Characterisation of the Humberware produced at Blue Bridge Lane, York (YBB01)

Alan Vince

Excavations by Field Archaeology Specialists Ltd at Blue Bridge Lane, Fishergate, York, revealed a medieval pottery kiln and a substantial quantity of waste. The products of this kiln were in the Humberware tradition (known in York as Walmgate ware, 1987) and are of later 14th-century date.

In order to determine the raw materials used in the manufacture of this pottery and to determine whether or not the products could be characterised and, therefore, recognised on consumer sites samples were taken for thin section and chemical analyses.

Methodology

Seven samples were thin sectioned by Steve Caldwell at the Department of Earth Sciences, University of Manchester and stained using Dickson's method (Dickson 1965). The samples were chosen to include vessels which showed signs of waste but were not vitrified. They also included sherds with white slip, which seems to have been applied alongside the copper-mottled lead glaze. All the thin-sectioned samples came from jugs, by far the most common form produced on the site (Table 1).

A subsample of each tile was prepared for analysis by Peter Hill, who mechanically removed all the sample surfaces, both original and breaks, in order to minimise post-burial contamination. These also included two vitrified wasters, including an unglazed drinking jug, V2581. The resulting lumps were then crushed to a fine powder and submitted to Royal Holloway College London, where they were analysed under the supervision of Dr J N Walsh, Department of Geology, using Inductively-Coupled Plasma Spectroscopy (ICP-AES).

Table 1

TSNO	Context	Ref No	cname	Form	Action	Description
V2579	1186	1213	HUM	JUG	TS;ICPS	PULLED LIP
V2581	1537	1437	HUM	DJ	ICPS	
V2585	1189	1209	HUM	JUG	TS;ICPS	GLAZE WITH CU; KILN SCAR
V2580	1186	1213	HUM	JUG	ICPS	BURNT GLAZE
V2577	1186	1213	HUM	JUG	TS;ICPS	WHITE SLIP AND SPOTS OF BURNT GLAZE
V2584	1695	1538	HUM	JUG	TS;ICPS	
V2583	1695	1538	HUM	JUG	TS;ICPS	

TSNO	Context	Ref No	cname	Form	Action	Description
V2582	1537	1464	HUM	JUG	TS;ICPS	
V2578	1186	1213	HUM	JUG	TS;ICPS	WHITE SLIP

Petrological analysis

Description

All seven sections have a similar appearance in thin section, apart from differences in firing which are probably due in part to the sherds coming from wasters. The following inclusion types were noted in the seven thin sections:

- Angular quartz. Abundant well-sorted fragments, ranging from c.0.2mm to 0.5mm across. Most have one or more flat faces, suggesting overgrowth. In some cases this overgrowth is marked by a difference in the quantity of inclusions in the grain, in which case the original grains seem to have also been angular but in most there is no sign of an original surface. Larger grains, up to 1.0mm across with evidence for an original rounded surface are present but sparse.

- Rounded opaques. Moderate rounded grains between c.0.1mm and 0.3mm across. Most have been affected by firing and there is a void between the grain surface and the clay matrix.

- Fine-grained sandstone. Sparse angular fragments ranging up to 1.0mm across of a sandstone with grains of similar size to the angular quartz sand. There is no evidence of cement and it is likely that the rock was therefore quite friable.

- Rounded mudstones. Sparse rounded fragments of mudstone, up to 1.0mm across. Examples with a similar colour and texture to the clay matrix, examples with a lighter colour and examples with a redder colour are present. Sparse angular quartz silt is present in the mudstone and bedding laminae are visible.

- Altered limestone. Sparse fragments up to 0.5mm across. All represented now by voids filled with alteration products.

- Angular plagioclase feldspar. Sparse fresh fragments of similar size and shape to the angular quartz.

- Angular chert. Sparse fragments up to 0.5mm across. These include quartz inclusions, c.0.1mm across and possible sponge spicules, replaced by chalcedony.

- Rounded siltstone. Sparse fragments up to 1.0mm across containing quartz and dark brown grains in an altered calcareous matrix.

- Angular perthite. Rare fragments of similar size to the angular quartz.
- Muscovite. Sparse fragments up to 0.4mm long.

The groundmass consists of optically anisotropic baked clay minerals with abundant darker brown clay pellets rare angular quartz and muscovite laths up to 0.05mm long.

Where present in thin section, the glaze is partially crystallized. It contains abundant needles of an unidentified mineral but no quartz inclusions. The boundary between the glaze and the body usually has a dark, almost opaque interface and in places quartz inclusions in the body are standing proud of the surrounding surface into the glaze. Sparse rounded vesicles are present in the glaze.

Interpretation

Because of the fineness of the sand inclusions it is difficult to identify the source of any with any certainty. However, the fine-grained sandstone, the calcareous siltstone, limestones, and the mudstones all outcrop in the Jurassic outcrops of the Hambleton Hills and there are no inclusions present which could not originate in that area. The groundmass appears in the main to consist of weathered mudstone, recognisable because of the ill-defined dark clay pellets in the groundmass and the similarity in colour and texture of much of this clay to the mudstone inclusions. Of particular interest are the small chert fragments. None was sufficiently large for the positive identification as Rhaxella chert to be made, but the fragments are more similar to Jurassic cherts than to Carboniferous ones.

Chemical Analysis

A range of major elements were measured as percent oxides (Appendix 1) whilst a range of minor and trace elements were measured as parts per million (Appendix 2). Silica was not measured directly but was estimated by subtracting the total major element count from 100%. Fig 1 shows the estimated silica content for other analysed samples of Humberware and indicates that the York ware has a lower mean silica value than those from Holme upon Spalding Moor and material from consumer sites at Barton upon Humber and Wawne (East Yorkshire) but overlaps with material from Cowick and West Cowick.

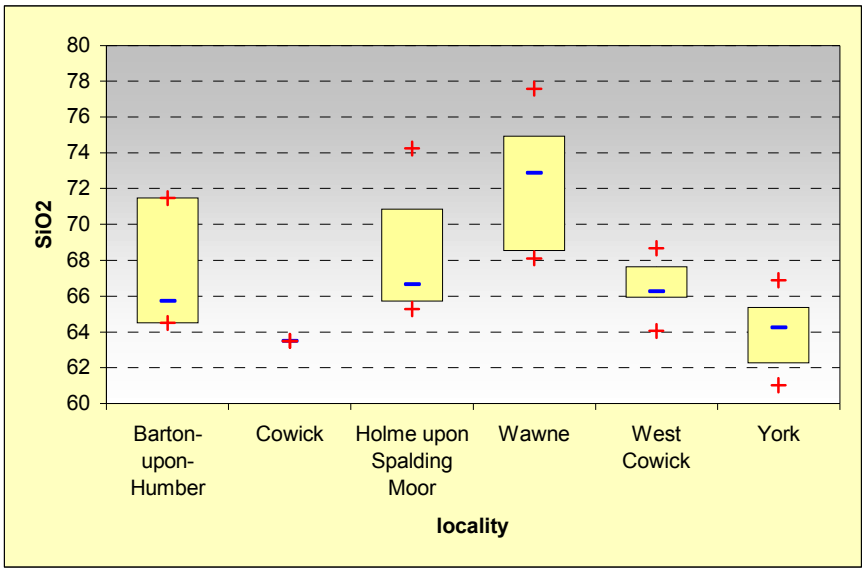

Figure 1

Because of this variation in silica content, some of which is probably due to the deliberate tempering of the clays, the chemical data were normalised to aluminium. The resulting dataset was then analysed using factor analysis. This revealed six significant factors, of which two, Factors 4 and 6, clearly separated the York from the other data (Fig 2). Fig 2 also shows that the two other kiln waste groups, from West Cowick and Holme upon Spalding Moor were clearly separated from each other as well as from the York samples. The Barton and Wawne samples include some which have similar compositions to the West Cowick and Holme groups, and some samples which clearly have different compositions, indicating other, unlocated sources of Humberware supplying those two settlements. Neither site included any samples which might be York products. A single sherd of Humberware from a consumer site in York itself (Coppergate, sample V2395) can be seen in Fig 2 to have a similar composition to the Blue Bridge Lane samples but with a higher F6 score.

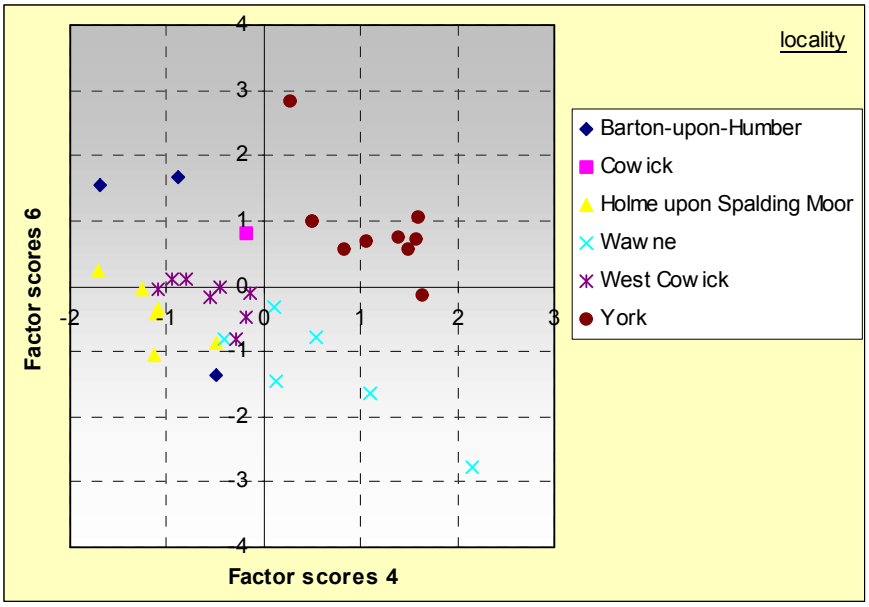

Figure 2

The lead content of the two vitrified Blue Bridge Lane samples is lower than that of any other analysed Humberwares, some of which have clearly been contaminated with lead glaze since they contain higher lead contents than occur on unglazed wares found in the Vale of York area. Although this low lead content is partly due to the absence of lead glaze on the drinking jug, it is actually lower than that found in unglazed wares and probably indicates the removal of lead due to volatilisation. No other elements have similar depletion or corresponding enrichment in other elements and therefore it is likely that firing conditions are not a major factor in the chemical composition.

The Blue Bridge Lane Humberware analyses were then compared with other red earthenwares of known/suspected York origin (Fig 3). Again, six factors were found and two of these, F4 and F5, were the most successful in distinguishing the various groups. In Fig 3 the Holme upon Spalding Moor samples (HUM HOSM) and the West Cowick samples (HUM WC) have negative F4 scores, whilst the Humberware samples from Wawne (HUM WAWNE) and Barton (HUM BOH) have lower F4 scores than the remainder, as do two sherds of Tees Valley Ware (TVW).

The remaining samples have similar compositions. They include 12th-century splashed wares in the Beverley ware tradition (BEVO1T, BEVO2T), a redware identified as a red-firing Brandsby-type ware (BRANRED), a sample of Roman Eboracum 1 ware (RPOT). However, a sample of what is taken to be genuine Beverley glazed ware from a site in York has a similar composition (BEVO2).

Samples of Anglo-Scandinavian York A ware (YORKA) and iron rich sandy ware (IRS), tempered with hammerscale, are clearly distinguished from the remainder by their F6 scores and are distinguished from each other by their F4 scores.

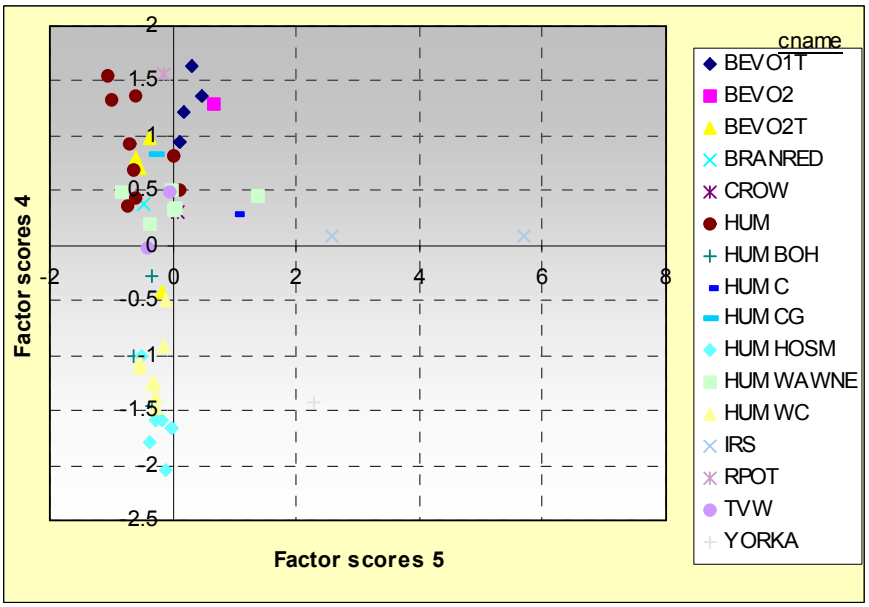

Figure 3

Discussion and conclusions

In thin section, the Blue Bridge Lane samples all have a similar appearance and this suggests that a single clay source, naturally tempered with a fine quartz sand, was used to produce the pottery. Without samples of the local boulder clay, it is not possible to say whether this clay was cleaned in any way to remove large inclusions, or whether naturally stone-free boulder clay is available in the York area. The sections also show that there is a strong similarity between the range of inclusions found in the Blue Bridge Lane samples and those found in Brandsby-type ware and that this suggests that a major source of the boulder clay in the York area is the Jurassic rocks of the Hambleton Hills and Howardian Hills area. This in turn suggests that some/all of the coarse-grained overgrown quartz grains present in this clay are possibly of Upper Jurassic sandstones rather than the Millstone Grit. This has some importance for the interpretation of ceramic thin sections in the Vale of York area.

The chemical composition of the Blue Bridge Lane Humberware can be used to distinguish it from Humberwares produced elsewhere in Yorkshire and, possibly, northeast Lincolnshire. It also reveals slight but real differences from a sample from Coppergate and this holds out the possibility that the Blue Bridge Lane pottery might be distinguished from other York production sites making visually indistinguishable pottery (such as the waste found at Walmgate).

The chemical data also add to the tentative suggestion that some of the Beverley-type wares found in York are actually locally-made copies, although they are easy to distinguish from the Blue Bridge Lane fabric in thin section and were clearly made using different clays.

Bibliography

Brooks, C M (1987) *Medieval and Later Pottery from Aldwark and Other Sites*. The Archaeology of York 16/3 London, York Archaeol Trust.

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

Appendices

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2577	19.62	6.51	2.35	1.9	0.37	3.19	0.8	0.19	0.081
V2578	20.67	6.94	2.26	2.01	0.4	3.4	0.85	0.27	0.087
V2579	18.78	6.45	1.84	1.9	0.37	3.12	0.75	0.68	0.105
V2580	21.51	7.21	2.63	2.5	0.35	3.38	0.9	0.41	0.098
V2581	19.34	6.69	2.49	2.47	0.4	3.11	0.78	0.15	0.092
V2582	19.88	6.65	2.44	2.37	0.39	3.19	0.81	0.17	0.095
V2583	19.33	6.56	2.12	2.21	0.46	3.15	0.75	0.19	0.088
V2584	21.37	7.25	2.64	2.23	0.38	3.36	0.85	0.19	0.085
V2585	20.71	7.22	2.55	2.05	0.42	3.4	0.83	0.27	0.092
Mean	20.13	6.83	2.37	2.18	0.39	3.26	0.81	0.28	0.09
SD	0.97	0.33	0.26	0.23	0.03	0.13	0.05	0.17	0.01

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2577	470	113	35	112	59	16	140	108	23	74	56	105	57	9	1.5	5.2	2.8	500	99	22
V2578	533	103	41	128	60	17	148	113	25	81	58	114	59	9	1.7	5	3	1379	107	20
V2579	655	109	31	112	57	16	163	102	23	78	51	103	52	8	1.5	5	2.9	563	104	20
V2580	564	128	32	135	45	18	170	129	26	82	60	116	61	10	1.7	5.5	3.3	175	125	18
V2581	476	110	35	124	58	16	136	109	25	80	54	106	55	9	1.5	5	3.1	162	97	23
V2582	480	112	34	118	61	16	144	110	23	68	54	105	54	9	1.5	4.5	2.8	1148	98	25
V2583	496	113	61	101	59	16	137	95	22	62	52	103	53	9	1.4	4.5	2.6	3786	101	23
V2584	494	127	35	129	65	18	148	115	25	81	58	105	59	9	1.5	5	3	325	107	23
V2585	512	123	34	127	63	18	151	114	23	66	59	124	60	9	1.5	5	2.8	944	111	21
Mean	520	115	37	120	58	17	149	111	24	75	56	109	57	9	1.5	4.97	2.92	998	105	22
SD	59	9	9	11	6	1	12	9	1	8	3	7	3	1	0	0	0	1,129	9	2