Plan	Plan of Ditch 023
17	1:10	Section	E-facing section through Ditch 021 and Cut 029
18	1:10	Elevation	S-facing elevation of Flue Arch 026
19	1:10	Section	N-facing section of Ditches 010 and 021
20	1:10	Elevation	E-facing elevation of Flue channel 026
21	1:10	Elevation	W-facing elevation of Flue channel 026
22	1:20	Plan	Plan of Cut 029 and Flue Structure 026
23	1:10	Section	Combined E-facing section through Kiln 011

APPENDIX 4

Photographic Listings

Norton Community Primary School 10.66.2012

Film Type Digital

Number	Context	Scale	Facing	Identifier
1	11	1m	N	Kiln Pre-exc
2	11	1m	W	Half-sectioned Kiln
3	11	0.5m	W	Kiln chamber after excavation
4	11	W	W	Floor of Kikn chamber
5	021/022	1m	NW	Ditch
6	17	1m	E	Longitudinal section of flue
7	017-019	1m	W	Longitudinal section of flue
8	022/023	1m	S	Ditch
9				Working Shot
10	021, 019	1.5 + 0.5m	S	Ditch cutting stokehole
11		0.5m	N	Stokehole
12	21	0.5 + 1m	W	Southward continuation of Ditch
13	21	1.5 + 1m	NW	Ditch fully excavated
14	21	1.5m	SE	Ditch fully excavated
15	19	0.5m	W	Stokehole section
16		0.5 + 1m	E	Flue + stokehole
17		0.5 + 1m	N	Flue + stokehole
18	26	0.5m	N	Flue Structure
19	26	0.5m	N	Flue Structure
20	26	0.5m	W	Flue Structure
21	33	0.5m	W	Base of Kiln chamber
22	11	1.5 + 1m	E	Kiln fully excavated
23	11	1.5 + 1m	E	Kiln fully excavated
24	28	5cm	E	Slots in kiln wall
25	28	N/A	E	Slots in kiln wall
26	28	1m	E	Slots in kiln wall
27	26	0.5m	N	Collapsed roof of flue
28	11	1.5 + 1m	W	Half-section through Kiln
29	26	0.5m	N	Flue channel
30	26	0.5m	W	W wall of flue channel
31	26	0.5m	E	E wall of flue channel

Film Type Monochrome

Number	Context	Scale	Facing	Identifier
1 & 2	11	1m	N	Kiln Pre-exc
3 & 4	11	1m	W	Kiln Chamber half-sectioned
4 & 5	11	0.5m	W	Kiln Chamber fully excavated
6 & 7	11	0.5m	W	Base of Kiln

8 & 9	021-022	1m	NW	Ditch Segment
10 & 11	17	1m	E	Longitudinal section of Flue
12 & 13	17	1m	W	Longitudinal section of Flue
14 & 15	021 & 029	1.5 + 0.5m	S	Ditch Segment and stokehole deposit
16 & 17	020/021	1m + 0.5m	W	Continuation of Ditch segment
18 & 19	020/021	1.5 + 1m	NW	Ditch segment fully excavated
20 & 21	020/021	1.5m	SE	Ditch segment fully excavated
22	19	0.5m	W	Section of stokehole
23 & 24	26	1 + 0.5m	E	Stokehole and flue
25 & 26	26	1 + 0.5m	N	Stokehole and flue
27 & 28	26	0.5m	N	Flue structure
29 & 30	26	0.5m	W	Flue structure
31	26	0.5m	W	Close-up of Flue structure
32 & 33	33	0.5m	W	Base of Kiln chamber
34 & 35	11	1.5 + 1m	E	Kiln structure fully excavated
36 & 37	28	1m	E	Slots in E wall of kiln chamber
38 & 39	26	0.5m	N	Collapsed roof of Flue
40 & 41	011/026	1.5 + 1m	W	Section of Kiln chamber and Flue
42 & 43	26	0.5m	N	Flue fully excavated

Col. Transparency

1 & 2	11	1m	N	Kiln Pre-exc
3 & 4	11	1m	W	Half-sectioned Kiln chamber
5 & 6	11	0.5m	W	Kiln chamber after excavation
7 & 8	11	0.5m	W	Base of Kiln chamber
9 & 10	020/021	1m	NW	Ditch Segment
11 & 12	17	1m	E	Longitudinal section of Flue
13 & 14	017-019	1m	W	Longitudinal section of Flue
15 & 16	021 + 029	1.5 + 1m	S	Ditch and Stokehole
17 & 18	21	1m + 0.5m	W	Southwards continuation of Ditch
19 & 20	21	1.5 + 1m	NW	Ditch Segment fully excavated
21 & 22	21	1.5m	SE	Ditch Segment fully excavated
23	19	0.5m	W	Section of Stokehole
24	11	1 + 0.5m	E	Stokehole and Flue
25	11	1 + 0.5m	N	Stokehole and Flue
26	26	0.5m	N	Flue Structure
27 & 28	26	0.5m	W	Flue Structure
29	33	0.5m	W	Base of Kiln chamber
30	11	1.5 + 1m	E	Kiln fully excavated
31	28	1m	E	Slots in E wall of Kiln chamber
32	11	1.5 + 1m	W	E-facing section of excavated Kiln

Digital

P2210810			NW	Area A after removal of tarmac
P2210811			S	Area A after removal of tarmac
P2210812			S	Area A after removal of tarmac
P2210813			S	Area A Surface of Subsoil
P2210814			NE	Area A Surface of Subsoil
P2210815			N	Area A Stripped area
P2210816			E	Area A Foundation
P2210817			N	Area A Foundation

P2210818			NE	Area B Pre-exc
P2210819			N	Ditto
P2210820			S	Ditto
P2210821-2			S	Area B Foundation at SW corner
P2210823			SW	Area B Foundation at SW corner
P2210824			S	SW part of stripped area
P2210825			SW	Ditto
P2210826	009 + 010	1m	S	Ditch + re-cut
P2210827	009 + 010	1m	E	Ditch + re-cut
P2210828	009 + 010	1m	NE	Ditch + re-cut
P2210829	009 + 010	1m	W	Ditch + re-cut
P2210830	009 + 010	1m	SW	Ditch + re-cut
P2210831			S	Area B after stripping
P2210832			SE	Ditto
P2210833			N	Ditto
P2210834			S	Area B Finds in subsoil
P2210835			S	Area B Stripped
P2210836			S	Ditto
P2210837			SW	Ditto
P2210838	25	1m	E	Ditch segment
P4100991-3			N	Area B Service Trench
P4100995			W	Ditto
P4100996-8			W	Service Trench
P4131013-19			E	Service Trench
P4131044-5			NW	Service Trench

Norton Primary School

Roman Pottery Assessment

Author:	A. Croom
Checked by	P. Bidwell
Commissioned by	MAP Archaeological Practice Ltd
Report number	1374
Date	13.4.12

1. INTRODUCTION

1.1 The site produced 2006 sherds of pottery weighing 51.780kg from 15 contexts.

1.2 There are two small pieces of tile, 13 fragments of clay plates and kiln lining, and one sherd of medieval pottery.

2. SUMMARY

2.1 The majority of the pottery (37.602kg) came from the filling of the kiln and the stokehole. The ditches produced 11.309kg of pottery and the subsoil 2.869kg.

2.2 The fill of the kiln features was almost exclusively made up of kiln products, with only a very few sherds of other pottery types. Other pottery brought onto the site was mainly restricted to the ditch fills and subsoil.

3. THE POTTERY

3.1 Amphorae

3.1.1 There are five sherds in total, four from olive-oil carrying Dressel 20s, and one from a Gaulish wine amphora.

3.3.2 There is one Dressel 20 sherd with an incomplete graffito.

3.2 Samian

3.2.1 There are 17 sherds of samian, from Forms 18/31, 36, 37 and 45.

3.2.2 There are two stamps.

3.3 Mortaria

3.3.1 There are five sherds of mortaria, most of which were only small scraps. The best preserved sherd is a Yorkshire product.

3.4 Fine wares

3.4.1 There are two sherds from a funnel-necked Nene Valley ware beaker and two sherds from a colour-coated indented beaker.

3.5 Coarse wares

3.5.1 Most of the non-kiln products consist of reduced wares, including flanged bowls, flat-rimmed bowl/dishes, lids, funnel-necked beaker imitations, and a pinch-necked flagon. There were also some sherds of Ebor ware, flagons and other oxidised wares.

3.6 *Norton ware*

3.6.1 The sherds are in good condition, and although some show signs of cracking during firing, there are no examples of badly under- or over-fired vessels, and the finished colour is good.

Three separate fabrics were represented amongst the kiln products

3.6.2 A highly fired, mid-grey fabric, as found at the Model Farm kilns (Corder 1950). This was used particularly for the cooking pots and jars, and makes up approximately 65% of the Norton products in the assemblage (for the vessel types represented see Appendix 1). They are usually, but not exclusively, wheel-thrown.

3.6.3 A softer fabric distinguished by burnishing which can have a very high gloss, used for bowls and dishes, making up about 17% of the Norton products by sherd count. The vessels copy BB1 forms closely, including both the burnishing and decoration such as scribbled lines on the underside of the base. They are hand-made, and despite the effort put into the burnishing, the rims are often quite roughly finished. This fabric seems to have been present at the Grove Bungalow kiln, but was not discussed (Hayes 1988, fig. 54).

3.6.4 Calcite-gritted ware. The only forms found in the kiln were hand-made jars (Knapton type), although a bowl and a lid were found in the ditch-fill. The ditches also produced the only rim sherd to have decoration on the outer edge. The jars make up about 18% of the Norton products by sherd count. Although the excavators of the Model Farm kilns were not absolutely certain that the calcite-gritted ware vessels they found were made in the kilns, numerous sherds were also found in the Grove Bungalow kiln, while the quantity and condition of the sherds from this kiln indicate they were made here.

3.6.5 There were two sherds from 'smith' pots with appliqué hammers, and a small beaker with an appliqué human arm. Both types are known in grey wares from Malton, but previously only face pots have been found associated directly with the Norton kilns.

4. **DISCUSSION**

4.1 *The kiln and its products*

The assemblage is of great significance since it comes from the first kiln in Norton to have been excavated since 1949. The pottery made at the previously discovered kilns was studied in 1950 and 1988, but has not been considered in any detail since then. The study of Roman kilns and their products is Research Strategy Objective no. 2 of the *Research Strategy for the Study of Roman Pottery in Britain* (Perrin 2011, 41), and detailed publication of this assemblage would be a major contribution towards this objective.

The pottery has more than just local significance, being a traded ware that is found on the northern frontier. Currently, however, it is not represented in the National Roman Fabric Reference Collection (Tomber and Dore 1998) or in Tyler's *Roman Pottery in Roman Britain*, and the significance of the ware is currently overlooked.

4.2 Forms

This is an importation assemblage of pottery that provides additional information to that already published from the Norton kilns (Corder 1950 and Hayes 1988).

The imitation BB1 bowls and dishes (Types 1 and 2) are of great interest as they have not been studied in detail before. The finished appearance would have been very different from that of the usual grey wares produced at the kilns. As they are hand-made they seem to have been made by the same potters who made the Knaption type calcite-gritted ware jars.

The flasks with zig-zag decoration on the body and those with the slashed cordon (Type 7) at the neck seem to be well represented at the kiln. There is also a large collection of cooking pots and jars of types that have not previously been adequately published.

The assemblage includes sub-types not previously noted at the Norton kilns; a number of the sherds from indented beakers (Type 9) have a zig-zag pattern running down between the indentations (perhaps imitating scale beakers), as well as a few sherds from lug-handled jars in calcite-gritted ware. There are other handles in grey ware which come from vessel types other than the lug-handled jar, and examples of smith pots.

The presence of the calcite-gritted ware jars (Type 8) indicates that this ware was being made in the kilns. These handmade vessels are part of a tradition that began in the pre-Roman period when vessels were fired in a clamp or bonfire, so it is of interest that here the jars were fired in a kiln. This appears to be a further example of a practice noted elsewhere where handmade wares (such as BB1) were beginning to be made in kilns during the mid-Roman period.

There are two or three examples of concave-sided bowls in Norton grey ware that are typologically earlier than most of the other vessels represented in the kiln. The noticeable quantity of second-century pottery from the site suggests there was occupation nearby during this period, and it is possible that the concave-sided bowls indicate pottery production in the area prior to the construction of the excavated kiln.

4.3 *Dating*

4.3.1 Subsoil

The subsoil contexts (003, 006) include second-century vessels, such as a flat-rimmed Ebor ware bowl, and grey ware flat-rimmed bowl and lid, but also includes a single flanged bowl of c.270+ and a sherd of medieval pottery. These two must be contamination if the kiln cuts the subsoil.

4.3.2 Ditch cutting stoke hole (020)

As well as containing some second-century material this also produced grey ware imitation funnel-necked beakers dating to after c.225, and a single flanged bowl, dating to after 270+.

4.3.3 Cut 010 (context 007)

This feature also held second-century material, but the fill dates to some times after c.225, as there is a Nene Valley ware funnel-necked beaker.

4.3.4 Ditch (024)

As well as kiln products, this included second-century material such as lids, a flat-rimmed bowl, and a number of early concave-sided bowls.

4.3.5 Kiln products

The close copies of the BB1 plain-rimmed dishes indicates a date after 150, and probably closer to 200. There are no examples of Norton ware flanged bowls (dating to c.270+), as found at the other Norton kilns. However, it is difficult to give more precision between these dates to the kiln products.

5. **RECOMMENDATIONS**

5.1 *Archive Report*

5.1.1 The pottery requires a fully quantified ceramic archive catalogue (as defined by the *Study Group for Roman Pottery* guidelines: Darling 1999). This should comprise a detailed description of the various fabrics and forms, their quantification by weight, sherd count and EVE (estimated vessel equivalents).

5.2 *Publication report (see Appendix 3)*

5.2.1 A full publication report is required, concentrating on the BB1 imitation dishes and the other forms either not previously known or not fully published from the other kilns. The report would consist of a table of fabrics present, fabric descriptions, a catalogue of the illustrated vessels and a discussion of the assemblage. As there a number of vessels with complete or near complete profiles, it is suggested approximately 100 illustrations by line drawing or photographs are required to show the full range of vessels present, as well as those of importance for dating or of special interest.

5.2.2 The samian stamps require a report.

5.2.3 The graffito requires a specialist report.

5.3 *Condition and curation*

5.3.1 The pottery is in a stable condition and no further conservation is required.

5.3.2 It is recommended that all the Roman pottery should be kept.

6. BIBLIOGRAPHY

Corder, P., 1950, 'The pottery made at the kilns', in Hayes, R. H. and Whitley, E., *The Roman Pottery at Norton, East Yorkshire*, Roman Malton and District Report 7, 26-34.

Darling, M. (ed.), 1999, *Guidelines for the archiving of Roman pottery*, Study Group for Roman Pottery, Guidelines Advisory Document 1.

Hayes, R. H., 1988, *North-East Yorkshire Studies: Archaeological Papers*, York.

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Tomber, R. and Dore, J., 1998, *The National Roman Fabric Reference Collection: a Handbook*, London.

Appendix 1: Vessel types in Norton ware present on the site (after Corder 1950 and Hayes 1988)

Type (incl. variants)	vessel type	no. of sherds (rims unless otherwise stated)	comments
1	plain rimmed bowl/dish (grey)	14	
1	plain rimmed bowl/dish (BB)	87	
1h	plain rimmed with external groove	2	1 vessel
2	beaded/rounded rimmed b/d (grey)	8	
2	beaded/rounded rimmed b/d (BB)	94	
4a-b	lug-handled jar	3	handles only
4e	cooking pot	100	
4f	small cooking pot	9	
5	beaker	1	
6a	wide-mouthed bowl	1	
7	jars and flasks	7	
7a	narrow-mouthed jar	5	
7b	flask	15	
7g	flask with incised decoration	18	body sherds only
8a	calcite-gritted ware jar (long rim)	20	
8b	calcite-gritted ware jar, hooked rim	2	
-	calcite-gritted ware jars (short rim)	27	
9	indented beaker	5	plus many body sherds
10	'carinated bowl'/concave-sided bowls	5	
17	beaker	3	
-	'smith' pot and similar	3	
-	untyped rims	3	
	handles	2	

Appendix 2: Weight and sherd count and spot dating of the pottery by context

context	wt (kg)	sh no.	spot dating
003	0.230	17	(excl. med) C3
006	2.639	44	soon after 270??
007	1.916	105	225+
012	0.780	46	C3
013	0.706	27	C3
014	5.027	228	C3
015	3.539	141	C3
016	7.106	217	C3
017	3.865	158	C3
018	0.794	39	C3
019	6.316	255	C3
020	3.927	224	soon after 270
024	5.466	213	C3
027	4.011	138	C3
030	5.458	167	C3

Assessment of the animal bones and marine shell by Jane Richardson

In total, 123 animal bone fragments and one oyster shell were recovered during the hand excavation of Roman deposits, with no bones retrieved from the soil samples. The bone fragments from dateable features (excluding subsoil material) fall well below the minimum reliable sample size of around 500 (with reference to a number of statistical parameters after Van der Veen and Fieller 1982, 296). The data are summarised by feature or deposit in Table 1.

Methodology

Bones were identified to taxa wherever possible, although lower-order categories were also used (e.g. sheep/goat, cattle-sized). In the absence of any goat bones, however, sheep/goat bones are subsequently assumed to be of sheep. As the assemblage was small, all fragments were recorded at this assessment stage, although to date the data produced has only been cursorily examined. Identification of 46 diagnostic element zones, here defined as non-reproducible parts, was also made.

For age-at-death data, epiphyseal fusion (after Silver 1969) and the eruption and wear of deciduous and permanent cheek teeth were considered. Dental eruption and wear were recorded using the letter codes of Grant (1982). Bone condition, erosion and fragment size were recorded in order to assess bone preservation, while gnawing, burning and butchery marks were noted to determine bone treatment. Given the fragmented nature of the assemblage, and its small size, the recovery of biometrical data was not attempted. Pathological bones were noted.

Preliminary observations

The assemblage is of questionable value due to its small size and fragmented nature, but it has survived in good condition with very few eroded surfaces. Butchery marks are limited to cattle (and cattle-sized) and sheep (and sheep-sized) bones. Twenty-three bones had been gnawed and two are burnt.

Cattle, horse, sheep, pig and dog bones are present, plus a single oyster shell. Age data are limited due to the small size of the assemblage and interpretations of animal husbandry practices are unlikely, but dental wear data have been recorded for horse and sheep, and epiphyseal data have been recorded for cattle, horse and sheep. Interestingly, horse bones are surprisingly common, and at least two individuals are represented, including a male animal with pathological changes to its jaw.

Recommendations

The assemblage has been adequately recorded onto an Access database and no further analysis of the bone is recommended. The assemblage, and its database, should be retained as part of the archive.

Further data manipulation than was possible during the assessment, however, will be necessary prior to publication. This will include comparison of bone treatment by feature, an assessment of the body parts present, interpretation of the butchered bones and a description of pathological specimens.

Table 1. Animal bone fragments by feature (zone counts given in parentheses)

	Kiln	Ditch 10	Ditch 21	Ditch 25	Subsoil	Total
Cattle	(4) 9	(5) 12	(5) 8	(1) 3	2	(15) 34
Horse	1	(3) 3	(3) 7		(5) 10	(11) 21
Pig		1				1
Sheep/goat	(6) 11	(2) 5	(6) 9	(1) 1		(15) 26
Sheep		(2) 2	(1) 1	1		(3) 4
Dog		(1) 1	(1) 1			(2) 2
Cattle-sized	10	14	1	2	4	31
Sheep-sized	2		2			4
Bone total	33	38	29	7	16	(46) 123
Oyster					(1) 1	(1) 1

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Norton Primary School MAP 10-66-2012
Carbonised Plant Macrofossils and Charcoal
Diane Alldritt

1: Introduction

A total of eight environmental sample flots from excavation work at Norton Primary School (MAP 10-66-2012) were analysed for carbonised plant remains and charcoal. Samples came from a ditch feature and from within and around kiln (011). The kiln feature contained substantial amounts of Romano-British pottery. Analysis of the kiln samples may provide some indication of the types of activity the kiln was used for and for fuel types.

2: Methodology

Bulk environmental samples were processed by MAP using a Siraf-style water flotation system (French 1971). The flots were dried before examination under a low powered binocular microscope. Carbonised plant remains were encountered in amounts from <2.5ml up to 20ml, with the majority of burnt material found within the various kiln contexts. Small amounts of modern roots from <2.5ml to 5ml were recorded together with some snail shell indicating a small amount of bioturbation. All identified plant remains including charcoal were removed and bagged separately by type.

Wood charcoal was examined using a high powered Vickers M10 metallurgical microscope at magnifications up to x200. The reference photographs of Schweingruber (1990) were consulted for charcoal identification. Plant nomenclature utilised in the text follows Stace (1997) for all vascular plants apart from cereals, which follow Zohary and Hopf (2000).

3: Results

Results are presented in table 1 and discussed below.

4: Discussion

The eight environmental sample flots from Norton Primary School produced fairly small amounts of charred material, with the greatest quantities coming from the stokehole and flue areas of the kiln. Perhaps surprisingly very little wood charcoal was found, with the majority of the botanical evidence pointing to the exploitation of peat or heath land for fuel resources. Small amounts of cereal grain were present in some of the deposits, although this may be intrusive or could have been deliberately dumped as levelling material. Occasional weeds recorded from two of the samples were all wetland or grassland types, and probably arrived with peat or heathy turves cut for fuel. Industrial type waste, resembling slag, present in a number of the flots would need to be examined by an appropriate specialist to determine the processes taking place.

Sample 1 (007)

Single ditch fill (007) contained trace amounts of rhizomes, a single piece of Prunoideae (cherry) charcoal and two grass seeds, providing trace evidence for burning occurring in the vicinity. This sample is probably not that significant.

Sample 2 (012)

The upper fill of kiln (011), this context (012) produced some very fragmented and degraded cereal grain, a few of which could be distinguished as barley type, mixed with snail shell and coal fragments. This material could be a dumped deposit of waste from cooking or cereal processing, perhaps levelling material or general waste trampled into the surface.

Sample 3 (014)

Context (014) one of the kiln fills, produced a single *Calluna* (heather) stem together with a number of fragments of industrial waste, maybe slag. The heather fragment was very thick suggesting it had originated as a deep basal root, which was probably dug up with peat harvested for fuel.

Sample 4 (016)

This context came from near the base of the kiln and contained industrial material, together with a heather stem and some very degraded cereal grains. The vesicular nature of the cereal grains suggested they had either been moved around / were intrusive or had been heated a number of times.

Sample 5 (019)

Context (019) from the upper part of the stokehole near the kiln, produced some interesting results, with a large amount of industrial residue / slag present together with abundant heather stems. As before the heather consisted of large thick root material indicating either plants that had been completely uprooted or material cut along with peat for use as fuel. The scattering of poorly preserved cereal grain in this context is probably a 'red herring' and is most likely intrusive or deliberately dumped as part of levelling / sealing activity.

Sample 6 (019)

The base of the stokehole pit, sample 6 (019) was identical in nature to sample 5, except it produced greater quantities of material. Large fragments of slag / industrial type material were present together with a substantial collection of thick heather roots and a very large rhizome. No cereal was present in this sample. Context (019) provided very strong evidence for the cutting of peat for use as industrial fuel in the kiln.

Sample 7 (027)

This sample taken from the basal fill of kiln (011) contained the same mixture of industrial material and heather as seen previously, but also a number of weeds which probably arrived from wetland or heath habitats. A small amount of quite well preserved bread wheat and barley was intriguing in this lower context, but may well be intrusive.

Sample 8 (030)

Context (030) from the flue of the kiln produced an almost exclusively heather root sample consisting of some very large twisted root fragments. A number of large slag / industrial fragments completed the contents of this sample.

5: Conclusion

The environmental samples from Norton Primary School produced a narrow range of carbonised plant remains, which were largely related to fuel use in the kiln. The evidence pointed very strongly to the use of peat or heathy turves as the main source of fuel for the kiln.

Cereal grain was sparse throughout the samples and generally probably not directly related to the industrial burning activity taking place within the kiln. The basal fill of the kiln (027) is perhaps the only one where it could be suggested cereal drying may have been taking place, with the finding of bread wheat and barley. But largely the primary use of the kiln appears to have been for industrial firing purposes. Much of the cereal grain was in very poor condition and was probably intrusive or part of a general scatter of burnt waste material being used as levelling or to seal earlier deposits.

Charcoal was surprisingly scarce, with only a single piece recorded from ditch fill (007). Heather and other peat related macrofossils formed the main component of the

assemblage, strongly indicating that peat was being cut for use as fuel. Industrial residue / slag was recorded in all six of the samples containing heather, often with both components recorded in large amounts. The industrial type material would need to be examined by an appropriate specialist to determine the type of processes taking place.

Overall the samples produced some nicely preserved carbonised material and indicated a high potential for future excavation work at the site to produce good quantities of well preserved carbonised plant remains.

References

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Table 1: Norton Primary School Site Code 10-66-2012: Carbonised Plant Remains, Charcoal and Other Material:

Norton Primary School	Sample	1	2	3	4	5	6	7	8
MAP 10-66-2012	Context	7	12	14	16	19	19	27	30
	Feature Type	ditch	upper kiln	kiln fill	kiln base	stokehole	stokehole pit	kiln base	kiln flue
	Total CV	5ml	<2.5ml	2.5ml	2.5ml	15ml	10ml	5ml	20ml
	Modern	<2.5ml	<2.5ml	<2.5ml	<2.5ml	5ml	<2.5ml	<2.5ml	<2.5ml
Carbonised Cereal Grain	Common Name								
<i>Triticum aestivum</i>	bread wheat							4	
<i>Hordeum vulgare</i> sl.	barley		2			2		7	
Indeterminate cereal grain (+embryo)			5		7	8			
Charcoal									
Prunoideae	cherry Family	1 (0.21g)							
Carbonised Wild Resources									
<i>Calluna</i> stems	heather			1 (0.03g)	1 (0.05g)	22 (1.20g)	36 (2.4g)	17 (0.49g)	38 (2.93g)
<i>Calluna</i> flower capsules	heather							1	
Rhizomes		2 (0.04g)					1 (0.21g)		
Carbonised Weeds									
Small Poaceae	grass Family	2							
<i>Bromus</i> sp.	bromes								3
<i>Scirpus (Isolepis) setaceus</i>	bristle club-rush								1
Other Remains									
Industrial remains / slag				5+	4	10+	10+	5+	5+
Non-marine mollusc (snail) shell		5	5+	5+	5+	5+			2
Coal			1						

Assessment of industrial process residues recovered during archaeological fieldwork at Norton Primary School.

by Dr R. Mackenzie

Introduction

This report covers the post-excavation assessment of fragments of slag-like residue recovered during archaeological fieldwork at Norton Primary School, Malton, North Yorkshire. The aims of the assessment have been to identify the process origin of the residues and establish whether there is potential for more detailed analysis of any of the fragments.

The results of the visual inspection of the fragments are summarised below in Table 1.

Results

Context Number	Sample Number	Number of pieces	Approx. Weight	Type of material
019	6	Approx.20	12g	Fuel ash slag
030	8	Approx.12	12g	Fuel ash slag

Table 1: Summary of industrial process residues recovered during archaeological fieldwork at Norton Primary School

The fragments of slag are mid-grey or mid-grey and brown in colour, and they have a light vesicular texture. Individual fragments range in size from approximately 3mm to 23mm at their widest points.

Interpretation of results

The morphology of the fragments suggests that they are all fuel-ash slag; this type of slag is a by-product of high temperature reactions between fuel ashes and clay hearth or furnace linings. The archaeological context that the slag was found in, and the remnants of peat used as fuel support this interpretation.

Conclusion and Recommendations

The archaeological context of the fragments and supporting evidence found in environmental samples suggests that slag formed as a by-product of the fire that was being used to heat the kiln.

In some cases, scientific analysis of fuel-ash type slags can help establish the type of fuel that produced the slag, although this is normally only justified where there is a lack of supporting archaeological or historical evidence. Although the use of peat as fuel in the kiln is interesting and potentially unusual, further scientific analysis of the fuel ash slag is unlikely to significantly add to what is already known about the kiln at the site.

No further analysis of the fragments of slag from the site is recommended at this stage. However, given that the slag is potentially an unusual variety of fuel ash slag from a secure archaeological context, it is recommended that the fragments are retained as part of the site archive and deposited with the relevant local museum.

Bibliography

n/a