Characterisation of the Medieval Pottery from Winksley, West Yorkshire

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As part of the post-excavation analysis of the medieval pottery from sites near Wetherby on the A1, West Yorkshire, being carried out by Jane Young, samples of medieval pottery and other ceramics from production sites in West Yorkshire were analysed.

Pottery waste from Winksley was discovered in 1965 (Bellamy and Le Patourel 1970). Four kilns were excavated and each produced a similar range of products, including several types of highly decorated jugs. In their report, Bellamy and Le Patourel state that the first documentary reference to potters in Winksley dates to the decade 1223-1233 and that the land was granted to the potters by Fountains Abbey, which was situated 4.8km away.

A collection of Winksley pottery was located in Harrogate Museum and samples were chosen by Jane Young for characterisation. This collection does not seem to be that found in 1965, or at least does not now include any of the vessels published by Bellamy and Le Patourel.

Eight samples of pottery waste were selected by Jane Young and submitted to the author for thin section and chemical analysis (Table 1). The samples were grouped into five fabrics, defined following examination at x20 magnification using a binocular microscope. The range of forms sampled include unglazed sandy whiteware jars (Fabric 1, V2517-8), roller-stamped whiteware jugs (V2521-22), highly-decorated redware jugs (V2519-20), a fine whiteware jug (V2527) with a copper-stained lead glaze and a whiteware jug with a red slip (V2528).

Table 1

Sample No	JY Fabric	Form	Chemical analysis 1	Chemical analysis 2
V2517	Fabric 1	JAR		
V2518	Fabric 1	JAR		
V2519	Fabric 2	JUG		
V2520	Fabric 2	JUG		
V2521	Fabric 3	JUG		
V2522	Fabric 3	JUG		

V2527	Fabric 4	JUG
V2528	Fabric 5	JUG

Description

The eight samples have been assigned the sample numbers V2517-22 and V2527-28.

The thin sections were produced by Steve Caldwell and stained using Dickson's method (Dickson 1965). The chemical analyses were undertaken at Royal Holloway College, London, under the supervision of Dr J N Walsh, Department of Geology, using Inductively-Coupled Plasma Spectroscopy (ICP-AES).

Petrological Analysis

Fabric 1

Description

The following inclusion types were noted in thin section:

- Mudstone. Abundant rounded fragments, of similar colour and texture to the groundmass, up to 2.0mm across.
- Medium-grained sandstone with brown cement. Sparse rounded fragments up to 1.0mm across containing angular quartz grains c.0.5mm across in a red clay/iron matrix.
- Angular quartz. Abundant angular fragments up to 0.5mm across. Most have a red coating similar to the matrix of the sandstone fragments.

The groundmass consists of optically anisotropic baked clay minerals with few visible inclusions.

Interpretation

The parent clay is probably a mudstone, and the mudstone inclusions might therefore be termed relict clay, although most retain evidence for bedding and have therefore not undergone modification during clay preparation. The sand temper is derived from the weathering of a red sandstone, probably a Coal Measures sandstone. The low quantity of sandstone fragments is probably partly a reflection of the soft nature of the cement and partly evidence for the detrital nature of the sand.

Fabric 2

Description

The following inclusion types were noted in thin section:

- Medium-grained sandstone. Sparse rounded fragments up to 1.0mm across. The sandstone contains angular overgrown quartz, muscovite and biotite laths, up to 0.3mm across.
- Angular quartz. Moderate fragments of monocrystalline, unstrained quartz up to 1.0mm across, often with one or more flat faces.
- Muscovite. Sparse laths up to 0.5mm long.
- Biotite. Sparse laths up to 0.5mm across.
- Dark brown clay pellets. Sparse rounded fragments, up to 1.0mm across, some of which have trailed off into the groundmass.
- Angular and subangular quartz. Abundant fragments, some overgrown, up to 0.3mm across. Similar in size and appearance to those in the medium-grained sandstone fragments.

The groundmass consists of optically anisotropic clay pellets, sparse angular quartz up to 0.1mm across and moderate angular dark brown specks. There are lenses and streaks of darker brown, inclusionless clay and fine-grained angular and subangular quartz grains.

One section includes an applied red-firing strip, which is made from a clay with fewer quartz inclusions than the groundmass.

Interpretation

The parent clay is probably a weathered Coal Measures mudstone, as is the clay used for the applied strips. The dark brown clay pellets are probably remnants of nodules or layers within the mudstone with a higher iron content. The remaining inclusions are probably a detrital sand which includes both Coal Measures and Millstone Grit sandstone fragments and their constituents. The lack of Millstone Grit sandstone fragments is probably due to the mechanical erosion of the sand.

Fabric 3

Description

The following inclusion types were noted in thin section:

- Angular quartz. as Fabric 2.

- Medium-grained sandstone. as Fabric 2.
- Dark brown mudstone. Sparse fragments up to1.0 mm long with traces of bedding.
- Coarse-grained sandstone. Sparse fragments containing coarse quartz grains and a kaolinite cement, up to 1.5mm across.
- Muscovite. as Fabric 2.
- Biotite. as Fabric 2.
- Angular and subangular quartz. as Fabric 2.

The groundmass consists of optically anisotropic light-firing baked clay minerals and sparse angular quartz.

Interpretation

The parent clay used for Fabric 3 is similar in iron content to that use for Fabric 1, but is more weathered (there are no relict clay or mudstone fragments) and has a higher silt content (although still relatively fine-textured). The sand temper is similar to that used in Fabric 2, the only differences being in the presence of mudstone and Millstone Grit fragments, probably simply due to the rarity of these inclusions in the sand.

Fabric 4

Description

The following inclusion types were noted in thin section:

- Angular quartz. as Fabric 2.
- Medium-grained sandstone. as Fabric 2.
- Subangular and angular quartz. as Fabric 2.
- Muscovite. as Fabric 2.

The groundmass consists of light-firing, optically anisotropic baked clay, sparse angular quartz grains and sparse rounded light-colours clay pellets.

Interpretation

The parent clay used for Fabric 4 is lower in iron content to that of Fabric 3 but is otherwise similar. The sand temper, likewise, is very similar to that used in Fabrics 2 and 3.

Fabric 5

Description

The following inclusion types were noted in thin section:

- Subangular and angular quartz. as Fabric 2.
- Angular quartz. as Fabric 2.
- Dark brown clay pellets. as Fabric 2.
- Medium-grained sandstone. as Fabric 2.
- Plagioclase feldspar. Sparse fragments up to 0.3mm across.
- Muscovite. as Fabric 2.

The groundmass consists of optically anisotropic baked clay minerals, dark brown grains and sparse angular quartz up to 0.1mm across..

Interpretation

The parent clay for Fabric 5 is probably the same as that used for Fabric 3 and the sand temper is similar, or identical, to those used for Fabrics 2, 3, and 4.

Chemical Analysis

A range of major elements was measured as percent oxides (Appendix 1) and a range of minor and trace elements were measured as parts per million. Silica was not measured directly but was estimated by subtraction of the total measured oxides from 100%. The two fabric 1 samples have lower silica estimates than the remainder (65.8-67.5%, versus 67.8-73.5%) but there are too few samples for each fabric to tell if there is significant variation in silica content.

Table 2

SiO2	WNK 1	WNK 2	WNK 3	WNK 4	WNK 5	Grand Total
65-66	1					1
67-68	1			1		2
68-69					1	1
70-71		2				2
73-74			2			2
Grand Total	2	2	2	1	1	8

The data were normalised to Aluminium (Al_2O_3) to take account of the variations in silica, some of which is contributed by the added quartz sand temper.

Factor analysis of the normalised chemical data reveals that there are five significant factors. The first factor has high weightings for Potassium, Vanadium, Scandium, Zirconium, Magnesium and Titanium, separates the two Fabric 1 samples from the remainder. The second factor has a high weighting for Lithium and high negative weightings for Copper, Phosphorus, Zinc, Calcium, Nickel and Iron, and separates the two Fabric 2 samples from the remainder. Factor 3 has high weightings for two Rare Earth Elements (Lanthanum and Neodymium). The two Fabric 3 samples have the highest F3 scores. Factor 4 has moderate weightings for a large number of elements, such as Manganese, Sodium and Barium, and separates one of the Fabric 3 samples and one of the Fabric 1 samples from the remainder. Factor 5 has a high weighting for one of the Rare Earth Elements, Europium, and this separates one of the Fabric 2 samples from the remainder.

Several of the samples have a high Lead value, which suggests that they are contaminated with glaze. However, no other elements appear to be correlated with Lead.

Discussion and Conclusions

The Winksley potters seem to have utilised at least two distinct sands and three distinct clays.

The sand used in Fabric 1 is distinctive and not used in any of the remaining samples. It is composed of fragments of a iron/clay cemented medium-grained sandstone and its constituents whereas the remaining sands are more mixed. All contain fragments of a medium-grained sandstone, but usually without an iron-rich cement. Coarser-grained sandstone fragments, probably from the Millstone Grit, also occur in some samples.

The clay used for Fabric 1 is also distinctive, including numerous rounded mudstone fragments. Both the mudstones and the groundmass contain few visible inclusions and are probably derived from a weathered mudstone. The clay used for Fabric 2 is also distinctive, having a higher iron content than the remainder and few visible inclusions. The clays used for fabrics 3, 4 and 5 are all similar, although that used for fabric 4 has a lower iron content than that use for the other two fabrics. However, this apparent difference may have been emphasised by firing, since the Fabric 4 sample is reduced.

The chemical composition also indicates that Fabrics 1 and 2 are distinct from the remainder and this is clearly illustrated by the plot of F1 against F2 scores (Fig 1).

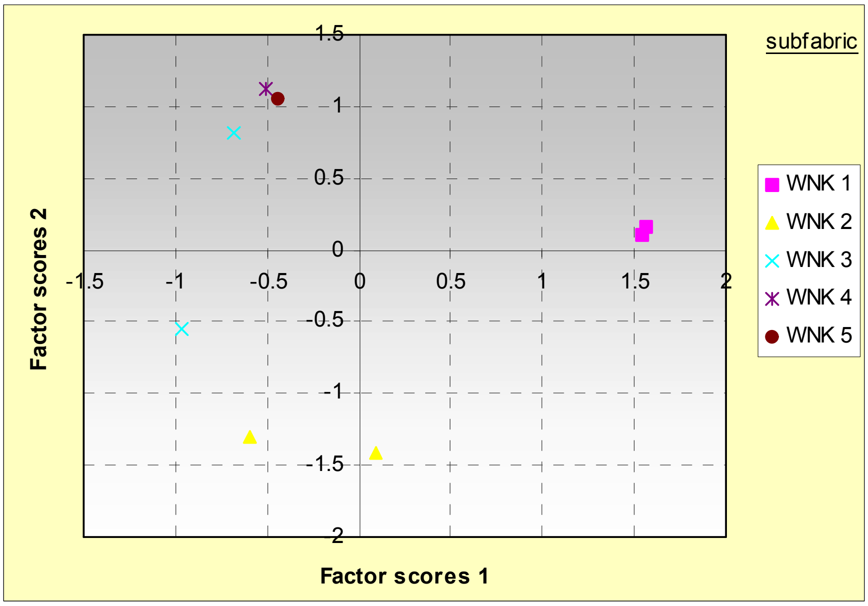

Figure 1

When the Winksley samples are compared with the Lumley Farm, Grantley, samples, produced in the neighbouring parish, the petrological characteristics suggest that the sand temper used at Lumley Farm is the same as that used for Fabrics 3, 4 and 5 at Winksley whilst the clay groundmass is also similar to, but coarser than, that used for those fabrics. A factor analysis of the chemical data, excluding elements which were suspect at either Lumley Farm or Winksley, indicates that the Lumley Farm products can be distinguished from the Winksley samples through their Factor 2 scores (Fig 2). The Lumley Farm samples have higher relative Sodium and Barium values (Fig 3).

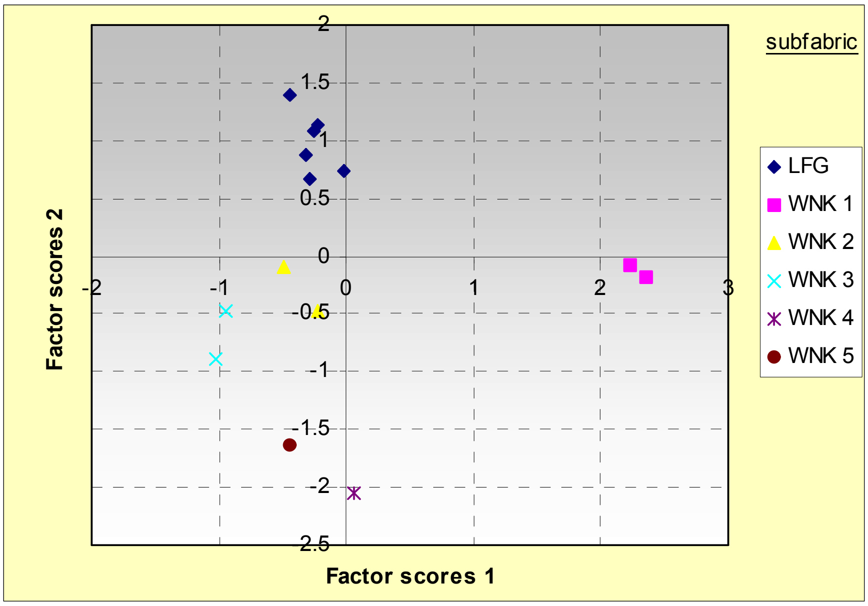

Figure 2

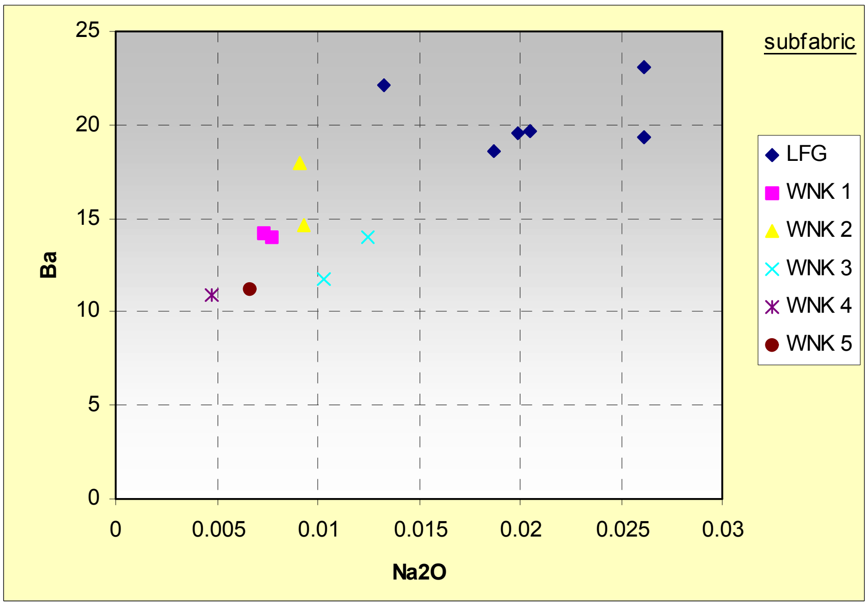

Figure 3

Appendices

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2517	24.5	4.03	1.15	0.28	0.1805	2.65	1.26	0.06	0.009
V2518	23.35	3.71	1.05	0.28	0.1805	2.54	1.28	0.05	0.011
V2519	18.8	7.19	0.74	0.33	0.171	1.37	0.76	0.08	0.018
V2520	20.31	6.04	0.44	0.26	0.19	1.25	0.82	0.1	0.011

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2521	19.04	4.73	0.53	0.2	0.2375	1.13	0.79	0.06	0.03
V2522	19.34	4.26	0.49	0.19	0.1995	1.03	0.81	0.07	0.02
V2527	25.98	2.96	0.63	0.12	0.1235	1.23	1.09	0.05	0.005
V2528	24.37	4.07	0.62	0.17	0.1615	1.27	1.01	0.05	0.022

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2517	349	139	36	130	47	23	87	175	31	114	57	112	59	9	2	6	3	225	81	18
V2518	327	138	35	121	42	21	82	174	29	115	51	99	53	8	2	5	3	428	82	16
V2519	337	102	34	87	44	14	59	79	19	43	36	77	37	5	1	3	2	7,118	78	13
V2520	298	113	33	80	46	15	57	96	24	54	41	81	42	7	2	4	2	1,579	84	11
V2521	266	87	20	120	31	13	84	68	19	44	45	74	45	6	1	3	2	1,350	59	12
V2522	227	95	30	96	31	12	85	55	15	46	48	81	48	7	1	3	2	2,373	90	9
V2527	284	119	30	164	44	20	73	115	28	64	52	96	53	9	2	5	2	995	47	8
V2528	273	127	26	149	38	17	53	107	25	56	49	98	50	8	2	5	2	716	46	10

Bibliography

Bellamy, C. V. and Le Patourel, H. E. J. (1970) "Four Medieval Pottery Kilns on Woodhouse Farm, Winksley Near Ripon, W. Riding of Yorkshire." *Medieval Archaeol*, XIV, 104-119.

Dickson, J. A. D. (1965) "A modified staining technique for carbonates in thin section." *Nature*, 205, 587.