Characterisation Studies of Anglo-Scandinavian to Early Medieval Pottery from Swillington Brick Quarry, West Yorkshire (SWI06)

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Archaeological investigations at Swillington Brick Quarry, Swillington, West Yorkshire, revealed a scatter of Romano-British finds and a series of ditches which from the few finds within them appear to be medieval field boundaries. However, an isolated pit produced a large number of potsherds which appear to date the filling to the Anglo-Scandinavian period. Although the feature produced a large number of sherds study showed that there were only three vessels represented in the main fill, context 108. Two of these were identified by eye as York A ware, a gritty wheelthrown red earthenwares produced at Thorner, West Yorkshire (Cumberpatch and Roberts 1998-1999; Vince 2004). This ware is dated between the late 9th and the 11th centuries at Coppergate, York (Mainman 1990). The third vessel, represented by a single sherd, is of York Gritty ware, which had replaced York A ware in York by the late 11th century. In particular, York Gritty ware is the only likely contemporary pottery type found in association with the construction of the Norman minster which was complete by c.1100 (Holdsworth 1995). Later fills in the same feature, context 101/102, produced sherds of a fourth vessel which appears to be a thick-walled handmade jar with a sagging base. The appearance of this vessel suggested that it might either be of early to mid Anglo-Saxon date or mid 11th to mid 12th century date, being a local version of the various handmade wares which appear in the midlands and the east coast north of the Humber. The context suggests the latter option is most likely although no similar vessels are known to the author from sites in West Yorkshire or the Vale of York in North Yorkshire. Samples of the two York A ware vessels, the York Gritty ware sherd and the handmade gritty vessel were therefore taken for thin section and chemical analysis (Table 1).

Table 1

Action	TSNO	Context	Cname	Form	Description	Part	Nosh	NoV	Weight	Use
		93	YG	JAR		B	1	1	14	
TS;ICPS	V4285	102	SSTMG	JAR		BS	1	0	16	
ICPS	V4286	108	YG	JAR	CYLINDRICAL WALLED	BS	1	1	11	SOOTED EXT
DR;ICPS;TS	V4288	108	YORKA	JAR		BS	4	1	62	SOOTED EXT
DR;ICPS;TS	V4287	108	YORKA	JAR	COMPLETE PROFILE;FLAT BASE;CYLINDRICAL BODY NARROWING TO TRIANGULAR RIM CF COPPERGATE PER 4	PROF	59	1	479	SOOTED EXT

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93	NGR	JUG	COLLAR RIM;PLAIN SPLASHED GL	R	1	1	9
123	YG	JAR		BS	1	1	5
101	SSTMG	JAR		B	2	1	59

Thin Section Analysis

York A ware (V4287-8)

The following inclusion types were noted:

- Quartz. Moderate well-sorted subangular grains up c.0.8mm across. Most of the grains are monocrystalline and unstrained but polycrystalline strained grains and polycrystalline grains with a mosaic texture also occur. Some grains have one or more straight faces. V4288 also contains sparse rounded grains up to 0.2mm across.
- Sandstone. Sparse subangular fragments up to 1.5mm across containing subangular quartz grains. There is no sign of cement and the grains are either interlocking or have euhedral pores, formed by overgrowth of the quartz.
- Mudstone. Sparse rounded dark brown inclusionless laminated pellets up to 1.5mm long are present in V4287.
- Clay/iron pellets. Sparse (V4288) to moderate (V4287) pellets with a dark staining. Some grains have a poorly developed oolitic structure and are probably concretions.
- Feldspar. Sparse fragments of microcline and orthoclase feldspars up to 0.8mm across. The latter are mostly moderately to heavily altered.
- Graphic intergrowth. A single fragment was observed, 0.5mm across.
- Organics. Sparse rounded voids up to 0.5mm across with a darkened halo.

The groundmass of the two sections differs. V4288 consists of dark brown optically anisotropic baked clay minerals with abundant muscovite laths up to 0.1mm and sparse angular quartz and dark brown clay/iron grains of similar size. V4287 consists of highly birefringent optically anisotropic baked clay minerals and sparse angular quartz up to 0.1mm across.

The range of inclusions is probably due to the use of a sand derived mainly from coarse-grained sandstone, such as the Millstone Grit. The mudstone fragments could be detrital but are similar in colour and texture to V4287 and might therefore be classed as relict clay. The rounded quartz grains found in V4287 might be of Permian origin but are small enough to be transported by wind.

Both fabrics can be paralleled at Thorner where the pottery was made using local mudstone of Millstone Grit age and tempered with sand probably collected from the local river. Thorner village, and the kiln investigated in 1998, sits halfway up a hillside which

cuts through Millstone grit sandstones and mudstones at its base and is capped by Permian sandstone. Veins of barytes run through both the Millstone Grit and Permian sandstone and are rare but distinctive inclusions in York A and Thorner kiln samples but no grains of barytes were present in either of these sections.

York Gritty ware (V4286)

The thin section of York Gritty ware contains a very similar range of inclusions to that in the two York A ware samples and has a groundmass similar to that of V4288, but with a lighter colour. The only absent types are: rounded quartz grains, dark brown mudstone pellets; graphic intergrowth.

Early Medieval Handmade ware (V4285)

The thin section of early medieval handmade contains a similar coarse sand to that in the York A and York gritty ware samples although the sandstone fragments are larger, up to 3.0mm across. However, the groundmass is of much coarser texture and consists of dark brown to black optically anisotropic baked clay with abundant angular quartz grains up to 0.3mm across, sparse rounded quartz grains up to 0.2mm across and moderate sheaves of muscovite up to 0.2mm long (and including sparse examples up to 0.7mm long).

The texture of the groundmass is much coarser than that of any Thorner products and is paralleled by early to mid Anglo-Saxon vessels from various sites in the Vale of York which are thought to have been made using fluvioglacial silty clays, possibly lacustrine, which overlie the boulder clay in large areas of the valley. Deposits of silt of this type occur a few miles to the east of Swillington.

Chemical Analysis

The four vessels were sampled for chemical analysis using Inductively-Coupled Plasma Spectroscopy. The analysis was carried out at Royal Holloway College, London, under the supervision of Dr J N Walsh. A range of major elements was measured and expressed as percent oxides (App 1) and a range of minor and trace elements was measured and expressed as parts per million (App 2).

Silica was not measured but an estimate was calculated by subtracting the total measured oxides from 100%. These estimates indicate that the York Gritty sample has the least silica, followed by the York A samples and finally the early medieval handmade vessel (Fig 1).

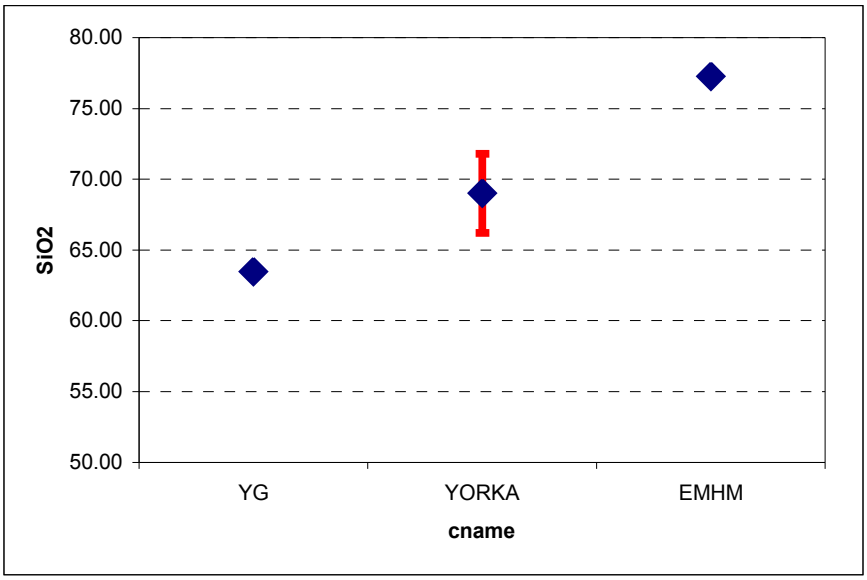

Figure 1

The ICPS data was normalised to aluminium, to take account of the dilution effect of variations in silica content, and the normalised data were then examined using factor analysis, to establish the structure of the dataset and the most variable elements. The most mobile elements, calcium, strontium, phosphorus and the rare earth elements, all of which are affected by post-burial alterations, were omitted from this analysis.

This analysis found that there were differences between the three fabric groups but less difference between the two York A vessels. The York Gritty sherds have higher frequencies of copper and lead. These are unlikely to be due to the presence of lead glaze in the kiln and are probably a reflection of mineralisation in the parent sand or clay. It also has less manganese, barium, nickel, cobalt and iron than the other two groups. The handmade vessel has higher vanadium, sodium and zinc frequencies.

York A and York Gritty wares

The Swillington data were then compared with a range of York Gritty and York A ware samples and samples from the Thorner kiln and its kiln walls. Factor analysis found two main factors (Fig 2). Factor 1 does not distinguish the two groups but factor 2 separates most of the York Gritty samples from the York A samples. However, the Swillington samples all fall into the York Gritty group, together with one example of York A ware from Beverley.

High Factor 2 scores are due to potassium and to a lesser extent magnesium, copper, chromium, barium and lithium. A plot of potassium against magnesium values shows the two groups and again places all three Swillington samples, and the Beverley sample in the York Gritty group (Fig 3).

Barium values for this dataset are either very low (as is the case for all three Swillington samples) or erratically high (in the York A and Thorner kiln samples and one York Gritty sample. This is consistent with their being due to the presence of isolated barytes grains.

A plot of nickel against lithium values shows that high lithium is a Thorner kiln/York A characteristic whilst nickel shows no obvious correlation with any groups. In Fig 4 the aberrant Beverley sample has a high lithium content but the Swillington samples do not.

All of these features suggest that chemically the York A ware samples from Swillington actually belong to the York Gritty ware group. However, the York A ware samples have iron and chromium contents comparable with the York A and Thorner samples (Fig 5). They therefore can been seen as an intermediate group, closer in composition to York Gritty ware but with features paralleled in York A and the Thorner kiln.

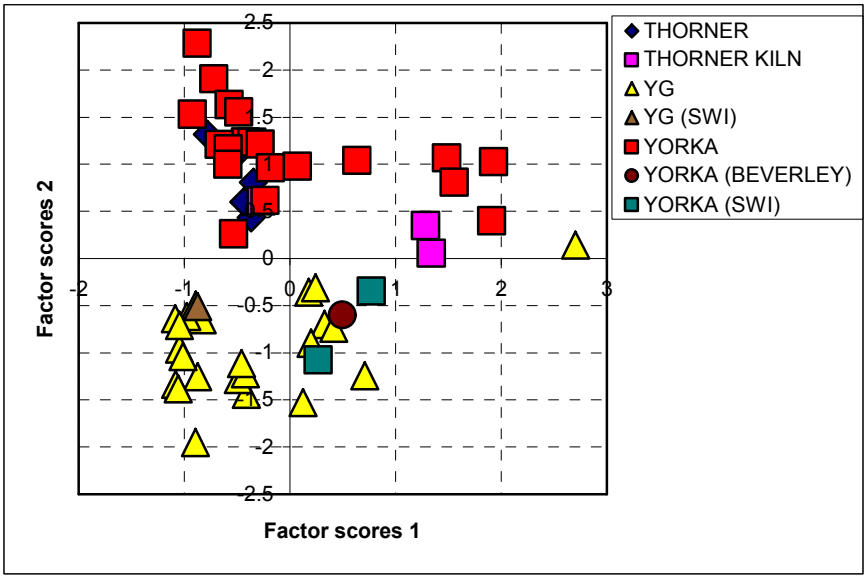

Figure 2

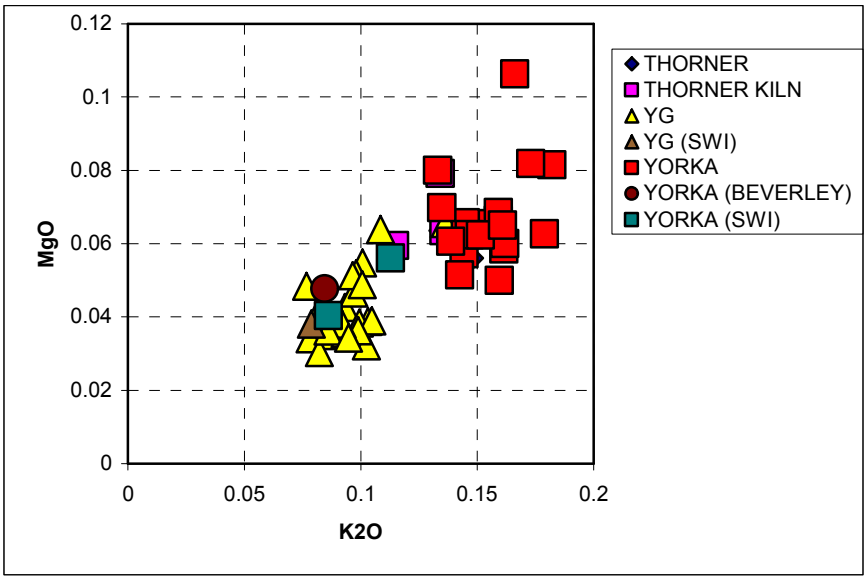

Figure 3

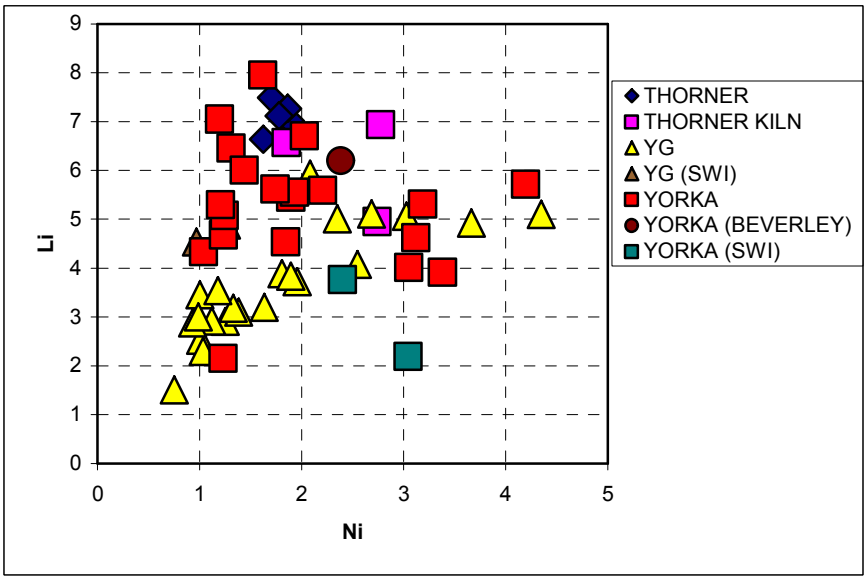

Figure 4

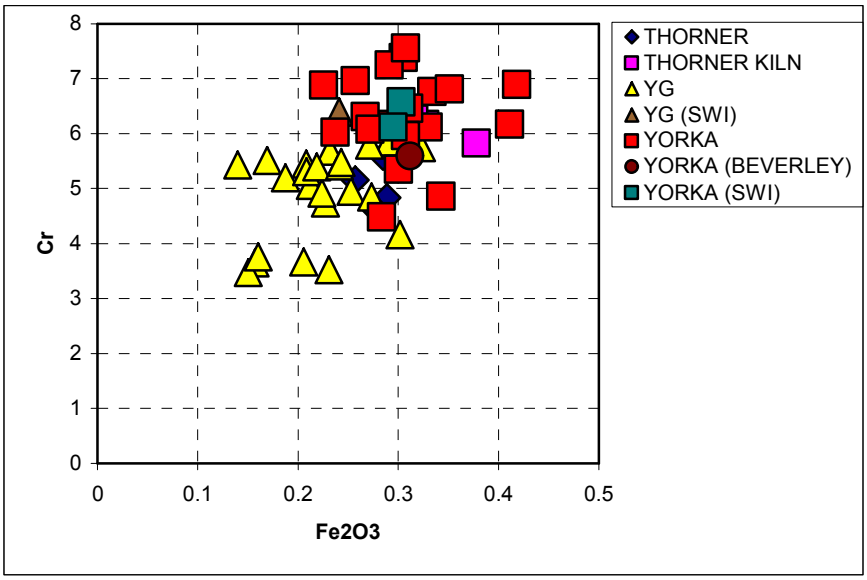

Figure 5

Early Medieval Handmade

The early medieval handmade vessel was compared with a series of samples of early to mid Anglo-Saxon date which contain similar sandstone-derived temper and in many cases share the silty groundmass found in the Swillington sherd. These samples come from a range of sites in the Vale of York, ranging from Catterick and Scorton in the north to York in the south, Otley in the west and Scrayingham and West Lilling in the east. Samples from Otley and Boston Spa are the closest geographically to Swillington. Factor analysis of this dataset indicates the presence of three main factors and a plot of the first two factor scores shows that there is a geographical component, although the samples from different sites have overlapping compositions. There is a correlation of the two factors, so that those with high F1 scores tend to have high F2 scores. There is also evidence for a systematic difference in F2 scores, so that the Ferrybridge, West Lilling and Scrayingham samples have the lowest mean F2 scores, and are both from sites located at the eastern side of the vale whilst Catterick and Scorton have the highest mean F2 scores and come from sites in the northern part of the vale. The remaining samples, from York, Boston Spa, Otley, Swillington, and intermediate mean F2 scores and come from sites in the southwest part of the Vale. These groups probably reflect the source of the sediment feeding into the pro-glacial and post-glacial lakes and are consistent with the Swillington sample having a source using lacustrine clay in the southwest of the Vale of York.

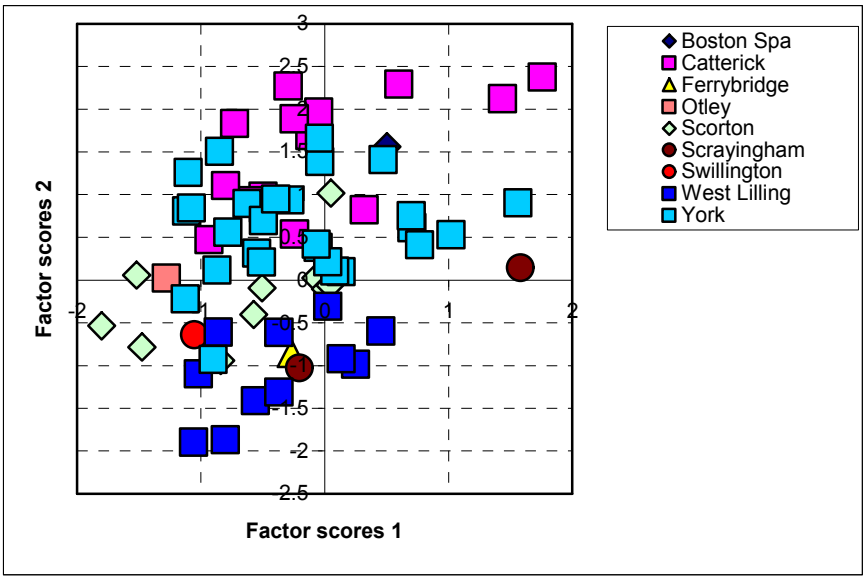

Figure 6

Conclusions

The Swillington pit includes one sherd from a typical York Gritty ware vessel. This is confirmed by both thin section and chemical analysis. The similarity of the grit found in York Gritty ware to that found in Thorner products suggests a similar source region and the light-firing body is typical of those produced from Coal Measures deltaic clays, especially those which form seatearths underlying deposits of coal. Potterton, situated immediately south of Thorner, has a place name which suggests the presence of potters in the late 11th century and at that date the only known pottery found in that part of Yorkshire is York Gritty ware. This makes it fairly certain that Potterton was one, if not the only, source of York Gritty ware at that time.

The two York A vessels, however, have a composition which is intermediate between the Thorner products and York Gritty ware, with a higher similarity to York Gritty ware. This suggests perhaps that they were made from red-firing clays in the Potterton area.

The colour of these Carboniferous clays and mudstones is due to the removal of iron and related elements by soil formation in sub-tropical deltaic conditions. It has been established through analysis of a series of test samples from Mirfield, West Yorkshire that iron content, and the frequency of elements correlated with iron, varies with colour but that other elements are unaffected. Thus, the similarity of the clay in most respects to York Gritty ware points to a Potterton source rather than a Thorner one. It is possible, therefore, that the earliest products of the Potterton industry include these two vessels (and possibly the Beverley example) which have a colour, tempering and rim form similar to that of the Thorner pottery and that these were rapidly replaced by the whiteware vessels whose collared rim forms suggest a strong Norman influence.

The early medieval handmade vessel is in all respects a successor to the early to mid Anglo-Saxon handmade wares which in this area probably date from the 7th to the 9th centuries. There is some evidence for the continued use of handmade vessels at Coppergate but these appear to be of the bag-shaped everted rimmed type current in the mid Saxon period. However, it is possible that this industry continued into the later 11th (a similar pattern is found in Lincolnshire, where handmade shell-tempered ware, ELFS, has a similar fabric in thin section and similar chemical composition to its late 10th to 12th century successor, LFS (Young and Vince 2006).

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Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V4285	14.64	4.38	0.53	0.33	0.62	1.59	0.53	0.09	0.024
V4286	25.80	6.22	0.98	0.38	0.17	2.03	0.83	0.12	0.010
V4287	22.05	6.51	0.89	0.42	0.26	1.90	0.77	0.08	0.086
V4288	18.70	5.67	1.05	0.39	0.23	2.11	0.75	0.09	0.042

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V4285	412	92	14	35	30	12	82	78	18	42	40	69	41	7	2	3	2	28	87	10
V4286	467	165	51	117	25	21	108	111	14	131	54	87	53	5	1	3	2	59	33	9
V4287	649	135	13	83	53	17	85	94	33	70	62	106	63	10	2	6	3	25	51	15
V4288	614	123	15	41	57	16	57	85	28	52	60	102	61	10	2	5	3	29	63	15