Wiltshire Archaeological & Natural History Magazine, vol. 117 (2024), pp. 19–50

Peterborough Ware from West Amesbury Farm, Wiltshire

by Michael Russell,[1] Julie Dunne,[2] Richard Evershed,[2] Patrick Quinn,[3] Judith Dobie,[1] Peter Marshall[1] and David Roberts[1]

Small-scale archaeological evaluation at West Amesbury Farm, just east of Stonehenge, revealed five Middle Neolithic pits which produced sherds of Peterborough Ware in the Fengate sub-style. Representing some thirty-six vessels this is the largest assemblage of such pottery from Wessex. An area disturbed by badgers, including a linear feature, in close proximity to the pits yielded further sherds of Peterborough Ware in both Mortlake and Fengate sub-styles. Petrographic and organic residue analyses have elucidated, respectively, likely sources of raw materials used in pot-making and the uses to which the vessels were put, including the first evidence from organic residue analysis for reuse of a broken pot in food preparation. Scientific dating, including Bayesian modelling, sets the assemblage in its chronological context. The pottery is discussed within its site, local and regional context highlighting the importance of decorative technique in discriminating between otherwise stylistically similar assemblages, particularly in the Fengate sub-style. The synthesis of specialist analytical results from this assemblage allows important conclusions to be drawn about the lifecycle of Peterborough Ware at the site, and the care taken in its selective deposition.

Introduction

In the winter of 2015–16 Historic England undertook excavations (Roberts *et al.* 2020) targeting a series of archaeological features identified through aerial and geophysical surveys in fields to the south of the A303 (Linford *et al.* 2015; Last 2017) (Figure 1). At West Amesbury Farm (WAF hereinafter), on the southeastern slopes of King Barrow Ridge, five pits were identified, four of which ([93205], [93206], [93208] and [93233]) were in close proximity but not paired, with another [93201] about 12m to the northwest (Figure 2).

Circular in plan and of roughly similar size and depth (between 1.0m and 1.34m in diameter and 0.57m and 0.78m deep), the pits had near-vertical to overhanging sides and concave bases. Three ([93201], [93205] and [93208]) were cut wholly into natural Upper Cretaceous Seaford Chalk while [93206] and [93233] also cut tree throws [93207] and [93209]. Apart from thin chalky erosion deposits in [93206] and [93233] which probably resulted from rapid weathering of the relatively soft fill of the tree throws, the primary fill in each pit, even [93205] which had mostly been emptied and back-filled to accommodate a post, was a distinctive grey-brown silt with pea-grit chalk inclusions thought to be ashy when excavated. Microscopic analysis, however, demonstrated that no ash was present or likely to have been present previously. The primary fills, rich in cultural material, were overlain by a combination

[1] Historic England, Fort Cumberland, Portsmouth PO4 9LD. Since this article was first written Michael Russell has retired and David Roberts has moved to School of History, Archaeology and Religion, Cardiff University, John Percival Building, Colum Drive, Cardiff, CF10 3EU; [2] School of Chemistry, Cantock's Close, University of Bristol, BS8 1TS; [3] UCL Institute of Archaeology, 31–4 Gordon Square, London WC1 0PY

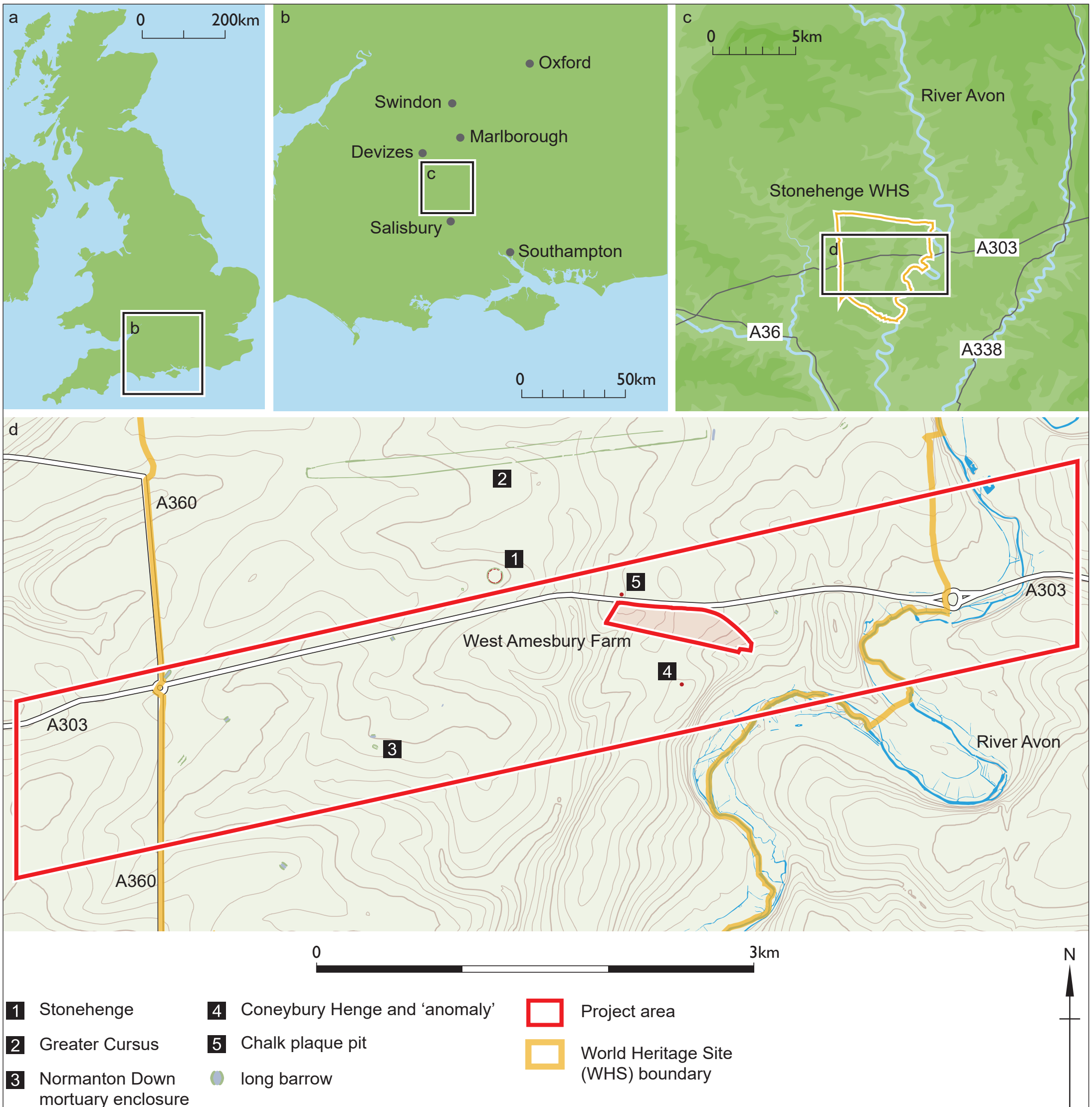

Fig. 1 Location map of West Amesbury Farm (reproduced from Roberts et al.*, 2020)*

of erosion of the pit sides and infilling of more mixed soil, with evidence of a final renewed act of deposition particularly of pottery and lithics in the uppermost fills of [93206], [93208] and [93233]. Pit [93208] was cut by a rectilinear grave [93240] which in turn was cut by pit [93233]. The pits were subject to flotation sampling and coarse-sieving which provides a level of confidence that the material retrieved is closely representative of the assemblages as originally deposited.

Each of the pits produced substantial assemblages of cultural material including Peterborough Ware in the Fengate sub-style, a large assemblage of worked flint (Bishop *et al.* 2019), animal bone and hazelnut shells (Worley *et al.* 2019), and a range of objects including worked bone and antler (*ibid.*) shale and shell beads, and a chalk ball or cube (Roberts *et al.* 2020).

Radiocarbon dating and modelling on material from the pits (Roberts *et al.* 2020) suggests that pits [93201], [93205] and [93206] were broadly contemporary, and either contemporary with or slightly later than pit [93208], which was cut by grave [93240], which in turn was cut by the

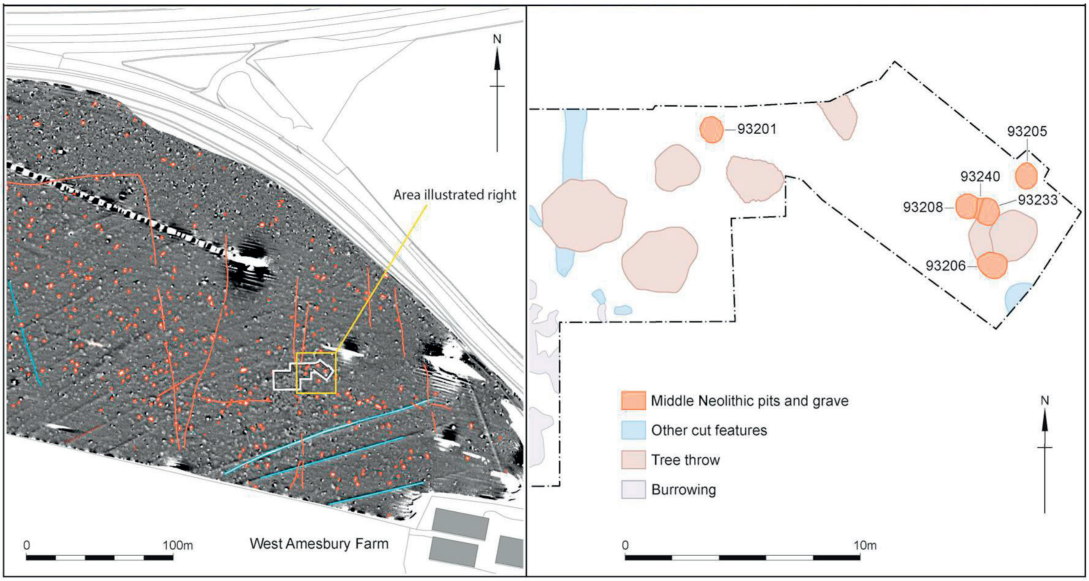

Fig. 2 Plan of West Amesbury Farm pits (right) in relation to greyscale plot of magnetometer survey (left) highlighting significant pits in red and showing linear anomalies transcribed from the ground penetrating radar survey with high amplitude reflectors in red, low amplitude in blue (based on Linford et al., 2015 Figs. 4, 12 and 13). Figure reproduced from Worley et al., *2019.*

probably latest pit [93233]. The digging of these pits likely commenced between *3370–3155 cal BC (94% probability)* and ceased between *3235–3060 cal BC (90% probability)* placing them in the Middle Neolithic. This model, which assumes that the cutting of pit [93233] through grave [93240] was not deliberate but resulted from the location of the grave having been forgotten, or become overgrown beyond visibility, suggests that the duration of activity represented by these five pits is likely to be in the order of *75–125* years, with the four pits of the 'early' group probably in rapid succession.

To the west of the pits a large multiphase badger sett, both cutting and cut by Middle Neolithic features (two short linears, with four postholes on the eastern periphery of the sett) produced Middle Neolithic material including a partial fox skeleton radiocarbon dated to 3300–2900 cal BC (UBA-31621, 2σ) and Peterborough Ware in the Fengate and Mortlake sub-styles.

It is important to remember that only a small sample of several hundred possible pit-like anomalies recorded within the study area (Linford *et al.* 2015) has been examined, and that both Middle Neolithic and Later Neolithic pits have been found further upslope on King Barrow Ridge and the wider environs (Harding 1988; Richards 1990; Cleal and Allen 1994; Roberts and Marshall 2020). It is envisaged that the hillside was repeatedly revisited during the Middle and Late Neolithic, with pit digging forming part of this regular activity (Roberts *et al.* 2020).

This article reports on a nationally significant assemblage of Peterborough Ware from the pits and badger sett. The study has five aims: to describe the nature and character of the pottery in detail to facilitate comparisons with related material and provide baseline information for future study; to characterise the ceramic fabrics at macroscopic and microscopic levels to establish the provenance of raw materials and examine fabric variation between the pits and pits and sett; to explore how the distribution, fragmentation and condition of the pottery could contribute to an understanding of site formation processes and relative chronology; to investigate through organic residue analysis what the pots had been used for and whether there was a correlation between use and the fabric, form and decoration of the vessels; and to discuss county and regional comparanda.

The Pottery

Methods

The pottery was studied in accordance with 'A Standard for Pottery Studies in Archaeology' (Barclay *et al.* 2016) and the research framework of the Prehistoric Ceramics Research Group (2016). Sherds were examined at between x10 and x50 magnification under a stereo microscope and sorted into fabric groups by context. Fabric descriptions are after Peacock (1977). Fresh fractures were only available for study in the small number of instances where sherds had been broken during excavation. A representative number of sherds from each fabric was selected for thin-section analysis (P. Quinn) to determine aspects of firing technology and the provenance of raw materials.

The pottery was quantified by sherd count (excluding crumbs <10mm long), weight and Minimum Number of Vessels (MNV) expressed as individually recognisable pots. The number of Rims and Bases was recorded along with Estimated Rim and Base equivalents (ERE and EBE) where they could be reliably determined (Orton 1975; Orton and Hughes 2013).

Sherd fragmentation was recorded by measuring maximum length, breadth, thickness and weight of each sherd over 10mm across. Sherd abrasion and weathering was assessed in terms of Edwards' (2009; 2016) four categories: 1 no or very little abrasion, 2 low abrasion where edges remain sharp but markedly extruded edges are worn, 3 medium abrasion where points, edges and surfaces are worn, and 4 high abrasion where the sherd is heavily rolled with lost surfaces and rounded fractures.

A representative sample of sherds was selected for organic residue analysis (for details of the methodology see Appendix 3) to determine what the pots had been used for (J. Dunne).

Context and quantification

A total of 466 sherds and 94 crumbs (2537.7g) of Peterborough Ware from a minimum of 56 separate pots was recovered from three context groups – five pits and a grave, an area some 20m to the west extensively disturbed by badgers in the Middle Neolithic and a north–south co-aligned linear slot disturbed by the badger sett.

The five pits contained 373 sherds and 78 crumbs (80.5% of the site assemblage) in total weighing 2172.6g (85.6% of the site assemblage) representing a minimum of 36 vessels in the Fengate sub-style. The distribution of sherds by pit and fill (Table 1) shows that pits [93201], [93208] and [93233] exhibit major depositional episodes in their primary fills followed by greatly reduced, possibly incidental deposition. By contrast, [93206] had at least two distinct, separate depositional events, vessels from its primary fill being different from and less numerous (four examples) than those (seven examples) from the penultimate and final fills. Pit [93205] held three fills, the earliest of which did not contain pottery while the other two possessed roughly equal quantities of sherds. The pottery is so similar that it is likely to derive from no more than three vessels, sherds of which occur in both deposits, which likely reflects disturbance when a post [93243] was inserted on the southeastern edge of the pit; its fill (93244) contained no pottery.

A grave [93240] which cut pit [93208] and was itself cut by pit [93233] contained two tiny plain sherds probably derived from [93208].

Two short north–south linear features cut by the badger sett produced 24 sherds and five scraps (102g) of Peterborough Ware accounting for 5.2% and 4% respectively of the site assemblage. The northern feature [93364] contained four sherds in (93318) including Mortlake sub-style Pot 26. The southern one [93356] produced small amounts of Peterborough Ware in the Mortlake sub-style from its primary (93359) and secondary (93358) fills. Most of the pottery came from its top fill (93357/93334) which included mainly Mortlake sherds and a single Fengate sub-style sherd which may be intrusive (Pot 38). A single cross-join between (93358 and 93357) was noted. A minimum of three Mortlake sub-style vessels and a single Fengate example are represented.

The badger sett yielded 69 sherds and 11 crumbs (14.3% of site assemblage) with a total weight of 263.1g (10.3% of site assemblage), with Mortlake and Fengate sub-styles represented by four and seven pots respectively alongside another five Peterborough Ware vessels of indeterminate sub-style. Concentrations of pottery noted during excavation might represent disturbed features though incorporation of surface material into the sett cannot be discounted.

Individually recognisable vessels are described in the catalogue (Appendix 2). Representative sherds from decorated pots are illustrated in Figures 6–8.

Fabrics

A total of 13 Peterborough Ware fabrics identified during macroscopic examination was rationalised to nine following petrographic analysis. Detailed descriptions appear in Appendix 1.

The predominant temper is flint, both as fresh crushed, including probable knapping micro-

Table 1: Key metrical data for the pits, badger sett and linear features. Sherds exclude crumbs (shown separately) <10mm in length. MNV is Minimum Number of Vessels. Abrasion categories: 1 no or very little abrasion, 2 low abrasion where edges remain sharp but markedly extruded edges are worn, 3 medium abrasion where points, edges and surfaces are worn, and 4 high abrasion where the sherd is heavily rolled with lost surfaces and rounded fractures.

Context group	Context	Sherd count	% count each feature	NMV	Sherd weight (g)	Mean sherd weight (g)	% weight each feature	Max length (mm)	Mean length (mm)	Abrasion			
Pits										1	2	3	4
93201													
	93202 =91614	2	5.3		5.9	3	3.3	27	25	1	1	-	-
	93212	1	2.6		17.5	[17.5]	9.9	40	40	1	-	-	-
	93211	4	10.5		2.2	0.6	1.2	15	13	-	4	-	-
	93213 =91640	31	81.6		151.7	4.9	85.6	73	23.2	9	20	2	-
Totals		**38**		**6**	**177.3**	**4.7**			**22.6**				
Crumbs		5			0.5								
93206													
	93220	11	17.2		64.1	5.8	16.5	62	23.5	1	8	2	-
	93222	25	39.1		264.8	10.6	69	103	27.2	4	16	5	-
	93223	0	0		0	0	0	0	0	-	-	-	-
	93225	2	3.1		9	4.5	2.3	32	21.5	1	-	1	-
	93224 =93227	26	40.6		51.7	2	13.3	43	18	4	21	1	-
	93231	0	0		0	0	0	0	0	-	-	-	-
Totals		**64**		**9**	**389.6**	**6.1**			**22.7**				
Crumbs		16			1.9								
93208													
	93226	10	7.9		88.4	8.8	9.9	67	26.6	1	9	-	-
	93228	4	3.1		16.9	4.2	1.9	40	19.3	-	-	3	1
	93229	3	2.4		3.7	1.2	0.4	18	16.3	-	2	1	-
	93230	110	86.6		780.5	7.1	87.7	97	23.4	102	7	1	-
Totals		**127**		**6**	**889.5**	**7**			**23.4**				
Crumbs		40			4								
93233													
	93234	9	10.7		26.5	2.9	4.6	38	20.8	-	8	-	1
	93235	8	9.5		40.3	5	7	62	23.5	2	3	3	-
	93238	10	11.9		31.7	3.2	5.5	45	19.9	4	6	-	-
	93236	57	67.9		477.3	8.4	82.9	79	28.4	22	24	10	1
Totals		**84**		**12**	**575.8**	**6.9**			**26.1**				
Crumbs		9			1.6								
93205													
	93242	35	58.3		62.6	1.8	47.6	43	18.7	26	9	-	-
	93237	25	41.7		69	2.8	52.4	63	18.4	11	11	3	-
	93247	0	0		0	0	0	0	0	-	-	-	-
Totals		**60**		**3**	**131.6**	**2.2**			**18.6**				
Crumbs		7			0.8								
Badger sett													
	93320	26	37.7		80	3.1	30.6	45	18.5	-	14	12	-
	93321	1	1.4		15.7	15.7	6	45	45	-	1	-	-
	93322	6	8.7		21.2	3.5	8.1	36	23.8	-	3	1	1
	93323	10	14.5		60.4	6	23.1	48	26.9	-	8	2	-
	93325	16	23.2		34	2.2	13	50	17.9	-	10	6	-
	93327	2	2.9		12.5	6.3	4.8	34	29	-	1	1	-
	93332	1	1.4		9.2	9.2	3.5	37	37	-	1	-	-
	93333	2	2.9		2.5	1.3	1	19	16.5	-	2	-	-
	93338	1	1.4		3.2	3.2	1.2	24	24	-	-	1	-
	93349	1	1.4		20.6	20.6	7.9	49	49	-	1	-	-
	93350	1	1.4		1.6	1.6	0.6	18	18	-	-	-	1
	93368	2	2.9		0.7	0.4	0.3	12	11.5	-	-	-	2
Totals		**69**		**15**	**261.6**	**3.8**			**21.2**				
Crumbs		11			1.5								
Linear (N) 93364													
	93318	4	100		6.6	1.7	100	26	16.8	-	4	-	-
Linear (S) 93356													
	93357	12	60		52.1	4.3	54.9	52	20	-	2	4	6
	93334	1	5		16.4	16.4	17.3	40	40	-	1	-	-
	93358	5	25		21.1	4.2	22.2	40	24.4	-	-	3	1
	93359	2	10		5.3	2.7	5.6	24	23	-	1	1	-
Totals		**24**		**5**	**101.5**	**4.2**			**21.5**				
Crumbs		5			0.5								

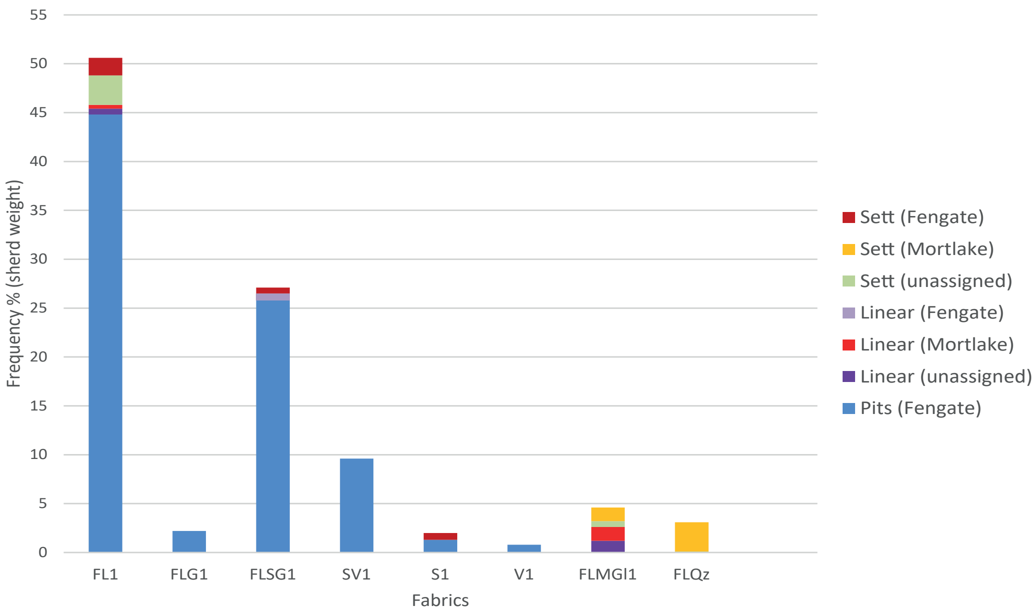

Fig. 3 Relative frequency of fabrics by feature and sub-style based on sherd weight (g)

debitage, and calcined fragments, in a variety of sizes and quantities, occurring in six of the fabric groups commonly in combination with fossil shell, grog and more rarely sandstone. Flint is the sole temper in an intrinsically quartz silty or sandy paste (FL1) where it represents 50.6% of the site assemblage by sherd weight. Flint also occurs with shell and rare grog in fabric FLSG1 (27.1%) and with rare-sparse grog in fabric FLG1 (2.2%), though with the exception of a single sample of FLSG1 grog was not seen in either fabric in thin-section (see below). Given the tiny amounts of grog in two of the fabrics it is possible that it is an incidental inclusion rather than deliberately added temper. Fabrics containing shell, as extant platelets (fabric S), rare-sparse platy voids which likely represent leached out shell or vegetable matter in a silty matrix (SV) or inferred entirely from voids (V1) represent 12.4% of all fabrics. Fabrics with flint in a glauconitic, slightly micaceous clay (FLMGl1) and flint, sandstone and limestone (FLQz) account for 7.7% of the assemblage. A sandy fabric identified in thin-section (see below) likely represents the matrix of other fabrics characterised by rare or sparse temper not seen in the petrographic analysis. The distribution of fabrics by context group and ceramic sub-style is shown in Figure 3.

Fabrics FLMGll and FLQz are totally associated with the sett and linears and, where attributable, are in the Mortlake sub-style; it is likely that the unassigned sherds in these fabrics also belong to the same sub-style. FL1 accounts for the rest of the small Mortlake assemblage (Table 2).

Flint tempered fabrics are characteristic of Mortlake assemblages in Wessex and the south of England (Cleal 1995; Soranoff 1976). Mortlake fabrics using glauconitiFc clays are rare in Wiltshire, possibly because the mineral is difficult to distinguish from iron-rich inclusions macroscopically, but have been identified in one fabric (group 3) at Cherhill associated with Early Neolithic and Mortlake sub-style ceramics (Darvill 1983, 97). A sandstone fabric in Cleal's (1995, fig. 16.2) study was totally associated with the Mortlake sub-style where it represented only 6% of that sub-style. Importantly, a Mortlake sherd from the mound of Amesbury G39, just northwest of WAF, contained fragments of sandstone. Sherds in a similar fabric, always rare within their site assemblages, cluster in the Avebury area (see discussion) and, like those at WAF, may not be local (Smith 1965), though fragments of macroscopically similar rock at West Kennet may provide a more local origin (Cleal

Table 2: Fabric composition of Mortlake sub-style fabrics from the linears and badger sett

	Linears	Badger sett	Combined linears and sett
Fabric	Weight (%)	Weight (%)	Weight (%)
F1	27.5	37.3	34.3
FLMGl1	72.5	24.9	39.6
FLQz		37.8	26.1

Table 3: Comparison of Fengate sub-style fabrics from the pits and combined linears and badger sett

	Pits	Linears and Sett
Fabric	Weight (%)	Weight (%)
FL1	53.5	46.5
FLG1	2.6	-
FLSG1	30.2	35.3
SV, V1, S1	13.7	18.2

1995, 190).

Fengate sub-style fabrics from the pits are dominated by FL1 and FLSG1. Shelly fabrics lacking flint, grouped here as SV, S1 and V1, and FLG1 are relatively minor wares (Table 4). The tiny amounts of grog in FLSG1 and FLG1 might suggest that it is an incidental rather than deliberate inclusion.

Comparison of the Fengate material from the pits and combined linears and badger sett (Table 3) shows close correspondence in the main fabric groups as to suggest that they might derive from a single population. While this is plausible, the lack of any vessel matches between the contexts indicates that they are spatially and ceramically separate though united by common fabrics and stylistic tradition.

The fabric composition of each of the pits by sherd weight and recognisable vessels (Figure 4) illustrates some significant variations between the pits, with perhaps the greatest dissimilarity between [93208] and [93233], the earliest and stratigraphically latest pits, and closer similarity between [93201] and [93208] particularly if fabrics SV and V1 are combined. These data demonstrate the diversity within and between each pit assemblage, a feature which is reinforced by stylistic variations.

Petrographic analysis

A sample of 26 sherds of Peterborough Ware (Table 4) from individually recognizable pots was

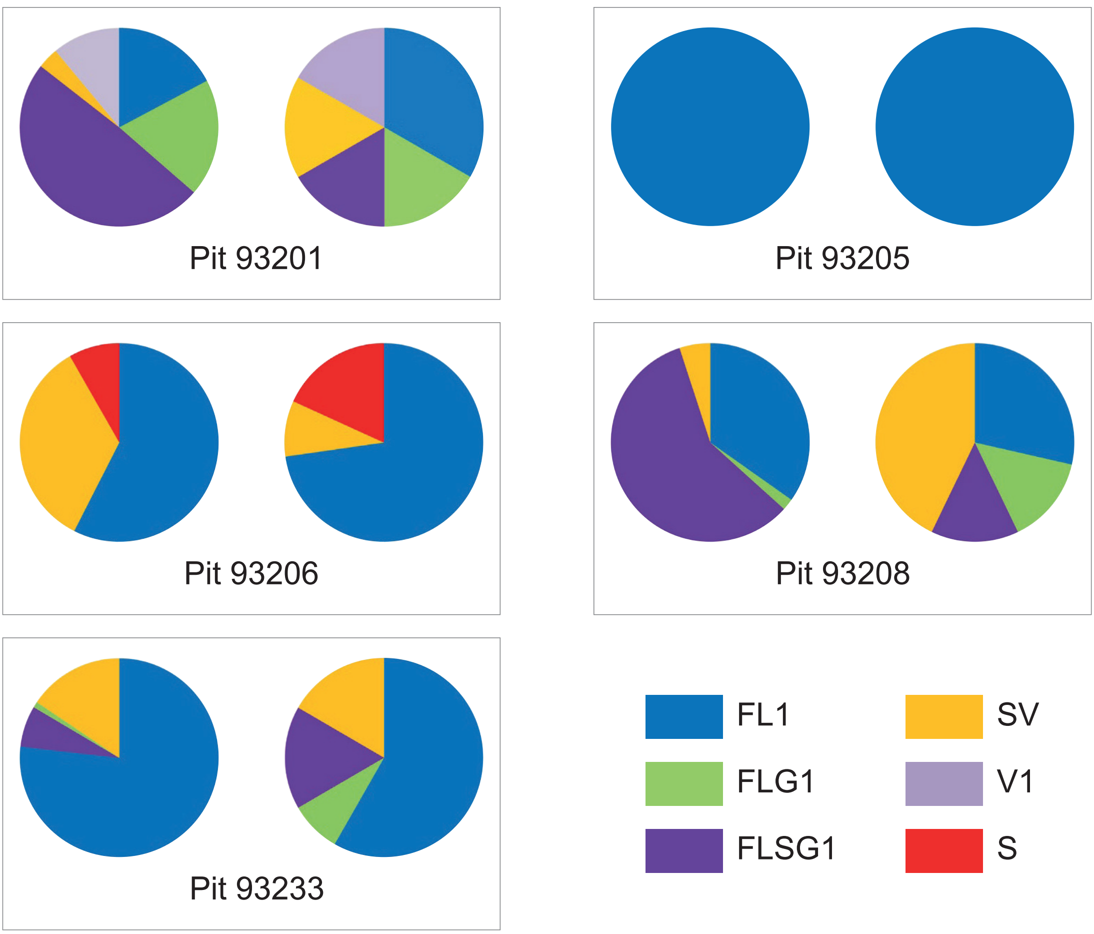

Fig. 4 Relative proportion of fabrics by sherd weight (left) and recognisable vessels (right) for each pit

Table 4: Concordance of macroscopic and petrographic fabrics sampled in thin section

Fabrics				
Macroscopic	Petrographic	Sub-style	Pot	Feature
FL1	Flint Tempered Fabric	Fengate	2	Pit 93208
FL1	Flint Tempered Fabric	Fengate	4	Pit 93208
FL1	Flint Tempered Sandy Fabric	Fengate	8	Pit 93206
FL1	Flint Tempered Sandy Fabric	Fengate	10	Pit 93206
FL1	Flint Tempered Sandy Fabric	Fengate	11	Pit 93206
FL1	Flint Tempered Sandy Fabric	Fengate	14	Pit 93205
FL1	Flint Tempered Sandy Fabric	Fengate	5	Pit 93233
FL1	Flint Tempered Sandy Fabric	Fengate	23	Pit 93233
FL1	Flint Tempered Sandy Fabric	Probably Fengate	29	Sett
FLG1	Flint Tempered Fabric?	Fengate	3	Pit 93208
FLG1	Sandy Fabric	Fengate	17	Pit 93201
FLSG1	Flint and Shell Tempered Sandy Fabric	Fengate	1	Pit 93208
FLSG1	Flint and Shell Tempered Sandy Fabric	Fengate	7	Pit 93233
FLSG1	Flint and Shell Tempered Sandy Fabric	Fengate	15	Pit 93201
FLSG1	Flint and Shell Tempered Sandy Fabric	Fengate	38	Linear (S)
S1	Shell Tempered Sandy Fabric	Fengate	22	Pit 93206
S1	Flint and Shell Tempered Sandy Fabric	Fengate	51	Pit 93206
SV1	Sandy Fabric	Fengate	9	Pit 93206
SV1	Grog and Plant Tempered Fabric	Fengate	24	Pit 93233
SV1	Shell Tempered Sandy Fabric	Fengate	6	Pit 93233
V1	Vesicular Fabric	Fengate	52	Pit 93201
FLMGl1	Flint Tempered Sandy Glauconitic Fabric	Mortlake	19	Linear (S)
FLMGl1	Flint Tempered Sandy Glauconitic Fabric	Mortlake	41	Linear (S)
FLMGl1	Flint Tempered Sandy Glauconitic Fabric	Peterborough Ware	46	Sett
FLMGl1	Flint Tempered Sandy Glauconitic Fabric	Mortlake	26	Linear (N)
FLQz	Flint, Limestone and Sandstone Tempered Sandy Fabric	Mortlake	27	Sett

examined in thin section under the petrological microscope in order to determine their raw materials, provenance and manufacturing technology. Nineteen were from Fengate sub-style vessels from the five pits, the others, including those in Mortlake and Fengate sub-styles, came from the badger sett and linear features. Compositional classification was performed independently of the macroscopic fabric ascription, but the two were compared afterwards; with a few exceptions, there was good correspondence between the two. Some mismatches can be attributed to the lower resolution of the macroscopic analysis, which failed to detect small inclusions such as glauconite, or the representativeness of thin sectioning (Quinn 2013, 23, 138) in which rare components, such as the sparse shell in fabric SV1 or grog in fabrics FLG1 and FLSG1, were not seen down the microscope. The samples were classified into nine separate fabrics or recipes, many of which seem to represent different combinations of the same common ingredients (Figure 5).

Sandy Fabric (Pots 9, 17) has naturally occurring sub-rounded sand and silt-sized quartz inclusions in a non-calcareous clay matrix (Figure 5a). It is related to other sandy fabrics which contain temper, including the Shell Tempered Sandy Fabric (Pots 6, 22) (Figure 5b), which features abundant fragments of layered mollusc shell up to 2mm in size, the Flint Tempered Sandy Fabric (Pots 5, 8, 10, 11, 14, 23, 29) (Figure 5c) characterized by generally angular iron-stained flint temper with a fibrous internal microstructure, and the Flint and Shell Tempered Sandy Fabric (Pots 1, 7, 15, 38, 51) (Figure 5d), which contains both shell and flint temper. Fragments of micritic fossiliferous limestone in Pot 7 are suggestive of the origin of the shell in the two shelly fabrics.

Flint temper is also present in three other fabrics in the samples. The Flint, Limestone and Sandstone Tempered Sandy Fabric (Pot 27) (Figure 5e) contains flint temper plus large inclusions of limestone and medium-grained sandstone composed of quartz clasts cemented by cryptocrystalline silica, and quartz-rich sand in a non-calcareous clay matrix. Some naturally occurring heterogeneity occurs in this fabric, as well as the Flint Tempered Sandy Glauconitic Fabric (Pots 19, 26, 41, 46) (Figure 5f), in which flint was added to a silty quartz, mica and oxidized glauconite containing base clay.

The Flint Tempered Fabric (Pots 2, 3 and 4) (Figure 5g) is characterized by the presence of angular flint temper in a non-calcareous clay source

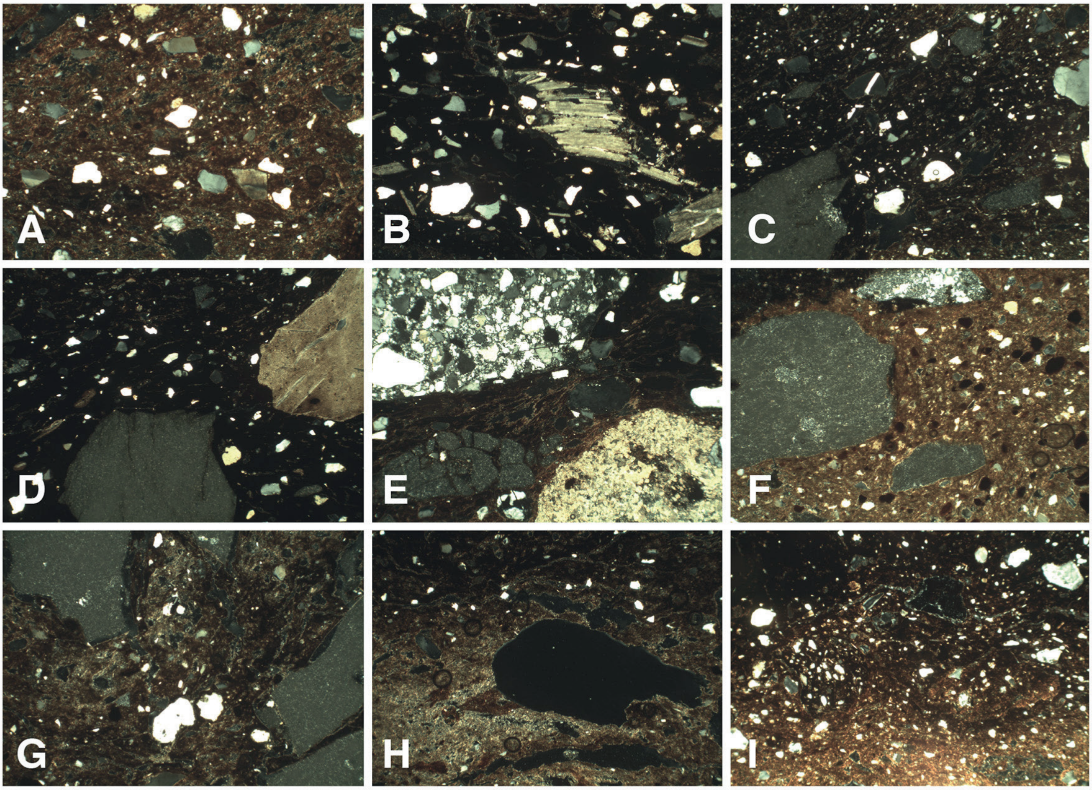

Fig. 5 Photomicrographs of Peterborough Ware

with angular sand and silt-sized intrinsic quartz, flint and rare polycrystalline quartz. This fabric is related to the Flint Tempered Sandy Fabric, but has a much lower proportion of sand inclusions.

The Vesicular Fabric (Pot 52) (Figure 5h) contains angular silt-sized quartz in a non-calcareous clay matrix with large voids. The latter may have formed by the leaching of inclusions, perhaps of limestone and/or shell. A single sherd (Pot 24) characterized by the presence of grog, possible plant temper, and intrinsic sand and silt-sized quartz, with rare polycrystalline quartz, mica and flint (Figure 5i) has been classified as the Grog and Plant Tempered Fabric. With the possible exception of Pot 1 from the Flint and Shell Tempered Sandy Fabric, no other analyzed sherds contain grog fragments in the thin sections.

Flint tempering is a common characteristic of Peterborough Ware and earlier Neolithic pottery of Wiltshire, including material from Stonehenge (e.g. Finch 1971; Craig *et al*. 2015), as is the addition of shell. However, these ingredients also occur in material from Gloucestershire (Morris and Woodward 2003, 286). Given that the bedrock underlying Amesbury and the surrounding region is Cretaceous chalk, flint could have been obtained locally from primary exposures, then added as temper. Another source could be superficial deposits such as the clay-with-flints which covers the chalk. This sandy clay rich material is a potential candidate for the raw materials used to manufacture sandy quartz-rich sherds such as the Flint Tempered Sandy Fabric.

The shell in several fabrics appears to be fossil in origin. A source of shelly limestone that may occur in the Amesbury Area is strata at the base of the Seaford Chalk Formation, which contains abundant thick-shelled inoceramid. The wall structure of the shell in the Shell Tempered Sandy Fabric and the Flint and Shell Tempered Sandy Fabric is in keeping with oyster, to which the extinct group inoceramids are related. Shell in Neolithic ceramics analysed from Durrington Walls by Craig *et al*. (2015) was interpreted as coming from the Kimmeridge Clay, over 20km from the site. This interpretation may have been influenced by the analysis of Peterborough Ware ceramics from Cherhill in north Wilshire by

Darvill (1983). While the latter author proposed that the Kimmeridge Clay was used to manufacture certain ceramics from this site, he in fact suggests that fossil material in the shelly pottery could have been obtained from certain Jurassic Corallian to the west and north-west of Cherhill.

Explaining the presence of glauconite in the Flint Tempered Sandy Glauconitic Fabric is difficult without the import of either glauconitic sand, sandy clay, or pottery made from it. Glauconite is not present in the chalk strata that dominates the area and is only likely to be a minor component of any superficial transported sediments such as alluvium. The closest source of this material is the Cretaceous Upper Greensand Formation, which outcrops 15km west of Salisbury. Flint is present in this area and could have been added as temper. The Upper Greensand contains quartz sand clasts that are also present in the Flint Tempered Sandy Glauconitic Fabric. The sandstone inclusions in the Flint, Limestone and Sandstone Tempered Sandy Fabric might also indicate a source in the Jurassic strata to the west of Stonehenge or perhaps the Tertiary sedimentary strata to the southeast.

Thin section petrographic characterisation of 26 sherds of Peterborough Ware from WAF indicates that most of the specimens were manufactured using different combinations of common raw materials including flint, shell and sandy clay. Comparisons with the local and regional geology, as well as other scientific studies of contemporaneous ceramics, suggests that these ceramics could have had a local origin. However, the similarity in bedrock and superficial deposits over a large area means that it is not possible to rule out production elsewhere and transport to the site. Several sherds containing glauconite and sandstone may have had a non-local origin, some 15–20km distant.

Forms and decoration

The Pits

The pottery from the pits, all apparently in the Fengate sub-style, is characterized by an expanded collar of upright or slightly inward sloping form with straight or slightly convex sides and a commonly inward sloping bevel or flat-topped rim, Ard and Darvill (2015) types F1–3. There are two examples of a simple rounded, pointed rim. The plain, concave, upright rim of Pot 15 is uncommon in Wiltshire but paralleled at Baston Farm, Kent (Philp 1973). Rim diameters range from 160mm to 240mm, with modes between 180mm and 200mm reflecting small to medium-sized vessels (Barclay 2002, 92). The exceptionally deep collar of Pot 9, matched by its large rim diameter of 240mm, is suggestive of a jar. Of the 24 rim sherds from 12 pots, and five collars lacking rims from another four vessels, only one (Pot 15) is undecorated. About one third of rims from individual vessels are decorated on their inner face and neck. Necks are generally rather poorly defined by a slight concavity which typically possesses a row of pits made with a tool, such as a stick or possibly bone, or fingertip.

Owing to the fragmentary nature of the assemblage the shape of the body is generally not possible to determine. Only one vessel, Pot 1, has a rim to near base profile which allowed its classification as a small bowl with a flat base, the latter missing. Flat or near flat bases from five vessels are present, of which only one is the diminutive form (Pot 17). Two base sherds from Pot 4 exhibit fine linear scratches or abrasions underneath reflecting wear from use. Vessel walls range from 6mm to 20mm thick with a mean of 10mm.

Some 80% of the sherds from the pits are decorated in a variety of techniques including impressions of twisted cord, fingernail, fingertip and stick. No apparent correlation between fabric, decorative technique, motif or use (see Organic Residue Analysis (ORA) below) was evident.

Around one third of all decorated vessels possess twisted cord impressions. This frequently occurs on rim-tops and bevels, most commonly as oblique (Pots 1, 2, 5, 9, 13), perpendicular (Pot 6) and horizontal rows (Pots 7 and 23). Collars carry nested filled chevrons (Pots 2, 8, 13, 16) (see Stanton Harcourt: Hamlin and Case 1963, figs 7, 13), horizontal rows (Pots 1, 6, 12), curvilinear (Pot 9) similar to Cassington, Oxfordshire (Leeds 1940, pl. 1, D), lattice (Pot 14) and vertical (Pot 23) schemes. Interior decoration occurs on the neck just below the rim as two rows of crescents (Pots 6, 9) similar to those on a Mortlake sub-style vessel from Peterborough (Smith 1956, fig. 60, 3) and W31 Wilsford Down (Raymond 1999a, fig. 119, 99) and fine zig-zag (Pot 14). Crescentic motifs are extremely rare on Fengate sub-style vessels but are characteristic of the Mortlake sub-style in the region. Necks are rarely decorated apart from pits, but a zig-zag motif (Pot 5) and a row of oblique impressions possibly also in zig-zag (Pot 12) are present. The bodies of vessels carry zig-zag (Pots 5, 61), horizontal (Pot 64) and vertical (Pots 9, 17) motifs; Pot 17 is similar to one from Wallingford (Richmond 2005, fig. 3, 7).

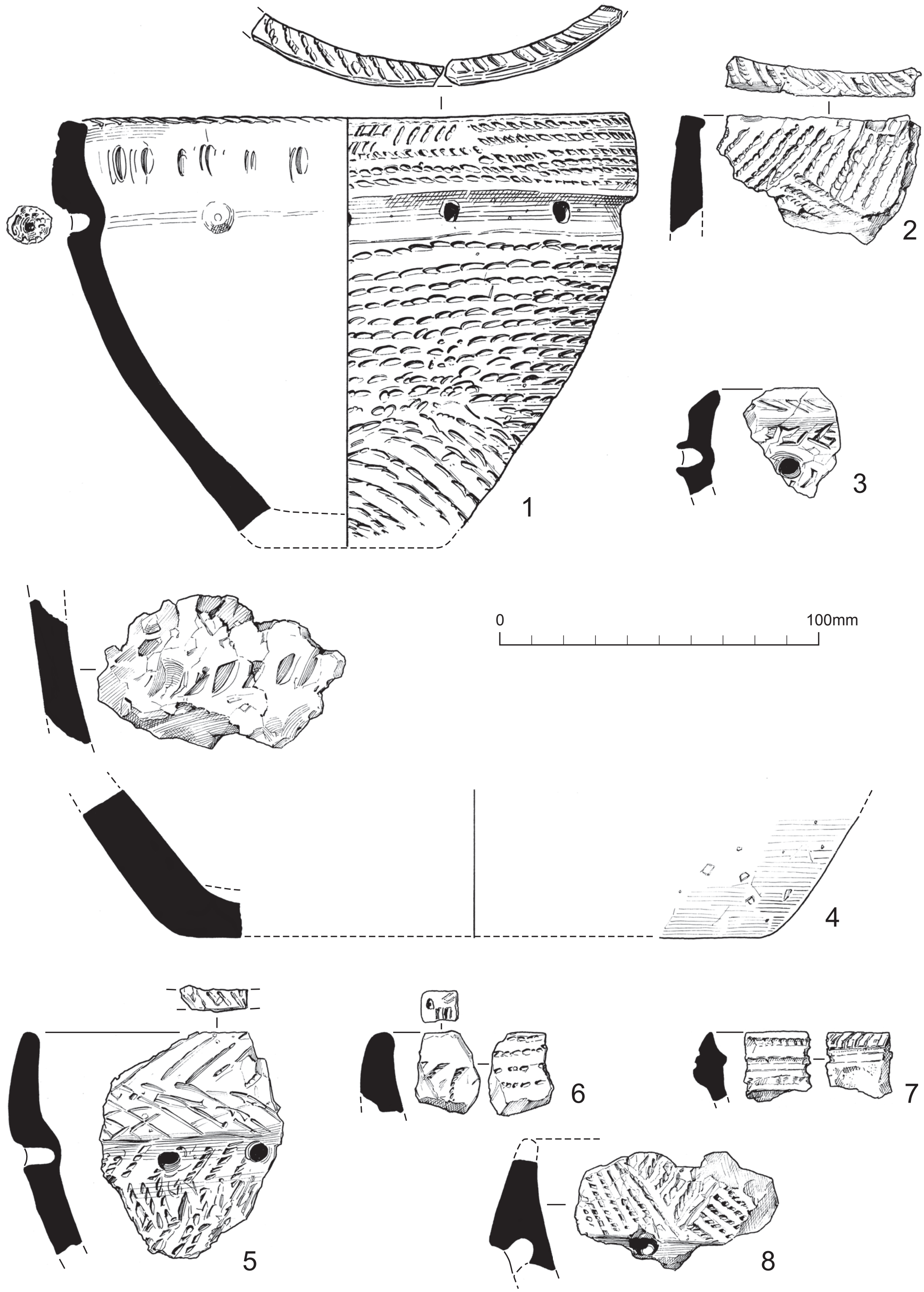

Fig. 6 Pottery illustrations: Pit 93208, pots 1-4; Pit 93233, pots 5-7; Pit 93206, pot 8

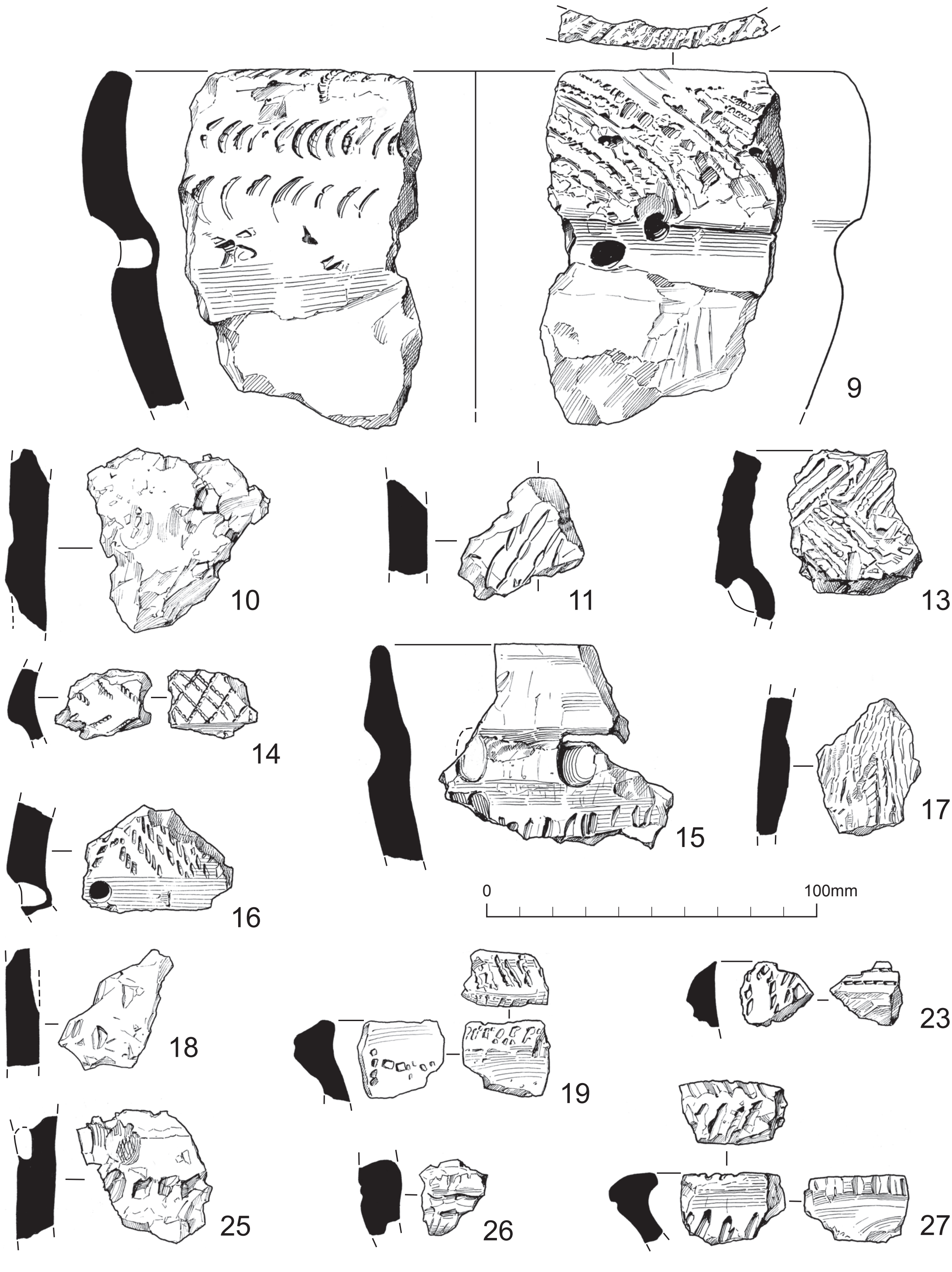

Fig. 7 Pottery illustrations: Pit 93206, pots 9-11; Pit 93205, pots 13-14, 25; Pit 93201, pots 15-18; Linear 93356, pot 19; Pit 93233, pot 23; Linear 93364, pot 26; Badger sett, pot 27

Fingernail impressions occur on 15.6% of all decorated vessels. Collars have zig-zag (Pots 3, 59) and horizontal rows (Pots 7, 58) while bodies carry zig-zag (Pot 3), oblique (Pot 56) and horizontal (Pot 57) schemes.

End-to-end linear fingernail impressions are employed on 11.1% of all decorated pots, most frequently on collars where they occur in lattice pattern (Pot 5), oblique parallel rows (Pot 54) and probably horizontal rows (Pot 11). It occurs once in zig-zag on the neck of Pot 54 where it continues from the collar. The only vessel with end-to-end fingernail impressions on its body is Pot 1 where it is deployed as horizontal rows below the neck turning 90^0 becoming vertical near the base. The technique on this vessel, however, is different from the conventional technique in that shallow impressions were created by applying the fingernail at about 45^0 to the surface of the pot rather than vertically forming a neat half-moon effect. This is the only vessel from the site with this unusual technique though remarkably similar examples came from a pit in the vicinity of Old Sarum (Algar and Hadley 1973) and from the Thames at Wandsworth (Smith 1956, fig. 53).

Fingertip impressions most frequently (6.7%) occur singly, often organised in rows on the bodies of vessels (Pots 4, 10, 51, 52). There is one example of a row of shallow impression on the inner face of the neck of Pot 1. Paired fingertip impressions are relatively uncommon (4.4%) being present on Pots 15 and 18. As all the fingertip impressions lack the pronounced nails required for fingernail decoration it would suggest that the techniques were executed by different individuals.

The necks of Fengate sub-style vessels are characterised by oval or round pits in a variety of sizes made by pushing a tool, probably a stick or bone, or fingertip part-way thought the vessel wall forming a boss on the inner surface. One of the tools used had a ledge on one side and a deeper section on the other (see Pot 1), possibly a step fracture on a bone, demonstrating that the implement had been pushed into the clay and withdrawn without being turned.

The frequency of these decorative techniques for each pit based on individual vessels (Figure 9) highlights the relative importance (between 28% and 38%) of twisted cord and the consistent presence of pits in the necks of pots. Beyond the close similarities between [93206] and [93208], the other pits appear individual and unique. [93233], the latest pit stratigraphically, may indicate a chronological trend in the increased use of fingernail decoration, both as single and end-to-end, the preferred technique in the Fengate sub-style (Ard and Darvill 2015, 10), though the argument cannot be developed further based on a single pit.

On only two vessels (Pots 1, 5) was it possible to associate the decorative scheme on the rim/collar with that on the body. In each, both the technique and motif on the rim/collar was different from that on the body, a feature observed on Fengate sub-style vessels in the region and the south generally (Smith 1956, 113). Body decoration is usually, with the notable exception of Pot 1, simple and restrained in contrast to often complex and elaborate schemes on collars. Nested filled chevrons or opposed diagonal lines in a variety of techniques are recurrent motifs on collars, fingertip impressions on bodies.

The Sett

Fengate sub-style vessels from the badger sett include two rims and the collars from at least five pots. Each has an expanded collar terminating in a shallow concave neck. With the exception of a plain rim and collar (Pot 34) and plain collar and neck (Pot 60) the others (Pots 30, 36, 37) are all decorated with twisted cord, stylistically closely similar to the pit assemblage. A single body sherd (Pot 29) has rows of oblique fingernail impressions and another (Pot 35) a neat row of vertical fingertip impressions.

Mortlake sub-style vessels are represented by a simply expanded rim with a lip on its inner face of Smith's (1956) type M2a decorated with twisted cord in zig-zag pattern with whipped cord maggots on the interior (Pot 27). The body of Pot 31 has neatly executed rows of bird or small mammal bone impressions.

Several vessels could not be assigned to a specific sub-type on the basis of fabric or decoration. These comprise Pot 28 with neat rows of shallow fingertip impressions, Pot 46 with deeper fingertip impressions, Pot 33 with fine twisted cord and Pots 32 and 39 which have distinctive fingertip impressions which have formed a crescent of clay on one side.

Linear feature

A single Fengate sub-style collar lacking its rim-top (Pot 38) has twisted cord impressions in opposed diagonal lines or possibly filled triangles.

Vessels in the Mortlake sub-style include a rim with twisted cord in zig-zag pattern with twisted cord on the inner surface and neck (Pot 19), body sherds (Pots 26, 41) decorated with carefully executed rows

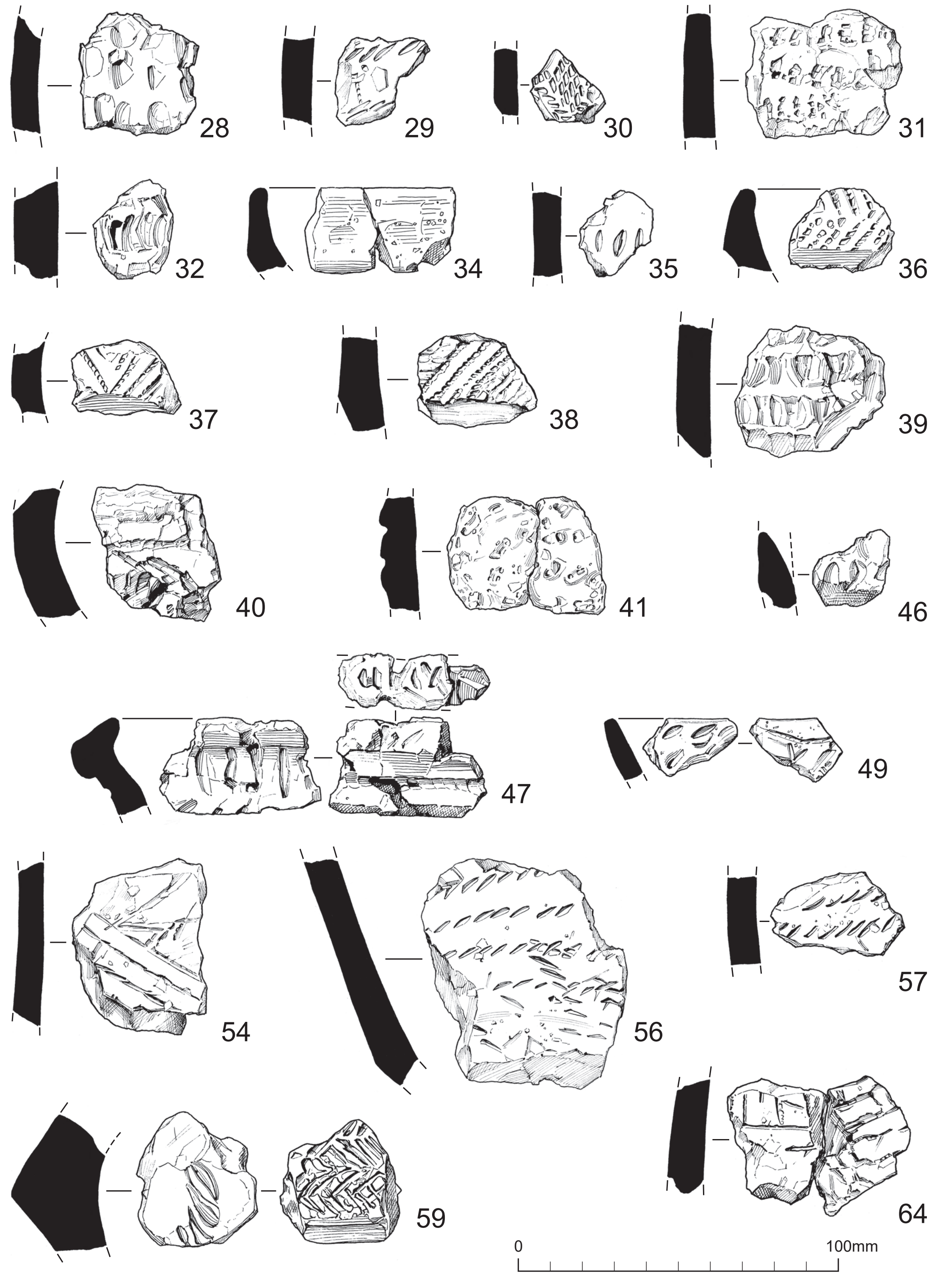

Fig. 8 Pottery illustrations: Badger sett, pots 28-37, 39, 46-47; Linear 93356, pots 38, 40-41; Pit 93201, pot 49; Pit 93233, pots 54, 56-57, 59; Pit 93206, pot 64

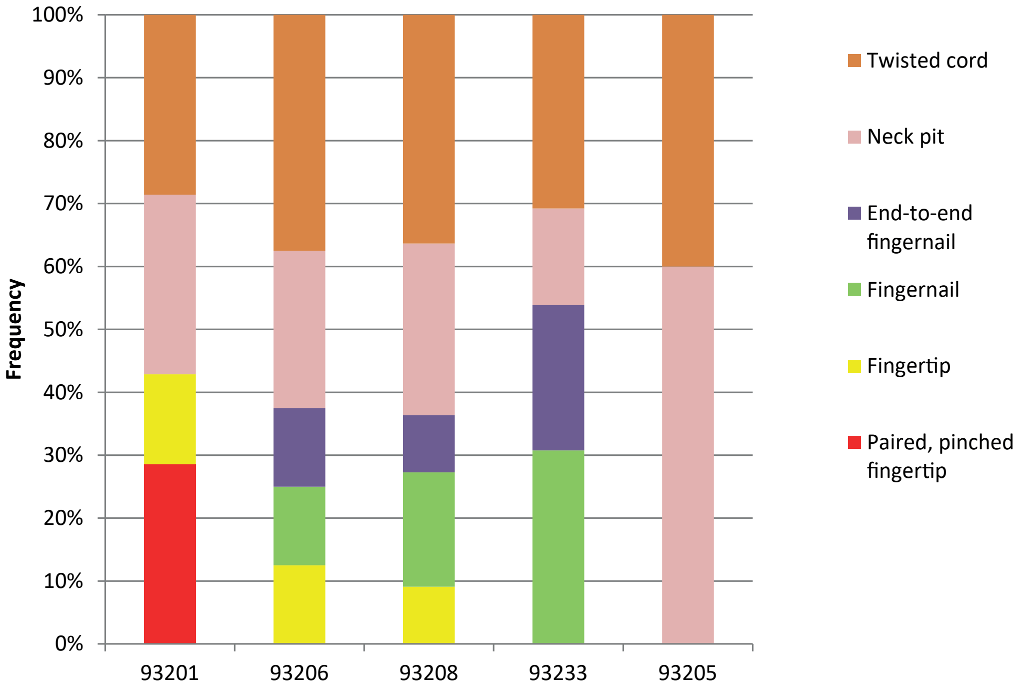

Fig. 9 Comparative decorative techniques

of bird-bone impressions and (Pot 40) horizontal rows of rather indistinct twisted cord above oblique fingernail impressions. Rim sherds were too small to determine whether they had pits in their necks.

Fragmentation, abrasion and representation

In general, sherds from the pits are highly fragmented, the largest being 103mm across, just over 80% under 40mm in length, with mean lengths between 17.5mm and 24.4mm. Average sherd weights are correspondingly low, between 2.2g and 7g (Figure 10). Statistical analysis using the Kolmogorov-Smirnov two-sample test of association based on maximum sherd length demonstrates that there is no significant difference in sherd fragmentation between the pits (results and P statistics available in the archive).

In the pit assemblages sherd abrasion is typically none (1) to low (2) with just over 90% falling in these categories (Table 2). Pit [93208] is unusual in having more than twice the class 1 material than pits [93201], [93206] and [93233], while virtually all medium abraded (3) sherds from pit [93206] came from secondary fills; two similarly abraded sherds from pit [93201] might be residual. Pit [93233] contained proportionately more medium (3) and highly (4) abraded sherds in both its primary and secondary fills than the other pits. The presence, though rare, of highly abraded sherds alongside those with no or low abrasion suggests either residuality or material drawn from parent material with differential sherd attrition such as a midden. The absence of a correlation between medium and high abrasion and the most fragmented sherds, and the generally fresh appearance of the pottery, suggests that fragmentation was largely independent of the processes that contribute to abrasion, such as weathering, horizontal or vertical movements, and trampling. Relatively friable pottery of this type might be expected to degrade rapidly if exposed to the elements or moved through redeposition or trampling whilst in occupation soils or middens. The apparent lack of both agencies indicates short exposure, curation in a protected environment or deliberate breakage to a preferred size shortly before deposition in the pits.

Sherds from the badger sett and linear features were similarly fragmented to those in the pits, with mean lengths and weights of 19.4mm and 3.3g (sett) and 19.1mm and 3.5g (linear), but are significantly more abraded with no fresh sherds present. Medium

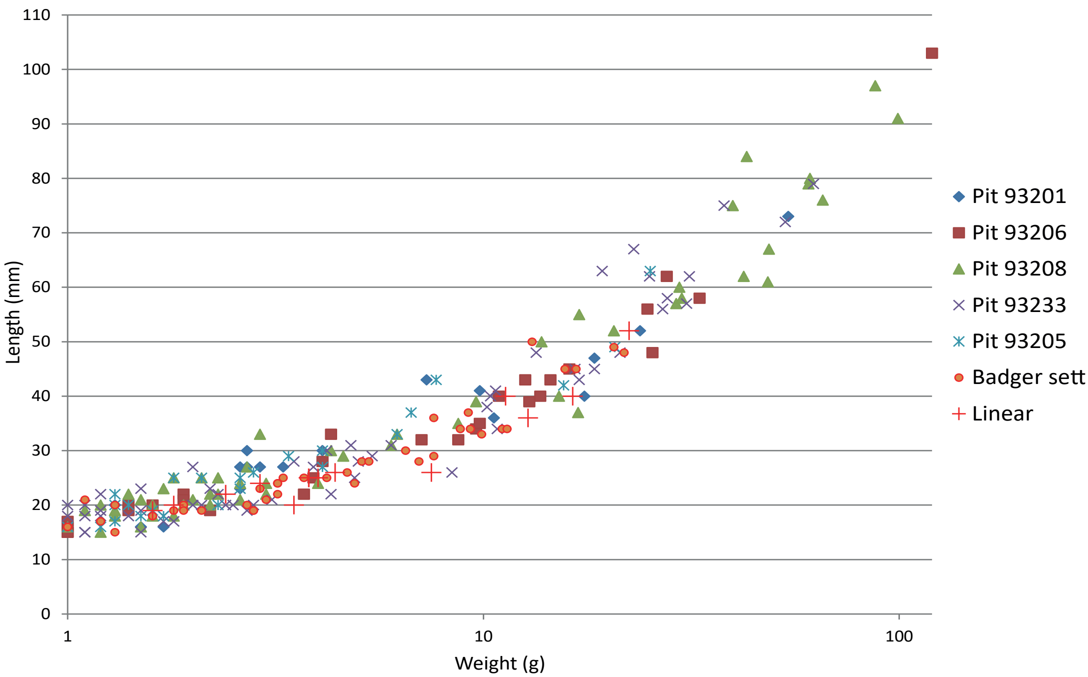

Fig. 10 Sherd fragmentation by weight and length. The x axis is logarithmic. Note that the badger setts contain nothing over 52mm and 23g

and highly (3–4) abraded sherds comprise a mean of only 9.4% in the pit assemblages, but account for almost 44% in the sett and 69% in the linear. The material from the linear is the most weathered and abraded from the site and distinct from the sett reflecting different formation processes and possibly chronology.

Only small proportions of each vessel were deposited in the pits, some pots represented by single sherds. There was no apparent preference or selection of one part of a vessel over another (Figure 11) though bases are under-represented compared with rims/collars and are absent in two of the pits; this, however, might be a function of the larger diameter of rims compared to bases and a concomitant higher fragmentation rate.

Each pit, commonly each fill, contained a unique repertoire of vessels except [93205] which had mixed pottery and [93208] where rim sherds from two vessels from its primary fill (Pots 1 and 3) were present in the final fill, perhaps deliberately reserved for the purpose. Despite the large assemblage, only four conjoining sherd groups within individual pits were identified, of which all except two groups from Pot 1 in [93208] comprised only two sherds.

[93208] and [93233] produced the sole cross-join across pits: a single sherd in the latter joined a large group of sherds from Pot 1 in the former. Two, non-joining, rim sherds from Pot 3 were also found in [93208] and [93233]. Given that [93208] is cut by grave [93240], which in turn is cut by [93233], it is likely that redeposition of a small amount of material occurred between [93208] and [93233]. Rims from similar yet separate vessels (Pots 2, 13) were found in [93208] and [93205] respectively. The lack of cross-joins between the pits and the individuality of each pit assemblage indicates that each pit was probably in use separately.

Sherds from Pot 1 show clear signs of differential pre-pit deposition processes, in which those with uniform orange-brown surfaces join with others that are consistently darker on one or both surfaces, the difference in colour being bounded by the break. The breaks of the darkened sherds are also similarly affected. This suggests that the darker material was burnt or 'changed' possibly as a result of use after the vessel was broken and then later reunited with unaffected sherds for deposit in the pit.

Organic residue analysis

The analysis of organic residues absorbed within the fabric of ceramic vessels, using molecular

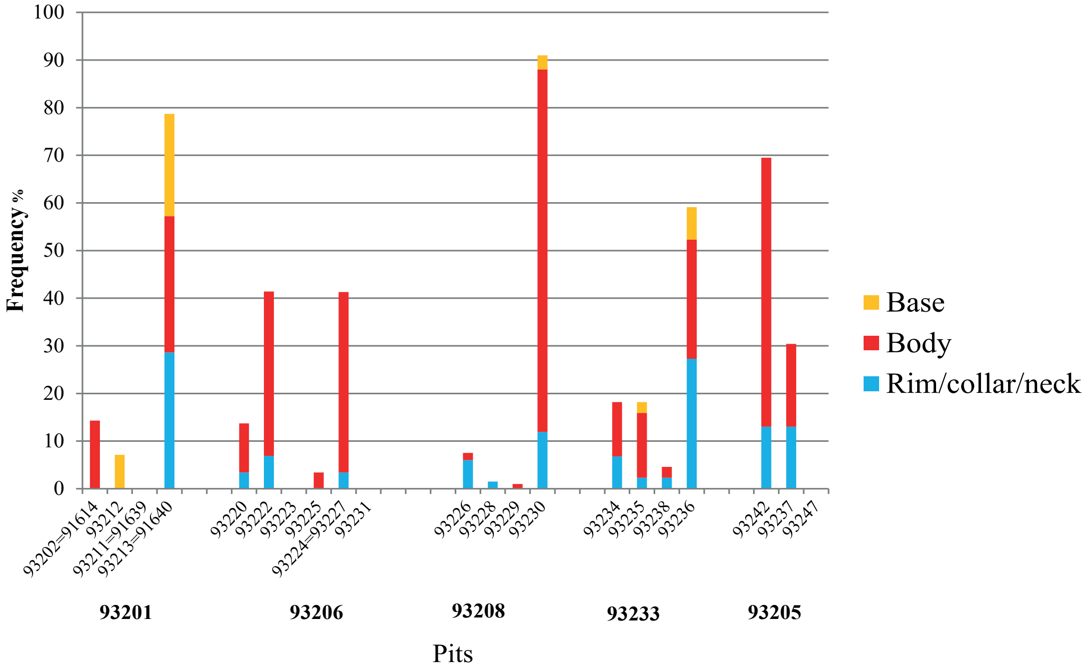

Fig. 11 Component parts of vessels in each fill of the five pits. Layers in sequence from final fill (left) to primary fill (right)

and isotopic techniques, has been shown to be a powerful tool both in the investigation of past diet and subsistence practices and in the reconstruction of animal management practices (e.g. Copley *et al.* 2003; Craig *et al.* 2005; Evershed *et al.* 2008; Outram *et al.* 2009; Dunne *et al.* 2012). Organic residue analysis has allowed the identification of terrestrial animal fats as proxies for carcass processing and secondary product exploitation, aquatic products, plant oils and waxes denoting vegetable and plant oil consumption and beeswax, resins, tars and bitumen used in a wide range of technological and cultural activities (e.g. Heron *et al.* 1994; Dudd and Evershed, 1998; Stern *et al.* 2003; Hansel *et al.* 2004; Stern *et al.* 2008; Cramp *et al.* 2011; Salque *et al.* 2013). On a broader scale, lipid residue analyses can provide insight into the domestication of plants and animals, the development of animal husbandry practices and ecological and environmental changes through time (Evershed, 2008b; Evershed *et al.* 2008; Dunne *et al.* 2012; Roffet-Salque *et al.* 2016).

The objective of this investigation was to determine whether organic residues were preserved in Middle Neolithic potsherds excavated from a group of five Middle Neolithic pits and a badger sett at WAF. The pottery assemblage comprised Peterborough Ware mainly in the Fengate sub-style, and consequently this is the largest study of organic residues in a Fengate Ware assemblage, aside from one Fengate vessel from Eton Rowing Lake which was analysed as part of a study on Neolithic pottery from Southern British Neolithic sites (Copley *et al.* 2005a).

Lipid analysis and interpretations were performed using established protocols (Correa-Ascencio and Evershed 2014; Appendix 3). Thirty-five sherds were selected for analysis. The lipid recovery rate was 50% (n=18) which compares favourably to those extracted from six other Southern British Neolithic sites (43%, Copley *et al.* 2005b) and from Late Neolithic Grooved Ware from Durrington Walls (48%, Mukherjee *et al.* 2007; 2008; Craig *et al.* 2015). The mean lipid concentration from the sherds (Table 5) was 1.5mg g^{-1}, with a maximum lipid concentration of 4.5mg g^{-1} (STH029). Several of the potsherds contained high concentrations of lipids (e.g. STH004, 3.6mg g^{-1}, STH007, 3.4mg g^{-1} and STH016, 3.8mg g^{-1}), demonstrating excellent preservation and indicating that these were vessels which were subjected to sustained use in the processing of high lipid-yielding commodities.

The lipid profiles comprised the free fatty

Table 5: Laboratory number, pot number, context number, pit number, lipid concentrations ($\mu g\ g^{-1}$), total lipid concentration in extract (μg), $\delta^{13}C$ and $\Delta^{13}C$ values, attributions and vessel types of West Amesbury Farm residues

Laboratory Number	Pot number	Context number	Pit number	Lipid concentration ($\mu g\ g^{-1}$)	Total lipid in extract (μg)	$\delta^{13}C_{16:0}$	$\delta^{13}C_{18:0}$	$\Delta^{13}C$	Attribution	Vessel type
STH002	24	93235	93233	31.3	41.3	-27.2	-28.4	-1.2	Ruminant adipose	Fengate bowl
STH004	1	93236	93233	3594.5	5535.6	-28.6	-32.6	-4.0	Dairy fat	Fengate bowl
STH007	9	93236	93233	3354.9	5535.6	-27.6	-30.7	-3.1	Dairy fat	Fengate bowl
STH008	56	93236	93233	108.9	238.4	-27.6	-31.3	-3.7	Dairy fat	Fengate bowl
STH009	17	93213	93201	112.4	171.9	-29.1	-32.2	-3.1	Dairy fat	Fengate bowl
STH011	15	93213	93201	2498.0	4146.7	-28.5	-31.6	-3.1	Dairy fat	Fengate bowl
STH015	1	93230	93208	2612.6	3683.7	-27.1	-29.8	-2.7	Ruminant adipose	Fengate bowl
STH016	2	93230	93208	3794.7	9980.0	-27.6	-29.7	-2.1	Ruminant adipose	Fengate bowl
STH022	21	93220	93206	534.2	1560.0	-28.7	-32.6	-3.9	Dairy fat	Fengate bowl
STH024	-	93227	93206	693.7	1463.8	-27.9	-30.7	-2.8	Ruminant adipose	Not known
STH026	13	93237	93205	4571.0	5439.5	-28.0	-29.6	-1.6	Ruminant adipose	Fengate bowl
STH027	25	93237	93205	330.2	647.3	-27.5	-28.6	-1.1	Ruminant adipose	Fengate bowl
STH028	31	93323	Badger	385.6	659.3	-27.9	-30.0	-2.1	Ruminant adipose	Mortlake bowl
STH029	39	93349	Badger	9051.2	19007.6	-28.3	-32.5	-4.1	Dairy fat	Mortlake bowl
STH032	41	93357	Badger	388.2	679.4	-27.2	-30.3	-3.1	Dairy fat	Mortlake bowl
STH033	40	93357	Badger	1664.4	4960.0	-27.9	-33.2	-5.3	Dairy fat	Peterborough Ware
STH034	1	93230	93208	280.7	631.5	-27.0	-28.8	-1.8	Ruminant adipose	Fengate bowl
STH036	1	93230	93208	1651.8	4327.8	-28.2	-32.8	-4.6	Dairy fat	Fengate bowl

acids, palmitic ($C_{16:0}$) and stearic ($C_{18:0}$), typical of a degraded animal fat (Figure 12a and b: Evershed *et al.* 1997; Berstan *et al.* 2008).

GC-C-IRMS analyses were carried out on 18 lipid residues (Table 5) to determine the $\delta^{13}C$ values of the major fatty acids, $C_{16:0}$ and $C_{18:0}$, and ascertain the source of the lipids extracted (Dudd and Evershed 1998; Copley *et al.* 2003; Dunne *et al.* 2012). The $\delta^{13}C$ values of the $C_{16:0}$ and $C_{18:0}$ fatty acids for the lipid residues are plotted onto a scatter plot along with the reference animal fat ellipses (Figure 13a). It has been established that when the extract from a vessel plots directly within an ellipse, for example, ruminant dairy, ruminant adipose or non-ruminant adipose, then it can attributed to that particular classification. If it plots just outside then it can be described as predominantly of that particular origin. However, it should be noted that extracts commonly plot between reference animal fat ellipses and along the theoretical mixing curves, suggesting either the mixing of animal fats contemporaneously or during the lifetime of use of the vessel (Mukherjee 2004; Mukherjee *et al.* 2005).

In this instance, sherds STH033 (Peterborough Ware of indeterminate sub-style) and STH036 (Fengate bowl) plot within the dairy reference ellipse (Figure 13a), with a further three residues STH004, STH022 and STH029 (Fengate bowls), plotting just on the border, suggesting three vessels were dedicated to dairy processing. Extracts of STH009 and STH011, both Fengate bowls from pit [93201], plot between the ruminant dairy and ruminant adipose ellipses (Figure 13a), suggesting some mixing of these animal products. The remainder of the vessels (Figure 13a) plot between the ellipses, suggesting some mixing of dairy and ruminant (cattle, sheep and goat) and non-ruminant products (pig) in the vessels, either contemporaneously or during the lifetime use of the vessel.

Ruminant dairy products are differentiated from ruminant adipose when they display $\Delta^{13}C$ values of less than -3.1 ‰ (Dunne *et al.* 2012; Salque 2012). Significantly, ten lipid residues plot in the ruminant dairy region (Figure 13b), confirming a strong reliance on secondary products, such as milk, butter and cheese, at the WAF site, although it should be noted that four of these plot at the extent of the range, suggesting some minor mixing with ruminant products. A further eight vessels were shown to have been used to process ruminant carcass products (Figure 13b); however, no vessels were solely used in processing porcine products. It should be noted that this could be a function of complex mixing processes. These eight vessels attributed to a ruminant carcass origin could theoretically be produced by mixing either pork and dairy products or pork and ruminant carcass products.

In summary, the results, determined from GC, GC-MS and GC-C-IRMS analyses, demonstrate that ten WAF vessels (56% of lipid-containing extracts) were routinely used to process dairy products. This is comparable to a study of 438 potsherds from six Southern British Neolithic sites, where dairy fats were observed in approximately 57% of the lipid-containing extracts and 25% of all the sherds, although this varied across sites (Table 6; Copley *et al.* 2005a). These sites include domestic and non-domestic contexts (causewayed

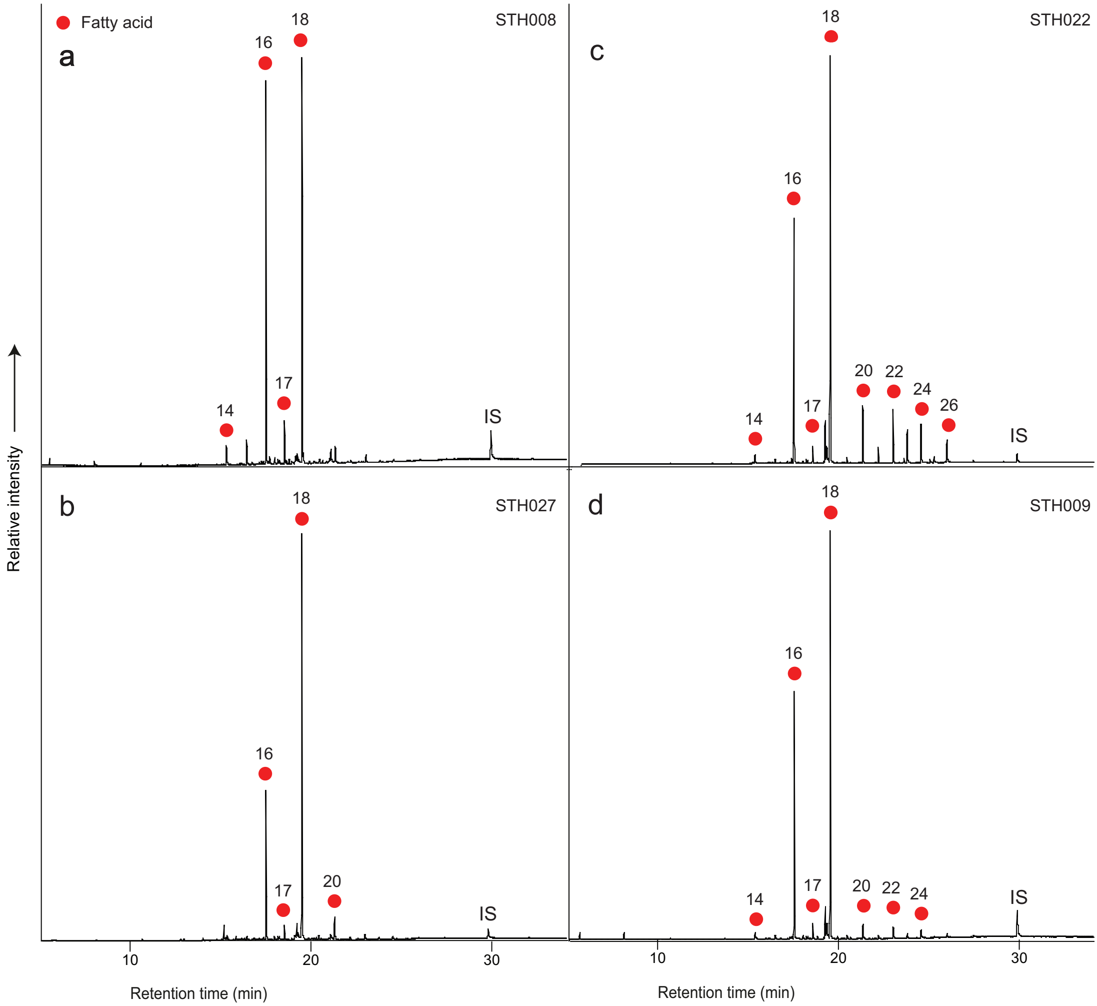

Fig. 12 Partial gas chromatograms of acid-extracted FAMEs from pottery extracts STH008, STH009, STH022 and STH027, circles, n- alkanoic acids (fatty acids, FA); IS, internal standard, C_{34} n-tetratriacontane. Numbers denote carbon chain length

enclosures) and it seems that generally higher abundances of dairy product processing are noted at domestic sites. Interestingly, an overwhelming predominance of dairy products (80%) has been associated with Neolithic pottery throughout the northeast of the British Isles (Cramp *et al*. 2014).

There does not appear to be any vessel specialisation as dairy products were processed in Fengate bowls (*n*=7), two Mortlake bowls and one vessel marked as Peterborough Ware, similarly, ruminant adipose products were processed in mainly Fengate Bowls (*n*=6), one Mortlake bowl and one vessel without attribution. However, analysis of four sherds from one of the Fengate bowls (Pot 1), STH004, STH015, STH034 and STH036, yielded a remarkable result. There are two separate, quite large portions, each comprising four conjoining sherds, representing a single vessel, Pot 1 from the primary fill (93230) of pit [93208]. Of these, samples (STH015 and STH034) from two sherds from one portion, with $\Delta^{13}C$ values of -2.7 and -1.8 ‰, respectively, displayed ruminant adipose signals, while the potsherd STH036, from the other portion produced a ruminant dairy signature ($\Delta^{13}C$ value of -4.6 ‰); the results of samples from two further sherds from this slab were inconclusive and suggest some contamination. A small, redeposited, body sherd which joins this latter slab, from pit 93233, was sampled (STH004) and was also found to have a ruminant dairy signal similar to its parent

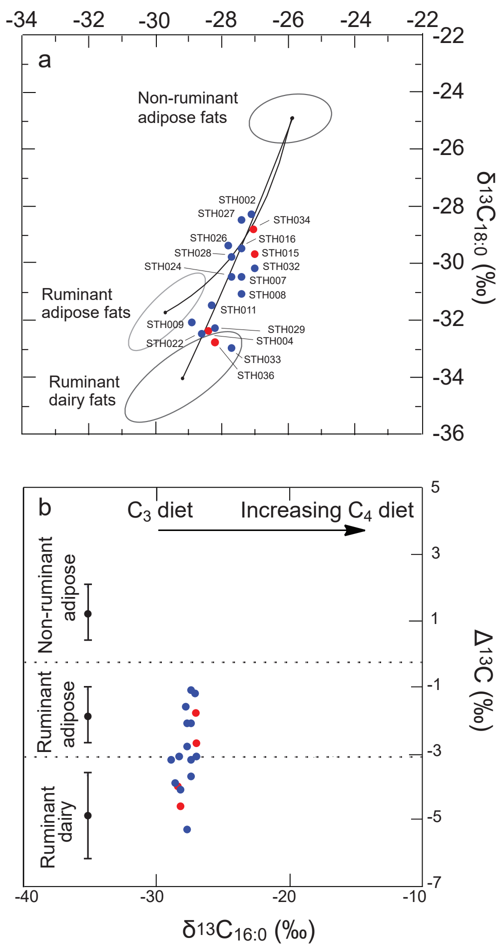

Fig. 13 Graphs showing: a. $\delta^{13}C$ values for the $C_{16:0}$ and $C_{18:0}$ fatty acids for archaeological fats extracted from West Amesbury Farm ceramics. The three fields correspond to the P = 0.684 confidence ellipses for animals raised on a strict C_3 diet in Britain (Copley et al. *2003). Each data point represents an individual vessel. b shows the $\Delta^{13}C$ ($\delta^{13}C_{18:0}$ – $\delta^{13}C_{16:0}$) values from the same potsherds. The ranges shown here represent the mean ± 1 s.d. of the $\Delta_{13}C$ values for a global database comprising modern reference animal fats from Africa (Dunne* et al. *2012), UK (animals raised on a pure C_3 diet) (Dudd and Evershed, 1998), Kazakhstan (Outram* et al. *2009), Switzerland (Spangenberg* et al., *2006) and the Near East (Gregg* et al. *2009), published elsewhere*

slab ($\Delta^{13}C$ value of -4.0 ‰).

This remarkable result raises the possibility of the secondary use of broken vessels in the Neolithic, the first evidence of its kind identified through organic residue analysis. Although in this case ORA cannot directly identify the pre-break use of the vessel, there are two possible pathways: that the complete pot was used to process dairy products and once broken a slab was 'recycled' to burn animal tallow, possibly as some sort of lamp. Alternatively, the vessel was used for cooking ruminant adipose products (beef or sheep meat) then, once broken, one of the remaining parts of the pot was used as a spoon, scoop or bowl for dairy products (milk, butter or cheese).

Interestingly, the faunal assemblages from the pits were generally dominated by pig bones (Worley *et al.* 2019), yet the organic residue results do not suggest dedicated pig processing within any of the vessels, although it should be noted that some minor mixing of pig and ruminant fats (dairy or adipose) likely occurred. However, in contrast to each of the other pits, the faunal assemblage from context 93230 (Pit 93208, samples STH015 and STH016) was dominated by cattle bones, rather than pig. Significantly, both vessels from this pit were used to process ruminant adipose products.

In summary, this data provides strong evidence that, for vessels deposited in pit contexts at WAF in the Stonehenge area, during the Middle Neolithic, the exploitation of secondary animal products was well-established. Organic residue analysis shows that the pottery was also used to process ruminant carcass products. There is tentative evidence of vessels being used to process both ruminant and non-ruminant (porcine) products, whether contemporaneously or during the lifetime use of the pot, but no vessels were used solely to process the latter.

Discussion

Although Peterborough Ware in its three sub-styles of Ebbsfleet, Mortlake and Fengate (Smith 1956; Ard and Darvill 2015) is widely distributed across Wiltshire, the nature, quality and integrity of the evidence is rather variable. The historical focus on monuments has contributed to assemblages from a relatively restricted number of contexts, typically soils buried beneath or incorporated into the earthen mounds of Early Bronze Age barrows or from the secondary fills of ditches at Early Neolithic causewayed enclosures and long barrows. Non-monument based approaches such as the pioneering Stonehenge Environs Project (Richards 1990), Between the Monuments (Gillings *et al.* 2014; 2015) and Living with Monuments (Gillings *et al.* 2017) have begun to redress some of this bias, and together with an increasing number of development-led interventions have revealed

Table 6: Comparison of sherd numbers (denoting vessels) used to process dairy products at Southern British Neolithic sites (adapted from Copley *et al.* 2005a; Copley and Evershed 2007; Mukherjee *et al.* 2007; Craig *et al.* 2015)

Site	Neolithic phase	Type of Neolithic site	No. of sherds containing dairy products	% of lipid-containing extracts
West Amesbury Farm	Middle	Pit	10	56
Hambledon Hill	Early - Middle	Causewayed enclosure	14	36
Windmill Hill	Early - Middle	Causewayed enclosure	20	42
Abingdon Causewayed Enclosure	Middle	Causewayed enclosure	15	30
Eton Rowing Lake	Early - Middle	Domestic (midden)	28	52
Runnymede Bridge	Middle	Domestic	20	50
Yarnton Floodplain	Middle - Late	Domestic	11	26
Durrington Walls	Late Neolithic	Ceremonial (Southern Circle)	12	55
Durrington Walls	Late Neolithic	Pit features	1	6
Durrington Walls	Late Neolithic	Midden	13	22
Durrington Walls	Late Neolithic	Settlement (house)	3	25
Ascott-under-Wychwood	Early	Domestic	8	73

new and complementary evidence of lifeways in the Middle Neolithic.

The discovery at WAF of five pits containing sherds from 36 individually recognizable vessels in the Fengate sub-style, the largest assemblage of such pottery from Wessex, is an important addition to an increasing number of Middle Neolithic pits from the north and east of the Stonehenge landscape (for a definition of the area see Parker Pearson *et al* 2022, 13).

Until recently the distribution of Peterborough Ware within the Stonehenge landscape was characterized by widely spread, if small, assemblages derived from surface collection with foci on Wilsford Down, north of the Great Cursus east of Fargo Wood, and King Barrow Ridge (Richards 1990) or residual sherds from the mounds of Early Bronze Age barrows, including Amesbury G39 (Ashbee 1981; Cleal and Allen 1994) and Amesbury G27, G30, G31 and G32 (Cleal and Allen 1994) on King Barrow Ridge, the Wilsford cum Lake barrows G51, G52 and G54 (Smith 1991) and the Lake Group of barrows, Wilsford (Grimes 1964). A small Mortlake sub-style sherd was recovered from the east ditch of Amesbury 42 long barrow (Cleal 2020, 118–19). Apart from the Wilsford area (Cleal with Raymond 1990; Smith 1991) where Fengate material was fairly well represented, these assemblages typically comprise sherds in the Mortlake or Ebbsfleet sub-styles with a rare Fengate presence. The large assemblage of Mortlake sub-style sherds from Amesbury G39, including typical cord impressed motifs, expanded rims and some evidence of neck pits, and a sherd in a quartzitic sandstone fabric similar to FLQz, provides a local parallel for the Mortlake sherds from the sett and linear features at WAF. The curvilinear motifs in twisted cord (Raymond 1990b, 188–9, P199 and P200) and twisted cord and end-to-end linear fingernail at Wilsford Down (Smith 1991, 35–7) recall those on Fengate pots P1 and P9 at WAF.

Development-led work at Larkhill Camp to the north of the area (McCarthy and Powell 2018; McCarthy 2019; Leivers 2021) and to the east around Amesbury at the Old Dairy, London Road (Harding and Stoodley 2017) and King's Gate (Powell and Barclay 2022) has revealed important complexes of pits containing Peterborough Ware. At Larkhill Camp all three sub-styles were represented though sherds in the Mortlake and Ebbsfleet sub-styles were most frequent. The use of incised lines and whipped cord on two of the Fengate vessels provides a point of difference with WAF. The pits around Amesbury produced Mortlake and Ebbsfleet sub-style sherds in a flint-tempered fabric. Whipped cord, bird-bone and occasional finger impressions were present, all represented on the Mortlake assemblage from WAF; pits and perforations within the cavetto were confined to Ebbsfleet sub-style pots.

Beyond the Stonehenge landscape, pit complexes from Old Sarum Spur to Bishopdown (Algar and Hadley 1973; Kendall 2015; Place 2008; Powell *et al.* 2005; Musty 1958; Dinwiddy and Powell 2015; Wessex Archaeology 2014), with outliers at Winterbourne Dauntsey (Stone 1935) and Harnham Road, south of Salisbury (Place

2008)—the greatest concentration of Middle Neolithic pits in the county (Roberts and Marshall 2020) —provide further parallels for the WAF material. Sherds in the Mortlake and Ebbsfleet sub-styles predominate. With the notable exception of a pit at Old Sarum Airfield, Area C (Kendall 2015), sherds in the Fengate sub-style were uncommon. Mortlake sub-style fabrics were almost entirely flint tempered; small amounts of additional grog and quartz sand were present at The Beehive (Heaton 2003). Twisted and whipped cord impressions, fingertip and fingernail and incision were common decorative techniques; interestingly, bird-bone impressions were absent.

A remarkable assemblage of possibly more than twenty vessels in the Fengate sub-style from a pit at Old Sarum Airfield, Area C, provides the best parallel for WAF in Wessex in terms of fabric, style, decorative technique and assemblage size. As this important group awaits full analysis, the account here is based on the evaluation report (Kendall 2015) and one of the author's (M. Russell) notes made during a viewing of the pottery. Fabrics containing flint, flint-and-shell, and shell are represented, all macroscopically closely matched at WAF. The material is variously fragmented, from near complete rim to base profiles to small, more abraded sherds, demonstrating complex pre-depositional processes. The vessels have deep pronounced collars and shallow necks, most with neck pits, one vessel, uniquely, with pits pressed from the inner face forming bosses externally. A variety of decorative techniques including twisted and whipped cord, bone and stick impressions, incision, fingertip and fingernail and finger-pinching were used, some in combination. Pots were decorated all-over or on collars only; there was one undecorated vessel. A common motif on collars, as at WAF, was nested filled chevrons or opposed multiple diagonal lines in twisted cord, some slightly curvilinear, and end-to-end linear fingernail in oblique rows. Of the larger sherds with a rim to body profile, a different decorative technique from that used on the collar was employed for the body, including vertical rows of whipped cord on one and fingernail on another. Despite clear analogues, important differences particularly in the use of bird-bone and whipped cord here, absent in the Fengate material at WAF, highlight the individuality of the two assemblages.

Fengate sub-style sherds from two pits north of Old Sarum cited in an archaeological register for 1973 but not further published (Algar and Hadley 1973) include three finely finished, fairly large, flint tempered sherds from a single vessel decorated with rows of linear end-to-end half-moon fingernail impressions. These sherds are so similar to WAF Pot 1 that they could have been made by the same individual. Further comparable Fengate pottery was found at Greentrees School, Bishopdown (Dinwiddy and Powell 2015) and Bishopdown Farm (Wessex Archaeology 2014) alongside Mortlake sub-style sherds. Both sub-styles were flint tempered. At Harnham Road, Salisbury (Place 2008), a single Fengate sub-style vessel in a fossil shell tempered fabric was represented; three more vessels in a flint tempered fabric were of the Mortlake sub-style.

A pit northeast of Knook Castle (Barclay 2008) and another at Downton (Rahtz 1962) produced Fengate sub-style jars, of which that from Knook Castle in a shell tempered fabric is stylistically similar to WAF. The use of fingertip impressions on the bodies of both jars from Downton (ApSimon 1962) are familiar traits at WAF.

The large Peterborough Ware assemblages in the Avebury area, especially at Windmill Hill (Smith 1965; Whittle *et al.* 1999) and West Kennet long barrow (Piggott 1962), the former historically important in defining Peterborough Ware, offer further parallels for WAF but, interestingly, mainly for the Mortlake sub-style. Beyond general similarities in the motifs used on Fengate vessels, particularly on collars and rims, the way in which the decoration was achieved is an important point of difference. Most of the Fengate sub-style sherds from Windmill Hill, certainly following a reassessment by Hamilton (1999), were found to be decorated with incision or grooving and fingernail as opposed to twisted cord more commonly utilized, *inter alia*, on most southern Wiltshire assemblages, including WAF. Incision and grooving also predominate especially on the collars and rim bevels of Fengate sub-style vessels at West Kennet long barrow. Contrastingly, the Mortlake sub-style at both sites and others in the area, including Cherhill (Evans and Smith 1983), the West Kennet (stone) Avenue and settlement site, Avebury (Smith 1965; Allen and Davis 2009; Pollard 2005), South Street long barrow (Ashbee *et al.* 1979) and Millbarrow, Winterbourne Monkton (Whittle 1987) is typified by profuse use of twisted and whipped cord, which suggests that the preference for incision and grooving on Fengate vessels is significant. This dichotomy is reinforced by the Fengate material from a pit at West Overton barrow G6a (Smith and Simpson 1964) and from Horslip (Windmill Hill) long barrow (Ashbee *et al.* 1979).

Focusing on assemblages comprising more than 15 Fengate sub-style vessels from Wiltshire, including WAF, Old Sarum Airfield, Windmill Hill and West Kennet long barrow, and from the wider region incorporating the regionally important material from Yarnton, Oxfordshire (Hey *et al.* 2016) and Cam, Gloucestershire (Smith 1968) it is possible to draw comparisons and contrasts over large geographical areas, particularly in terms of typical combinations of decorative schemes and techniques. Most interestingly, the recurrent use of certain motifs for particular parts of a vessel reflecting a differentiation between collar and body decoration, noted by Smith (1956, 113), suggests conventions and constraints possibly equivalent to vocabulary and syntax, though their meaning, if any, remains elusive. The choice of motifs for particular parts of a vessel, including a tendency for more complex designs on collars, including nested filled triangles, chevrons, concentric arcs, lattice and multiple curvilinear lines, and rather reserved schemes on bodies apply, variously adapted, over large geographical areas. Importantly, the techniques used to produce these schemes also tend to exhibit a distinction between collar and body, where the technique deployed on the collar is uncommonly repeated on the body of the same pot but, significantly, appear to vary at a regional or sub-regional scale and allow more precise parallels to be drawn between sites. It is argued that decorative technique rather than motif might afford a better way of identifying Fengate sub-style pot using communities or the products of individual or groups of potters. Accordingly the apparent preference for corded schemes across southern Wiltshire, Hampshire and Gloucestershire contrasts with incised and grooved designs in north Wiltshire and parts of Oxfordshire, particularly at Yarnton, though the picture is more nuanced and one of a patchwork of communities using contrasting techniques, as seen in the mainly corded assemblages at Cassington (Leeds 1940) and Wallingford (Richmond 2005) Oxfordshire. The claim that twisted cord is rare and fingernail impressions are the preferred Fengate sub-style technique (Ard and Darvill 2015, 10) over-simplifies important regional variations which deserve further study and definition.

One of the key research objectives of this analysis was the definition of the range of fabrics within the generally poorly understood Fengate sub-style in Wiltshire, and to provide further clarity to Cleal's (1995) pioneering study where the lack of vessels in the Fengate sub-style was an issue. Cleal identified three principal fabric groups in the Fengate sub-style, roughly divided between flint (25%) and flint-and-sand (21%), with a slight preference (30%) for shell; just under one quarter of the sub-style total was recorded as other fabrics. By contrast, over half of the Fengate fabrics at WAF are in a flint tempered ware which contains sparse to moderate amounts of intrinsic quartz silt and sand, though the totals are closer if Cleal's two flinty fabrics are combined. The significant point here is that flint tempered fabrics, irrespective of whether or not the clay source was naturally silt/sandy, are a major component of Fengate sub-style assemblages in Wiltshire. Ard and Darvill's (2015, 6) claim that flint is a minor inclusion in the sub-style might be correct at national level, especially to the east of the country, but underestimates its importance at a regional scale. The clays used in the WAF material may have been derived from a local exposure which was unusually sandy, particularly given that only one-third of 24 Peterborough Ware fabrics from the Stonehenge Environs Project contained sand (Cleal 1990, 235).

Shell-tempered fabrics comprised 30% of Cleal's Fengate sub-style sample. Shelly fabrics are an important component at WAF, at almost 14% of the Fengate sub-style sherds. However, a flint, shell and rare grog tempered fabric (FLSG1) accounted for around 30% of the WAF material, demonstrating the overall importance of shell in fabrics of the Fengate sub-style. A closely similar fabric is present at Old Sarum Airfield, in addition to flint tempered and shell tempered wares, and shelly fabrics were present in the Fengate sub-style sherds at Knook Castle (Barclay 2008), Harnham Road (Place 2008) and Overton Down 6a (Smith and Simpson 1964).

It is becoming clear, in Wessex at least, that grog is not a definitive temper within the Fengate sub-style and is, arguably, an incidental inclusion. Where it occurs, it is always rare and, critically, combined with more frequent temper such as those noted above. Significantly, at Windmill Hill, diagnostic sherds in the Fengate sub-style were tempered with flint and sand or sand, shell and grog and decorated with incision or grooving, fingernail and neck pits; more doubtful sherds were grog tempered, decorated with twisted cord and classified as Early Bronze Age, probably

Collared Urn (Hamilton 1999, 305).

While the Fengate fabrics from WAF appear to have been made from locally available materials, possibly including shelly deposits near Amesbury, two of the Mortlake fabrics indicate utilization of different clays sources possibly some 15–20km distant. The Glauconitic fabric might be derived from clays close to the Cretaceous Upper Greensand Formation west of Salisbury, possibly on the northern side of the Nadder valley. A glauconite fabric, fabric group 3, from Cherhill was considered to be related to the Kimmeridge Clay in which localized lenses of glauconite occur (Darvill 1983, 97). The limestone and sandstone fabric at WAF might have origins in the Jurassic deposits west of Stonehenge or possibly Tertiary strata to the southwest. Of particular importance is a sherd from Amesbury G39, just west of King Barrow Ridge, which contained fragments of sandstone possibly with a similar origin to that at WAF. A rare inclusion in Peterborough Ware in Wiltshire, sandstone also occurs in Mortlake fabrics in the Avebury area at Windmill Hill (Smith 1965, 74), West Kennet long barrow (Piggot 1962), Cherhill (Evans and Smith 1983) and Fussel's Lodge long barrow (Ashbee 1966).

Although no evidence of structured deposition of pottery was evident within the WAF pits during excavation, as occasionally observed in Peterborough Ware pits, for example at The Portway, Wiltshire (Powell *et al.* 2005, 256–8), Yarnton, Oxfordshire (Hey *et al.* 2016) and Horcott, Gloucestershire (Lamdin-Whymark *et al.* 2009), the biography of Pot 1 as revealed during this study suggests it might have been special to its users and afforded careful, deliberate, selection for deposition.

Highly decorated with a complex scheme executed in an unusual technique presumably requiring substantial investment of skill and time, this vessel was also carefully smoothed, unlike some of the other pots, and more thinly potted. The decorative technique used on the body is uncommon within the Fengate sub-style with one close local parallel near Old Sarum (Algar and Hadley 1973) and another from Wandsworth (Smith 1965, 1917–18) while the horizontal scheme on the collar is rare, certainly in Wiltshire. In spite of most of the vessels once broken having been reduced to small sherds, perhaps deliberately, where only a fraction of each vessel was deposited in the pits, sherds from Pot 1 were appreciably larger, occurred in greater numbers and, significantly, several rejoined to form two fairly large portions of the pot. Differences in the colour of sherds, particularly bounded by fractures, indicate different, possibly separate, post-break environments. Perhaps the most remarkable evidence comes from ORA which suggests that part of this broken pot had been reused. Such reuse may not be purely expedient but might suggest that Pot 1, even once broken, maintained a special significance to its users. The selection of these portions of the pot, which may have been spatially separated during reuse, strongly suggests deliberate selection for deposition. Finally, although most of the pot was recovered from the primary fill of pit [93208], one of its rim sherds and that from another pot from the same deposit appear to have been retained for incorporation into the final fill, perhaps as tokens. Taken together, it is argued that this remarkable pot biography indicates a vessel that was special to its users when made, during use and once broken, and reflects an intentionality of deposition analogous to some of the more familiar forms of structured deposit.

Acknowledgements

Thanks are due to Alistair Barclay (formerly of Wessex Archaeology) and Matt Leivers (Wessex Archaeology) for allowing MR to view and discuss the Old Sarum Airfield and other Peterborough Ware in advance of full publication, Bob Clarke (Wessex Archaeology) for access to the Old Sarum Airfield, Area C assessment report, and Adrian Green (Salisbury Museum) for access to the Stonehenge Environs Project archive and related ceramics. MR thanks his co-authors and illustrators for their patience during a long illness which delayed completion of this report, is grateful for comments on a draft of this report from Historic England colleagues and Matt Leivers (Wessex Archaeology) and thanks Judith Dobie for illustrating the pottery and John Vallender for laying out the drawings for publication; Rachel Cubitt's (Historic England) assistance and support in bringing the report to publication is gratefully acknowledged. The authors wish to thank the NERC for partial funding of the National Environmental Isotope Facility (NEIF; contract no. NE/V003917/1) and NERC (contract no. NE/V003917/1) and funding from the European Research Council under the European Union's Seventh Framework Programme (FP/2007–2013) and European Research Council Grant Agreement number 340923 for funding GC-MS capabilities, together with NERC (contract no. NE/V003917/1) and the University of Bristol for funding the GC-IRMS capabilities. Ian Bull, Helen Whelton, and Iain Kendall are thanked for their technical help. This paper is published with financial assistance from Historic England.

References

ANDERSON-WHYMARK, H. and THOMAS, J., 2012, *Regional perspectives on Neolithic pit deposition. Beyond the mundane*. Neolithic Studies Group Seminar Papers 12, Oxford: Oxbow

ALGAR, D.J. and HADLEY, J.D., 1973. 72/20 Salisbury (Old Sarum), in Wiltshire Archaeological Register for 1972. *WANHM* 68, 128

ALLEN, M. and DAVIS, B., 2009. A Middle Neolithic pit in the West Kennet (stone) Avenue, Avebury (2005). *WANHM* 102, 12–21

APSIMON, A.M., 1962. The Prehistoric Pottery, in P.A. Rahtz 1962, 128–38

ARD, V. and DARVILL, T., 2015. Revisiting old friends: The production, distribution and use of Peterborough Ware in Britain. *Oxford Journal of Archaeology*, 34, 1–31

ARMADIO, L., 2010, *Tilshead Nursery School, Wiltshire: A Neolithic Pit*. Wiltshire Field Group report 167.0809

ASHBEE, P., 1966. The Fussell's Lodge Long Barrow Excavation 1957. *Archaeologia* 100, 1–80

ASHBEE, P., 1981. Amesbury barrow 39: Excavation 1960. *WANHM* 74/75, 3–34

ASHBEE, P., SMITH, I.F. and EVANS, J.G., 1979. Excavation of three Long Barrows near Avebury, Wiltshire. *Proceedings of the Prehistoric Society* 45, 207–300

BARCLAY, A., 2002, 'Ceramic Lives', in A. Woodward and J.D. Hill (eds) *Prehistoric Britain: The Ceramic Basis*. Prehistoric Ceramics Research Group Occ. Paper 3, 85–95. Oxford: Oxbow

BARCLAY, A., 2008, 'Fengate Ware' in C. Ellis and A. B. Powell, *An Iron Age Settlement outside Battlesbury Hillfort, Warminster and sites along the Southern Range Road*. Wessex Archaeology Report 22, 172–3. Salisbury: Wessex Archaeology Ltd

BARCLAY, A. and CASE, H., 2007, 'The early Neolithic pottery and fired clay', in D. Benson and A. Whittle (eds), *Building Memories. The Neolithic Cotswold Long Barrow at Ascott-under-Wychwood, Oxfordshire*. 263–81 Oxford: Oxbow

BARCLAY, A., BOOTH, P., BROWN, D., EVANS, J., KNIGHT, D. and WOOD, I., 2016, *A Standard for Pottery Studies in Archaeology. Prehistoric Ceramics Research Group, Study Group for Roman Pottery and Medieval Pottery Research Group*. (http://romanpotterystudy.org/new/wp-content/uploads/2016/06/Standard_for_Pottery_Studies_in_Archaeology.pdf)

BERSTAN, R., STOTT, A.W., MINNITT, S., RAMSEY, C.B., HEDGES, R.E.M. and EVERSHED, R.P., 2008. Direct dating of pottery from its organic residues: new precision using compound-specific carbon isotopes. *Antiquity* 82(317), 702–13

BISHOP, B., PRICE, K.M., MARSHALL, P., LAMB, S, VALLENDER, J. and ROBERTS, D., 2019. Flintworking in the Middle Neolithic: techniques, technologies and deposition on Salisbury Plain in the late 4th Millennium BC. *Lithics: the Journal of the Lithic Studies Society* 40, 5–40

BRADLEY, R. and FULFORD, M., 1980. Sherd size in the analysis of occupation debris. *Bulletin of the Institute of Archaeology* 17, 85–94

CLEAL, R.M.J., 1990, 'The prehistoric pottery', in J. Richards, *The Stonehenge Environs Project*. English Heritage Archaeological Report 16, 65–6. London: English Heritage

CLEAL, R.M.J., 1995. 'Pottery fabrics in Wessex in the fourth to second millania BC', in I. Kinnes and G. Varndell (eds), *Unbaked urns of rudely shape, essays on British and Irish pottery for Ian Longworth*. Oxbow Monograph 55, 185–94. Oxford: Oxbow

CLEAL, R.M.J., 2020, 'Pottery from the Greater Cursus and Amesbury 42 long barrow', in M. Parker Pearson, J. Pollard, C. Richards, J. Thomas, C. Tilley and K. Welham, *Stonehenge for the Ancestors. Part 1: Landscape and Monuments*, 117–9. Leiden: Sidestone Press

CLEAL, R.M.J. and ALLEN, M.J., 1994. Investigation of tree-damaged Barrows on King Barrow Ridge and Luxenborough Plantation, Amesbury. *WANHM* 87, 54–88

CLEAL, R.M.J. with RAYMOND, F., 1990, 'The Pottery', in J. Richards, *The Stonehenge Environs Project*, 233–6. English Heritage Archaeological Report 16. London: English Heritage

COPLEY, M. S., BERSTAN, R., DUDD, S.N., DOCHERTY, G., MUKHERJEE, A.J., STRAKER, V., PAYNE, S. and EVERSHED, R.P., 2003. Direct chemical evidence for widespread dairying in Prehistoric Britain. *Proceedings of the National Academy of Sciences of the United States of America* 100(4), 1524–9

COPLEY, M. S., BERSTAN, R., MUKHERJEE, A.J., DUDD, S.N., STRAKER, V., PAYNE, S. and EVERSHED, R.P., 2005a. Dairying in antiquity. III. Evidence from absorbed lipid residues dating to the British Neolithic. *Journal of Archaeological Science* 32(4), 523–46

COPLEY, M. S., BERSTAN, R., DUDD, S.N., AILLAUD, S., MUKHERJEE, A.J., STRAKER, V., PAYNE, S. and EVERSHED, R.P., 2005b. Processing of milk products in pottery vessels through British prehistory. *Antiquity* 79(306), 895–908

COPLEY, M. S. and EVERSHED, R.P., 2007, 'Organic residue analysis', in D. Benson and A. Whittle (eds), *Building memories. The Neolithic Cotswold Long Barrow at Ascott-under-Wychwood, Oxfordshire*, 283–8. Oxbow Books: Oxford

CORREA-ASCENCIO, M. and EVERSHED, R.P., 2014. High throughput screening of organic residues in archaeological potsherds using direct acidified methanol extraction. *Analytical Methods* 6(5), 1330–40

CRAIG, O. E., CHAPMAN, J., HERON, C., WILLIS, L.H., BARTOSIEWICZ, L., TAYLOR, G., WHITTLE, A. and COLLINS, M., 2005. Did the first farmers of central and eastern Europe produce dairy foods? *Antiquity* 79(306), 882–94

CRAIG, O., SHILLITO, L.M., ALBARELLA, U., VINER-DANIELS, S., CHAN, B., CLEAL, R., IXER, R., JAY, M., MARSHALL, P., SIMMONS, E., WRIGHT, E. and PARKER PEARSON, M., 2015. Feeding Stonehenge: cuisine and consumption at the Late Neolithic site of Durrington Walls. *Antiquity* 347, 1096–1109

CRAMP, L.J.E., EVERSHED, R.P. and ECKARDT, H., 2011. What was a mortarium used for? Organic residues and cultural change in Iron Age and Roman Britain. *Antiquity* 85, 1339–52

CRAMP, L.J.E., JONES, J., SHERIDAN, A., SMYTH, J., WHELTON, H., MULVILLE, J., SHARPLES, N. and EVERSHED, R.P., 2014. Immediate replacement of fishing with dairying by the earliest farmers of the northeast Atlantic archipelagos. *Proceedings of the Royal Society B: Biological Sciences* 281(1780): http://doi.org/10.1098/rspb.2013.2372

DARVILL, T.C., 1983, 'The petrology of the Neolithic pottery from Cherhill', in: J.G. Evans and I. F. Smith, Excavations at Cherhill, North Wiltshire, 1967, 92–8. *Proceedings of the Prehistoric Society* 49, 43–118

DINWIDDY, M. and POWELL, A.B., 2015, *Greentrees School, Bishopdown, Salisbury, Wiltshire. Post-Excavation Assessment and Updated Project Design*. WA Ref. 105121.02

DUDD, S.N. and EVERSHED, R.P., 1998. Direct demonstration of milk as an element of archaeological economies. *Science* 282(5393), 1478–81

DUNNE, J., EVERSHED, R.P., SALQUE, M., CRAMP, L., BRUNI, S., RYAN, K., BIAGETTI, S. and DI LERNIA, S., 2012. First dairying in green Saharan Africa in the fifth millennium BC. *Nature* 486(7403), 390–4

EDWARDS, B., 2009, *Pits and the architecture of deposition narratives of social practice in the neolithic of North-East England*, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/2164/

EDWARDS, B.G., 2016, 'Fragmenting society: pottery biographies from Neolithic Northumberland', in R. Crellin, C. Fowler and R. Tipping (eds), *Prehistory without borders: The prehistoric archaeology of the Tyne-Forth region*, 82–94. Oxford: Oxbow Books

EVANS, G. and SMITH, I.F., 1983. Excavations at Cherhill, North Wiltshire, 1967. *Proceedings of the Prehistoric Society* 49, 43–117

EVERSHED, R.P., 2008 Organic residue analysis in archaeology: the archaeological biomarker revolution. *Archaeometry* 50(6), 895–924

EVERSHED, R.P., MOTTRAM, H.R., DUDD, S. N., CHARTERS, S., STOTT, A.W., LAWRENCE, G.J., GIBSON, A.M., CONNER, A., BLINKHORN, P.W. and REEVES, V., 1997. New criteria for the identification of animal fats preserved in archaeological pottery. *Naturwissenschaften* 84(9), 402–6

EVERSHED, R.P., PAYNE, S., SHERRATT, A.G., COPLEY, M.S., COOLIDGE, J., UREM-KOTSU, D., KOTSAKIS, K., ÖZDOĞAN, M., ÖZDOĞAN, A., NIEUWENHUYSE, O., AKKERMANS, P.M. M.G., BAILEY, D., ANDEESCU, R.-R., CAMPBELL, S., FARID, S., HODDER, I., YALMAN, N., ÖZBAŞARAN, M., BIÇAKCI, E., GARKINFEL, Y., LEVY, T. and BURTON, M.M., 2008. Earliest date for milk use in the Near East and southeastern Europe linked to cattle herding. *Nature* 455, 528–31

FINCH, L.A., 1971, 'Report on the petrological examination of sherds from Durrington Walls', in: G.J. Wanwright and I.H. Longworth, *Durrington Walls: Excavations 1966–1968*, 409–10. London: Report of the Research Committee of the Society of Antiquaries London 29

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1950, *Salisbury, England and Wales Sheet 282, Drift edition*. Chessington

GILBERT, D., MOORE, J. and ROBERTS, C., 2012. Late Neolithic and Early Bronze Age occupation at Middle Wallop, Hampshire. *Hampshire Studies*, 67, 69–78

GILLINGS, M., POLLARD, J., ALLEN, M., FRENCH, C. CLEAL, R., PIKE, A. and SNASHALL, N., 2014, *Between the Monuments: Fieldwork on the West Kennet Avenue 'occupation site' and Foot of Avebury Down lithic scatter, Avebury, Wiltshire, 2012–13. An interim report*. Leicester & Southampton: Between the Monuments Project

GILLINGS, M., POLLARD, J., ALLEN, M., PIKE, A., SNASHALL, N., CLEAL, R. and FRENCH, C., 2015, *The West Kennet Avenue occupation site, Avebury: an interim report on the 2015 excavation season*. Leicester & Southampton: Between the Monuments Project

GILLINGS, M., POLLARD, J. and SNASHALL, N., 2017, *Foot of Avebury Down, Avebury, Wiltshire: Project Design for excavation, 2017*. Southampton, Leicester & Avebury: Living with Monuments Project

GREGG, M.W., BANNING, E.B., GIBBS, K. and SLATER, G.F., 2009. Subsistence practices and pottery use in Neolithic Jordan: molecular and isotopic evidence. *Journal of Archaeological Science* 36(4), 937–46

GRIMES, W.F., 1964. Excavations in the Lake Group of barrows, Wilsford, Wiltshire, in 1959. *Bulletin of the Institute of Archaeology University of London* 4, 89–121

HAMILTON, M., 1999, 'Late Neolithic and Bronze Age', in A. Whittle, J. Pollard and C. Grigson, *The Harmony of Symbols. The Windmill Hill causewayed enclosure*, 292–310. Oxford: Oxbow

HAMLIN, A. and CASE, H., 1963. Excavation of ring-ditches and other sites at Stanton Harcourt. Notes on the finds and ring-ditches in the Oxford Region. *Oxoniensia* 28, 1–52

HANSEL, F.A., COPLEY, M.S., MADUREIRA, L.A.S. and EVERSHED, R.P., 2004. Thermally produced [omega]-(o-alkylphenyl) alkanoic acids provide evidence for the processing of marine products in archaeological pottery vessels. *Tetrahedron Letters* 45(14), 2999–3002

HARDING, P., 1988. The Chalk Plaque Pit, Amesbury. *Proceedings of the Prehistoric Society* 54(1), 320–7

HARDING, P. and STOODLEY, N., 2017. Newly-discovered barrows and an Anglo-Saxon cemetery at Old Dairy, London Road, Amesbury. *WANHM* 110, 56–114

HEATON, M., 2003. Neolithic pits at the Beehive. *WANHM* 96, 54–62

HERON, C., NEMCEK, N., BONFIELD, K.M., DIXON, D. and OTTAWAY, B.S., 1994. The chemistry of Neolithic beeswax. *Naturwissenschaften* 81(6): 266–9

HEY, G., BELL, C., DENNIS, C. and ROBINSON, M., 2016, *Yarnton: Neolithic and Bronze Age Settlement and Landscape*. Thames Valley Landscapes Monograph 39. Oxford: Oxbow

KENDALL, M., 2015, *Old Sarum Airfield (Area C), Salisbury, Wiltshire. Archaeological Evaluation Report*. Unpublished report 66013.03. Wessex Archaeology

LAMDIN-WHYMARK, H., BRADY, K and SMITH, A., 2009. Excavation of a Neolithic to Roman Landscape at Horcott Pit near Fairford, Gloucestershire, in 2002 and 2003. *Transactions of the Bristol and Gloucestershire Archaeological Society* 127, 73–92

LAST, J., 2017, New Investigations in the Stonehenge World Heritage Site. Historic England Research News, July 2017. Available at https://historicengland.org.uk/images-books/publications/historic-england-research-6/he-research-6/

LEEDS, E.T., 1912. On 'Neolithic' pottery from Buston Farm, Astrop. *Oxford Archaeological Society Report*, 114–8; figs. I–II

LEEDS, E.T., 1922. Further Discoveries of the Neolithic and Bronze Ages at Peterborough. *Antiquaries Journal* 3(2), 220–36

LEEDS, E.T., 1940. New discoveries of Neolithic pottery in Oxfordshire. *Oxoniensia* 5, 1–12

LEIVERS, M., 2021. The Army Basing Programme, Stonehenge and the Emergence of the Sacred Landscape of Wessex. *Internet Archaeology* 56. https://doi.org/10.11141/ia.56.2

LINFORD, N., LINFORD, P., and PAYNE, A., 2015, *Stonehenge Southern WHS Survey: West Amesbury, Wiltshire: report on geophysical surveys, October 2015*. Historic England Research Report 95–2015. Portsmouth, Historic England

MARSHALL, P., HAMILTON, W.D., VAN DER PLICHT, J., BRONK RAMSEY, C., COOK, G. and GOSLAR, T., 2009, 'Scientific dating' in M.G. Beamish, Island visits: Neolithic and Bronze Age activity on the Trent Valley floor. Excavations at Egginton and Willington, Derbyshire, 1998–1999, 62–81. *Derbyshire Archaeological Journal* 129, 17–172

McCARTHY, J., 2019, *Army Basing Programme (ABP) Larkhill Area 2016 (RSGGEN). Post-excavation Assessment*. 109516.16. Wessex Archaeology

McCARTHY, J. and POWELL, A., 2018, *Army Basing Programme (ABP) Larkhill Camp: Areas 2002 (ABHGEN) and 2003 (ABJGEN). Post-excavation Assessment*. 109516.11. Wessex Archaeology

MELVILLE, R.V. and FRESHNEY, E.C., 1982, *British Regional Geology. The Hampshire Basin and Adjoining Areas*. British Geological Survey

MORRIS, E. and WOODWARD, A., 2003. Ceramic petrology and prehistoric pottery in the UK. *Proceedings of the Prehistoric Society* 69, 279–303

MUKHERJEE, A.J., 2004, *The importance of pigs in the Later British Neolithic: integrating stable isotope evidence from lipid residues in archaeological potsherds, animal bone, and modern animal tissues*, unpublished PhD Thesis. University of Bristol

MUKHERJEE, A. J., COPLEY, M.S., BERSTAN, R., CLARK, K.A. and EVERSHED, R.P., 2005, 'Interpretation of $\delta^{13}C$ values of fatty acids in relation to animal husbandry, food processing and consumption in prehistory', in J. Mulville and A. Outram (eds), *The Zooarchaeology of Milk and Fats*, 77–93. Oxford: Oxbow Books

MUKHERJEE, A.J., BERSTAN, R., COPLEY, M.S., GIBSON, A.M. and EVERSHED, R.P., 2007. Compound-specific stable carbon isotopic detection of pig product processing in British Late Neolithic pottery. *Antiquity* 81(313), 743–54

MUKHERJEE, A.J., GIBSON, A.M. and EVERSHED, R.P., 2008. Trends in pig product processing at British Neolithic Grooved Ware sites traced through organic residues in potsherds. *Journal of Archaeological Science* 35(7), 2059–73

MUSTY, J.W.G., 1958. A pipe-line near Old Sarum: Prehistoric, Roman and Medieval finds including two twelfth century lime kilns. *WANHM* 57, 179–91

ORTON, C.R., 1975. Quantitative pottery studies: some progress, problems and prospects. *Science and Archaeology* 16, 30–5

ORTON, C.R and HUGHES, M, 2013, *Pottery in archaeology*, second edition. Cambridge: Cambridge University Press

OUTRAM, A.K., STEAR, N.A., BENDREY, R., OLSEN, S., KASPAROV, A., ZAIBERT, V., THORPE, N. and EVERSHED, R.P., 2009. The earliest horse harnessing and milking. *Science* 323(5919), 1332–5

PARKER PEARSON, M., POLLARD, J., RICHARDS, C., THOMAS, J., TILLEY, C. and WELHAM, K., 2020, *Stonehenge for the Ancestors. Part 1: Landscape and Monuments*. Leiden: Sidestone Press. https://www.sidestone.com/books/stonehenge-for-the-ancestors-part-1

PARKER PEARSON, M., POLLARD, J., RICHARDS, C., THOMAS, J., TILLEY, C. and WELHAM, K., 2022, *Stonehenge for the Ancestors. Part 2: Synthesis*. Leiden: Sidestone Press. https://www.sidestone.com/books/

stonehenge-for-the-ancestors-part-2

PEACOCK, D. P.S., 1977, 'Ceramics in Roman and Medieval archaeology', in D.P.S Peacock (ed.) *Pottery and Early Commerce: Characterization and Trade in Roman and Later Ceramics*, 21–33. London: Academic Press

PHILP, B.J., 1973, 'Site 1', in B.J. Philp, *A Neolithic Site near Baston Manor, Hayes, Kent in Excavations in West Kent 1960-1970*, 5–19. Dover: Second Research Report in the Kent Series

PIGGOTT, S., 1962, *The West Kennet Long Barrow Excavations 1955–56*. London: HMSO

PLACE, C., 2008, *Harnham Road, Salisbury, Wiltshire. An Archaeological Watching Brief*. Unpublished report COAS/WBF/06/WHS. Context One Archaeological Services

PIOFFET, H. and ARD, V., 2017. From sherds to potters: the contribution of techno-morphological approaches to understanding the British Neolithic. *Archeologické rozhledy* LXIX, 281–306

POLLARD, J., 2005, 'Memory, Monuments and middens', in G. Brown, D. Field and D.G. McOmish (eds), *The Avebury Landscape. Aspects of the field archaeology of the Marlborough Downs*, 102–14. Oxford: Oxbow

POWELL, A.B. and BARCLAY, A.J. 2022, *Between and Beyond the Monuments: Prehistoric activity on the downlands south-east of Amesbury*. Wessex Archaeology Monograph 36. Salisbury: Wessex Archaeology

POWELL, A.B., ALLEN, M.J., CHAPMAN, J., EVERY, R., GALE, R., HARDING, P., KNIGHT, S., MCKINLEY, J.I. and STEVENS, C., 2005: Excavations along the Old Sarum Water Pipeline, North of Salisbury. *WANHM* 98, 250–80

PREHISTORIC CERAMICS RESEARCH GROUP, 2016, *Prehistoric Ceramics Research Group Research Framework: Agenda and Strategy*, Prehistoric Ceramics Research Group Occasional Paper 6

QUINN, P.S., 2013, *Ceramic Petrography: The Interpretation of Archaeological Pottery and Related Artefacts in Thin Section*. Oxford: Archaeopress

QUINN, P.S., 2017, *Petrographic Analysis of Peterborough Ware Ceramics from West Amesbury Farm, Stonehenge, Wiltshire*. Unpublished Client Report for Historic England

RAHTZ, P.A., 1962. Neolithic and Beaker sites at Downton, Near Salisbury, Wiltshire. *WANHM* 58, 116–42

RAYMOND, F., 1999a, 'The Prehistoric pottery' (fig. 119), in J. Richards, *The Stonehenge Environs Project*. English Heritage Archaeological Report 16, 169–71. London: English Heritage

RAYMOND, F., 1999b, 'The Prehistoric pottery', in J. Richards,*The Stonehenge Environs Project*. English Heritage Archaeological Report 16, 188–91. London: English Heritage

RICHARDS, J., 1990, *The Stonehenge Environs Project*. English Heritage Archaeological Report 16. London: English Heritage

RICHMOND, A., 2005. Excavation of a Peterborough Ware pit at Wallingford, Oxfordshire. *Oxoniensia* 70, 79–96

ROBERTS, D., BARCLAY, A., BISHOP, B., BRONK-RAMSEY, C., CAMPBELL, G., CANTI, M., DOBIE, J., DUNBAR, E., DUNNE, J., EVERSHED, R.P., FORWARD, A., LAST, J., LAMB, S., LINFORD, N., LINFORD, P., LINSCOTT, B., MADGWICK, R., MARSHALL, P., MAYS, S., McPARLAND, H., PAYNE, A., PELLING, R., PIKE, A., PRICE, A., QUINN, P., RADINI, A., REIMER, P., RUSSELL, M., SEAGER SMITH, R., SOUTAR, S., SPELLER, C., VALLENDER, J., VALDEZ-TULLETT, A., VAN HEEKEREN, V., WORLEY, F., 2020. Middle Neolithic pits and a burial at West Amesbury, Wiltshire. *Archaeological Journal* 177(2), 167–213

ROBERTS, D. and MARSHALL, P., 2020. Pit digging and lifeways in Neolithic Wiltshire. *WANHM* 113, 16–34

ROFFET-SALQUE, M., DUNNE, J., ALTOFT, D.T., CASANOVA, E., CRAMP, L.J.E., SMYTH, J., WHELTON, H. and EVERSHED, R.P., 2016. From the inside out: Upscaling organic residue analyses of archaeological ceramics. *Journal of Archaeological Science: Reports* 16, 627–40

SALQUE, M., 2012, *Regional and chronological trends in milk use in prehistoric Europe traced through molecular and stable isotope signatures of fatty acyl lipids preserved in pottery vessels*. Unpublished PhD Thesis, University of Bristol

SALQUE, M., BOGUCKI, P.I., PYZEL, J., SOBKOWIAK-TABAKA, I., GRYGIEL, R., SZMYT, M. and EVERSHED, R.P. 2013. Earliest evidence for cheese making in the sixth millennium BC in northern Europe. *Nature* 493(7433), 522–5

SMITH, I.F., 1956, *The decorative art of Neolithic ceramics in South-Eastern England and its relations*. Unpublished Ph.D. thesis, University of London

SMITH, I.F., 1965, *Windmill Hill and Avebury. Excavations by Alexander Keiller. 1925–1939*. Oxford: Clarendon Press

SMITH, I.F., 1968. Report on Late Neolithic pits at Cam, Gloucestershire. *Transactions of the Bristol and Gloucestershire Archaeological Society* 87, 14–28

SMITH, I.F., 1973, 'The Prehistoric pottery', in B.J. Philp. *Excavations in West Kent 1960–1970*, 9–14. Dover: Second Research Report in the Kent Series

SMITH, I.F., 1991. Round Barrows Wilsford cum Lake G51-G54: Excavations by Ernest Greenfield in 1958. *WANHM* 84, 11–39

SMITH, I.F. and SIMPSON, D.D.A., 1964. Excavation of three Roman tombs and a prehistoric pit on Overton Down. *WANHM* 59, 68–85

SOFRANOFF, S.E., 1976, *A petrologic study of a portion of the ceramics of the so-called 'Windmill Hill' and 'Peterborough' traditions of Wessex area of Southern England*. Unpublished M.Phil thesis, University of Southampton

SOIL SURVEY OF ENGLAND AND WALES, 1983, *Soils of England and Wales: Sheet 6 -South East England*. Harpenden: Lawes Agricultural Trust

SPANGENBERG, J.E., JACOMET, S. and SCHIBLER, J., 2006. Chemical analyses of organic residues in archaeological pottery from Arbon Bleiche 3, Switzerland – evidence for dairying in the late Neolithic. *Journal of Archaeological Science* 33(1), 1–13

STERN, B., HERON, C., CORR, L., SERPICO, M. and BOURRIAU, J., 2003. Compositional variations in aged and heated pistacia resin found in Late Bronze Age Canaanite amphorae and bowls from Amarna, Egypt. *Archaeometry* 45(3): 457–69

STERN, B., CONNAN, J., BLAKELOCK, E., JACKMAN, R., CONINGHAM, R.A.E. and HERON, C., 2008. From Susa to Anuradhapura: Reconstructing aspects of trade and exchange in bitumen-coated ceramic vessels between Iran and Sri Lanka from the Third to the Ninth Centuries AD. *Archaeometry* 50: 409–28

STONE, J.F.S., 1935. Three 'Peterborough' dwelling pits and a doubly-stockaded Early Iron Age ditch at Winterbourne Dauntsey. *WANHM* 46, 445–53

VATCHER, F.D.M., 1963. The excavation of the Roman earthwork at Winterslow, Wilts. *Antiquaries Journal* 43, 197–213

WESSEX ARCHAEOLOGY, 2014, *Land to the North, West and South of Bishopdown Farm, Salisbury, Wiltshire. Unpublished post-excavation Assessment and Updated Project Design*. WA Ref. 101630.01

WESSEX ARCHAEOLOGY, 2015, *Kings Gate, 460 Units (Phases 3, 4 and 5) and Parcel 5, Amesbury, Wiltshire*. Post-Excavation Assessment and Updated Project Design. WA Ref. 85683.01

WHITTLE, A., 1987. Excavation at Millbarrow Neolithic chambered tomb, Winterbourne Monkton, North Wiltshire. *WANHM* 87, 1–53

WHITTLE, A., POLLARD, J. and GRIGSON, C., 1999, *The Harmony of Symbols. The Windmill Hill causewayed enclosure, Wiltshire*. Cardiff Studies in Archaeology. Oxford: Oxbow

WORLEY, F., MADGWICK, R., PELLING, R., MARSHALL, P., EVANS, J.A., LAMB, A.L., LOPEZ-DORIGAE, I.L., BRONK RAMSEY, C., DUNBAR, E., REIMER, P. and ROBERTS, D. and VALLENDER, J., 2019. Understanding Middle Neolithic food and farming in and around the Stonehenge World Heritage Site: An integrated approach. *Journal of Archaeological Science* 26, 101838

Appendix 1: Macroscopic Fabric Descriptions

FL1 This fairly hard fabric occurs in both through-fired dark grey, almost black ware or has an oxidised red-brown outer surface over a dark grey-black core and inner surface. It is tempered with sparse to moderate (3–15%), ill-assorted, mainly fresh angular crushed and some calcined flint up to 12mm, with modes between 1mm and 5mm in a relatively clean paste with a rare-sparse (2–5%) scatter of sub-rounded to rounded, mostly clear, quartz sand up to 0.7mm, most 0.1–0.4mm and rare (<1-2%), sub-rounded to rounded iron-rich pellets up to 2mm. Tendency to laminate; hackly fracture.

FLG1 This is a fairly hard, generally dark grey-black through-fired, fairly compact paste which contains sparse (3–10%), ill-assorted, angular fresh crushed and calcined flint up to 3.5mm, most between 1mm and 2mm; rare-sparse (2–3%) amounts of angular, buff-coloured grog or clay pellets up to 5mm; sparse (3%), sub-rounded, iron-rich clay pellets up to 1.5mm, most under 0.5mm in a fairly clean clay with sparse (3–5%), well-sorted, sub-angular mainly clear quartz sand between 0.2mm and 1mm.

FLSG1 Fairly hard paste with oxidised surfaces over a dark grey-black core; where the inner surface appears dark this is probably the result of pre-depositional burning. Rough and slightly sandy texture though surfaces have been smoothed prior to decoration. This fabric contains rare-sparse (2–3%), angular, ill-assorted mainly fresh and some calcined flint, some cherty, up to 9mm, most between 0.5mm and 2mm; sparse-moderate (5–10%), ill-assorted, platelets of shell, often with clear laminar structure, up to 7mm; rare (<1%), angular, pale yellow-brown grog up to 3.5mm, most between 1mm and 1.5mm. The paste has common (20–5%), well-sorted, mostly clear quartz sand between 0.2mm and 0.5mm, exceptionally to 1mm.

SV1 This fabric has dark brown surfaces over a dark grey-black core; surfaces have been smoothed and often feel soapy. It contains rare (<1%) thin fragments of shell up to 3mm (not present in all sherds) and sparse to moderate (3–7%) platy voids from leached out calcareous material, probably shell in a moderately (10–15%) quartz silt and sandy (up to 0.5mm) matrix.

S This fabric has an oxidised orange-brown outer surface over a dark grey core and inner surface; some sherds are dark grey-brown, through-fired. Rough. It is tempered with very common-abundant (30–40%), angular, ill-assorted platelets of shell, some quite thick, exceptionally up to 10mm in diameter, with modes between 2mm and 4mm, in a matrix which contains sparse-moderate (5–10%) amounts of sub-rounded, mainly clear, well-sorted quartz sand up to 0.7mm, most between 0.2mm and 0.3mm. One sherd from Pot 60 has a virtually clean matrix.

VI This has oxidised red-brown outer surfaces over a dark grey-black core. A virtually clean, silty paste contains moderate (15–20%) platy and elongated voids possibly from leached out shell or limestone and sparse (5%) amounts of sub-angular iron-rich minerals up to 0.6mm.

FLMGll This fabric has mainly oxidised orange-brown surfaces over a dark grey core; sometimes the inner surface is dark brown. It is tempered with sparse (3–5%), ill-assorted, mainly fresh angular crushed and some calcined flint up to 8mm, with modes between 2mm and 4mm in a quartz silty paste with rare (<1%)

fine mica and rare (1%), sub-rounded to rounded, mainly clear quartz grains up to 1mm but mostly under 0.5mm. There are also sparse-moderate (3–10%), well-sorted, sub-rounded, brown grains of glauconite between 0.1mm and 0.3mm.

FLQz This fabric has oxidised orange-brown outer surface over a dark grey core and inner surface. Surfaces are rough. It is tempered with moderate (10%) ill-assorted, calcined and fresh angular flint up to 8mm, most 1-5mm; sparse (2–5%), angular quartz sandstone up to 6mm in a moderately (15–20%) sandy matrix with well-sorted, sub-rounded quartz grains between 0.2mm and 0.4mm and a scatter of larger grains up to 0.7mm; sparse (3–5%), well-sorted, sub-rounded iron-rich pellets between 0.2mm and 0.5mm.

Appendix 2: List of Individually Identified Peterborough Ware Pots

(Figures 6–8)

Abbreviations used: FN finger nail; FT fingertip; IS inner surface; OS outer surface; TC twisted cord; WC whipped cord

1. Fengate bowl, rim to base. Oblique TC on flat-topped rim; shallow FT impressions on rim interior; rows of TC and oblique FN on collar; row of deep punched holes within neck; horizontal end-to-end, crescentic FN on body becoming curvilinear towards base. Rim diameter c.189mm. FLSG1. 93230, [93208]. Cross-join with [93233]. ORA STH004; STH015; STH034; STH036
2. Fengate. Rim and neck, dark brown-black. TC in opposed diagonal lines; oblique TC on rim bevel. Punched hole in neck. FL1. 93230, [93208]. ORA STH016.
3. Fengate. Rim and neck, dark grey, smooth. FN in zig-zag on collar, no apparent neck but punched hole at transition of collar and body. FLG1. 93230, [93208].
4. Fengate. Flattened base, orange-brown OS, dark grey-black IS and core, rough. Rows of FT on lower walls. FL1. 93230, [93208]. ORA.
5. Fengate. Rim and body, smooth red-brown OS, rougher dark-brown to black IS. Oblique TC on rim-top; end-to-end, overlapped FN in chevron on collar; punched holes in neck; TC zig-zag on neck and body. FL1. 93236, [93233].
6. Fengate. Rim and body, dark-brown to black, smooth. Rows of TC on collar; perpendicular TC on rim-top; row of TC crescents on inner face of neck. SV. 93236, [93233].
7. Fengate. Rim and collar, dark grey-black, smooth; OS laminated. Rows of FN on collar; band of TC on rim bevel. FLSG1. 93236, [93233].
8. Fengate. Rim and neck, orange brown, grey-black core, fairly smooth. TC filled triangles, on collar; punched holes in neck. FL1. 93220, [93206].
9. Fengate jar. Rim, deep collar, neck and body, dark brown, dark grey-black core, rough. Oblique TC on rim-top; curvilinear TC on collar; two rows of crescentic TC on inner face of neck; punched holes in neck; indistinct vertical ?TC on body. SV. 93222, [93206]. ORA STH007.
10. Fengate. Body, red-brown, dark grey-black core, fairly rough. Rows of FT. FL1. 93222, [93206].
11. Fengate. Collar and body, dark grey-brown OS, dark grey-black IS and core, smooth. FL1. 93222, [93206].
12. Fengate. Collar and neck, dark brown, dark grey-black core, fairly smooth. Rows of TC on collar; TC on neck. SV. 93226, [93208]. Not illustrated.
13. Fengate. Rim and collar, dark grey, almost black, smooth, some large temper protrudes. Oblique TC on rim-top; TC chevron or opposed filled triangles on collar; punched holes in concave neck. FL1. 93237, [93205]. ORA STH026.
14. Fengate. Thinly potted rim, collar and neck, orange-brown, grey core, smooth. Fine TC lattice on collar; fine TC zig-zag on interior of neck. FL1. 93237, [93205].
15. Fengate. Rim, collar and body, dark-brown OS, dark grey-black IS and core, smooth. Plain concave rim, markedly concave neck with punched holes; neatly paired FT on body. FLSG1. 93213, [93201]. ORA STH011.
16. Fengate. Collar and neck, red-brown, grey core, fairly smooth but temper protrudes. TC chevrons or opposed triangles on collar; punched holes made with a tool in concave neck. FL1. 93213, [93201].
17. Fengate. Body and base, dark red-brown, grey core, smooth. Vertical TC, slightly converging. FLG1. 93213, [93201]. ORA STH009. Base too small to illustrate.
18. Fengate. Body, red-brown, grey core, smooth; IS laminated. Paired shallow FT. FL1. 93213, [93201].
19. Mortlake. Rim and collar, dark grey-black, rough. TC zig-zag on expanded rim; traces of TC on inner face of rim. FLMGl1. [93356].
20. Unassigned, probably Fengate. Body. Not illustrated. FL1. 93202 [93201].
21. Fengate. Plain body sherds, red-brown, dark grey-black core, smooth. FL1. 93220, [93206]. Not illustrated. ORA STH022.
22. Fengate. Plain body sherds, red-brown OS, dark grey-black IS and core. S. 93224, [93206]. Not illustrated.
23. Fengate. Rim and collar, brown OS, dark grey-black IS and core, fairly smooth. Tapered, bevelled rim. Horizontal TC on rim bevel; vertical TC on collar. FL1. 93234, [93233].
24. Fengate. Plain body sherds, dark brown OS, dark grey-black IS and core. SV. 93235, [93233]. Not illustrated. ORA STH002.
25. Fengate. Neck and body, dark grey to black, fairly smooth. FT punched holes in neck, TC on body. FL1. 93242, [93205]. ORA STH027.
26. Mortlake. Body sherds, orange-brown OS, dark grey-

black IS and core, fairly smooth. Rows of bird-bone impressions. FLMGl1. 93318, [93364].

27. Mortlake. Rim and cavetto, red-brown, grey-black core, rough. Expanded rim with lip. TC zig-zag on rim; WC maggots on interior face of neck. FLQz. 93320, Sett.
28. Unassigned. Body sherds, dark grey-brown OS, dark grey-black IS, somewhat smoothed. Neat rows of FT. FL1. 93321, Sett.
29. Probably Fengate. Body, orange-brown, grey core, rough with temper protruding. Rows of oblique FN. FL1. 93322, Sett.
30. Probably Fengate. Collar, dark grey-black, slightly smoothed. TC in opposed triangles or chevrons. FL1. 93322, Sett.
31. Mortalke. Body sherds, orange-brown OS, darker brown IS, dark grey-black core, rough. Rows of bird-bone impressions. FLMGl1. 93323, Sett. ORA STH028.
32. Unassigned. Body sherds, orange-brown, dark grey-black core, rough. Deep FT with distinctive raised crescent of clay. FLMGl1. 93323, Sett.
33. Unassigned. Body sherds, brown IS, dark grey-black core, OS lost, smooth. Fine TC. FL1. 93323, Sett. Not illustrated.
34. Fengate. Plain rim and collar, dark grey-brown OS, lighter IS, dark grey-black core, fairly rough. FL1. 93325, Sett.
35. Probably Fengate. Body sherds, dark brown OS, dark grey-black core; IS laminated. Deep row of FT. FLSG1. 93325, Sett.
36. Fengate. Rim and collar, dark grey to black OS and core, dark brown IS, fairly smooth. TC zig-zag on collar. FLSG1. 93327, Sett.
37. Fengate. Collar, red-brown OS, dark grey-black IS and core, fairly smooth. Fine TC chevrons. FLSG1. 93332, Sett.
38. Fengate. Collar, dark grey-black, red-brown core, fairly smooth. TC opposed filled triangles. FLSG1. 93334, [93356].
39. Unassigned. Body, red-brown, dark grey-black core, rough with large pieces of temper protruding. Rows of deep FT with raised crescents of clay. FL1. 93349, Sett. ORA STH029.
40. Mortlake. Body, red-brown OS, dark grey-black IS and core. TC with oblique FN. FLMGl1. 93357, [93356]. ORA STH033.
41. Mortlake. Joining body sherds, red-brown, dark grey core, rough with temper protruding. Rows of bird-bone impressions. FLMGll. 93357, [93356]. ORA STH032.

42-45 Numbers not used.

46. Unassigned. Body, orange OS, dark grey-black core, IS lost. Deep FT. FLMGl1. 91630, Sett.
47. Mortlake. Rim and cavetto, dark brown OS, dark grey-black IS and core, fairly smooth. Expanded rim with inward facing lip. Outer face of rim has deeply impressed TC zig-zag and a band of TC within the neck. Vertical TC on inner face of rim. Burnt residue on interior face. FL1. 91641, Sett.
48. Number not used.
49. Possibly Fengate. ? Rim and body, dark brown OS, dark grey-black IS and core, soapy. Thinly potted sherds. Oblique possibly FT impressions on possible rim; impression from organic matter on body. SV. 91640, [93201].
50. Fengate. Flat base, red-brown OS, dark grey-black core, IS laminated, smooth. FL1. 93236, [93233]. Not illustrated.
51. Fengate. Body, red-brown OS, dark grey-black IS and core, smooth. FT. Traces of burnt matter on IS. S. 93222, [93206]. Not illustrated.
52. Fengate. Base and lower body, orange-brown OS, dark grey-black IS and core, fairly smooth. Row of FT on lower body walls. V1. 93212, [93201]. Not illustrated.
53. Number not used.
54. Fengate. Collar and neck, red-brown OS, slightly darker brown IS, dark grey-black core, fairly smooth. End-to-end linear FN chevrons on collar; end-to-end FN possibly in zig-zag and punched pits in neck. FL1. 93236, [93233].
55. Fengate. Base angle, dark brown OS, dark grey-black IS and core, fairly smooth. FL1. 93225, [93206]. Not illustrated.
56. Fengate. Body, orange-brown OS, dark grey-black IS and core, fairly smooth. Rows of oblique FN impressions, most in same direction but one row as paired crowfeet. FL1. 93236, [93233]. ORA STH008.
57. Fengate. Body, dark red-brown OS, dark grey-black IS and core, fairly smooth OS but with protruding temper on IS. Rows of oblique FN, some vertical. FL1. 93236, [93233].
58. Fengate. Rim, brown to dark brown, dark grey-black core, fairly smooth. Possible FN on rim lip. SV. 93238, [93233]. Not illustrated.
59. Fengate. Collar and neck, dark grey-black, fairly smooth. FN zig-zag on collar, probably FN crescent on inner face of neck. FL1. 93234, [93233].
60. Fengate. Plain collar and deeply concave neck, dark brown-black OS, dark grey-black core, IS lost. Large platelets of shell protrude surfaces. S. 93323, Sett. Not illustrated.

61 Fengate. Body, smooth, soapy, brown surfaces over a dark grey-black core. TC possibly in zig-zag or lattice. SV. Context 93226, [93208]. Not illustrated.

62. Number not used.
63. Fengate. Flat base angle, dark brown OS, dark grey-black IS and core, rough. FL1. 93235, [93233]. Not illustrated.
64. Fengate. Body, red-brown, dark grey-black core, fairly rough. Parallel lines of indistinct TC. FL1. 93222, [93206].

Appendix 3: Organic Residue Analysis Methodology

Lipid analysis and interpretations were performed using established protocols described in detail in earlier publications (Correa-Ascencio and Evershed 2014). Briefly, ~2g of potsherd were sampled and surfaces cleaned with a modelling drill to remove exogenous lipids. The cleaned sherd powder was crushed in a solvent-washed mortar and pestle and weighed into a furnaced culture tube (I). An internal standard was added (20μg *n*-tetratriacontane; Sigma Aldrich Company Ltd) together with 5 mL of H_2SO_4/MeOH 2 - 4% ($\delta^{13}C$ value measured) and the culture tubes were placed on a heating block for 1 h at 70°C, mixing every 10 min. Once cooled, the methanolic acid was transferred to test tubes and centrifuged at 2500rpm for 10 min. The supernatant was then decanted into another furnaced culture tube (II) and 2mL of DCM extracted double distilled water was added. In order to recover any lipids not fully solubilised by the methanol solution, 2 x 3mL of *n*-hexane was added to the extracted potsherds contained in the original culture tubes, mixed well and transferred to culture tube II. The extraction was transferred to a clean, furnaced 3.5mL vial and blown down to dryness. Following this, 2 x 2mL *n*-hexane was added directly to the H_2SO_4/MeOH solution in culture tube II and whirlimixed to extract the remaining residues, then transferred to the 3.5mL vials and blown down until a full vial of *n*-hexane remained. Aliquots of the TLE's were derivatised using 20μl BSTFA, excess BSTFA was removed under nitrogen and the derivatised TLE was dissolved in *n*-hexane prior to GC, GC-MS and GC-C-IRMS. Firstly, the samples underwent high-temperature gas chromatography using a gas chromatograph (GC) fitted with a high temperature non-polar column (DB1-HT; 100% dimethylpolysiloxane, 15m x 0·32mm i.d., 0.1μm film thickness). The carrier gas was helium and the temperature programme comprised a 50°C isothermal followed by an increase to 350°C at a rate of 10°C min^{-1} followed by a 10 min isothermal. A procedural blank (no sample) was prepared and analysed alongside every batch of samples. Further compound identification was accomplished using gas chromatography-mass spectrometry (GC-MS). FAMEs were then introduced by autosampler onto a GC-MS fitted with a non-polar column (100% dimethyl polysiloxane stationary phase; 60m x 0.25mm i.d., 0·1μm film thickness). The instrument was a ThermoFinnigan single quadrupole TraceMS run in EI mode (electron energy 70 eV, scan time of 0·6 s). Samples were run in full scan mode (*m/z* 50–650) and the temperature programme comprised an isothermal hold at 50°C for 2 min, ramping to 300°C at 10°C min^{-1}, followed by an isothermal hold at 300°C (15 min). Data acquisition and processing were carried out using the HP Chemstation software (Rev. C.01.07 (27), Agilent Technologies) and Xcalibur software (version 3.0). Peaks were identified on the basis of their mass spectra and gas chromatography (GC) retention times, by comparison with the NIST mass spectral library (version 2.0).

Carbon isotope analyses by GC-C-IRMS were also carried out using a GC Agilent Technologies 7890A coupled to an Isoprime 100 (EI, 70eV, three Faraday cup collectors *m/z* 44, 45 and 46) via an IsoprimeGC5 combustion interface with a CuO and silver wool reactor maintained at 850°C. Instrument accuracy was determined using an external FAME standard mixture (C_{11}, C_{13}, C_{16}, C_{21} and C_{23}) of known isotopic composition. Samples were run in duplicate and an average taken. The $\delta^{13}C$ values are the ratios $^{13}C/^{12}C$ and expressed relative to the Vienna Pee Dee Belemnite, calibrated against a CO_2 reference gas of known isotopic composition. Instrument error was ±0.3‰. Data processing was carried out using Ion Vantage software (version 1.6.1.0, IsoPrime).