Chemical Characterisation of Medieval Pottery from West Cowick, East Yorkshire (WCD'08)

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An archaeological watching brief carried out by Field Archaeology Specialists Ltd at a site in West Cowick (Site Code: WCD'08) revealed a spread of medieval pottery some of which was clearly waste. Unfortunately, those vessels which were undoubtedly wasters were too bloated and deformed to identify their form, and thus their date. Nevertheless, one of the distinctive types present in the collection, but never as clear waste, consisted of rounded jugs with an external brown slip, deliberately high fired to produce a purple, blistered surface. Such vessels are distinctive and have been dated to the 16th century (Watkins 1987; Didsbury and Watkins 1992). To establish whether these vessels could have been produced at the site, samples were taken for chemical analysis. In addition, samples of definite waste and of a piece of fired clay, probably used in a kiln superstructure or a piece of kiln furniture, were taken (Table 1).

Table 1

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V5008	WCD'08	1003	4976	HUM	JUG	ICPS	HANDLE SCAR	WASTE
V5009	WCD'08	1003	4977	HUM	JUG	ICPS		WASTE
V5010	WCD'08	1003	4978	HUM	JUG	ICPS	HANDLE JOIN	WASTE
V5011	WCD'08	1003	4979	HUM	JUG	ICPS		WASTE
V5012	WCD'08	1003	4980	HUM	JUG/JAR	ICPS		WASTE
V5014	WCD'08	1003	4982	HUM	JUG	ICPS;DR	STRAP HANDLE, TWO GROOVES, 35 ACROSS	PURPLE
V5015	WCD'08	1003	4983	HUM	JUG	ICPS;DR		PURPLE
V5016	WCD'08	1003	4984	HUM	JUG	ICPS;DR	COMBED WAVY DEC	PURPLE
V5017	WCD'08	1003	4985	HUM	JUG	ICPS;DR	STRAP HANDLE, 41 ACROSS	PURPLE

Methodology

Offcuts from each sample were taken and the surfaces mechanically removed, to minimise the effect of post-burial contamination on the composition. The resulting block was then crushed to a fine powder and analysed using Inductively-coupled Plasma Spectroscopy at Royal Holloway College, London, under the supervision of Dr J N Walsh. A series of major

elements were measured and expressed as percent oxides (App 1) and a series of minor elements were measured as parts per million (App 2). Silica was estimated by subtraction of the major element percentages from 100% and all the measurements were normalised to aluminium and then examined using WinSTAT for Excel, and in particular the Factor Analysis routine in that software package (2002).

Internal Variation

The normalised data were examined to see if there were any clear differences between the wasters, the brown-slipped jugs and the fired clay. The fired clay contained significantly less estimated silica than the other two groups (Table 2). It also contained slightly less iron, potassium, barium, strontium and lead and more magnesium, lithium, nickel, lanthanum, cerium, neodymium and europium. The two pottery groups, however, show no such differences.

Table 2

Group	N	Mean	Std.Dev.
WCD08 FCLAY	1	60.43	----
WCD08 PURP	4	64.53	1.536756622
WCD08 WASTE	5	66.27	1.652578833

Factor analysis of the normalised data revealed six factors. The first five factors did not clearly distinguish the three groups but the sixth factor separated the fired clay from the pottery groups. Examination of the weighting table indicated that only the iron and lithium weightings were responsible for this separation.

Those elements which were depleted in the fired clay are mostly likely to have been present in the sand fraction, and the fired clay is noticeably finer in texture than the pottery. The exception is the lead, which is presumably present in the pottery through contamination by lead glaze. The elements which are higher in frequency in the fired clay are all likely to have been present in the clay fraction. Since all are normalised results, this is unlikely to be due to the higher quantity of clay present in the fired clay and does suggest that the clay was not chosen from precisely the same source as the pottery.

Comparison with other West Cowick pottery

The normalised ICPS data for the WCD'08 samples were then compared with samples from other West Cowick sites:

- One sample from Cowick Manor, analysed for the South Yorkshire and North Derbyshire Pottery Reference collection (Cumberpatch 2004).
- Samples of ceramic building material and pottery wasters from Land west of Holly House, 55 Grange Road (Vince 2007).
- Samples from the 1963 Mayes excavations (various sites)

- A sample from the 1963 Mayes excavation analysed for the South Yorkshire and North Derbyshire Pottery Reference collection (Cumberpatch 2004.

Factor analysis of this dataset found five factors. A plot of the first two factors (Fig 1) found that the 2007 Grange Road samples can be separated from each other and from the remainder by a combination of these two factors but that the remaining samples form a single cluster.

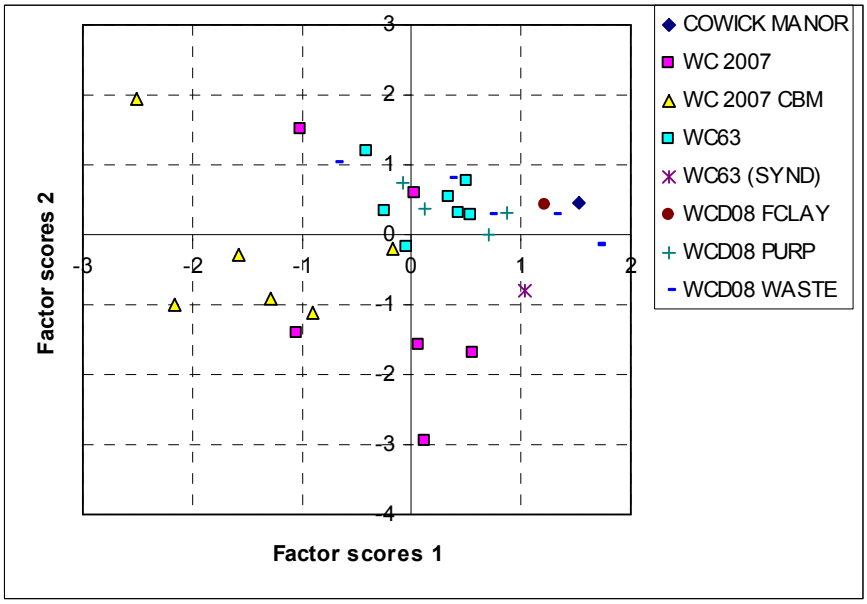

Figure 1

A plot of the factor scores for the third and fourth factors (Fig 2) showed that the F3 score separates the Cowick Manor sample from the remainder whilst F4 separates the 1963 samples from the remainder and partially separates the 2007 Grange Road samples from the 2008 samples.

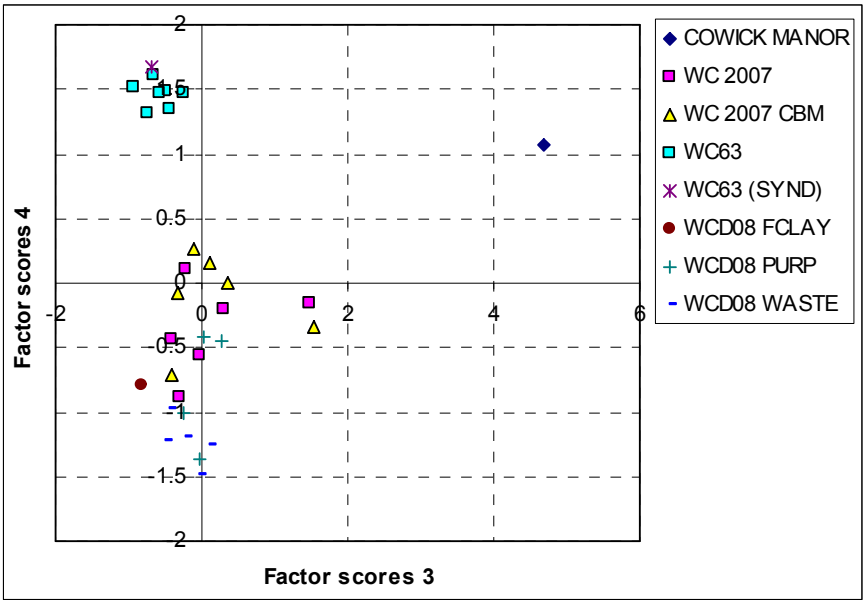

Figure 2

A plot of the fifth factor scores against the fourth (Fig 3) indicates that F5 separates the 1963 samples taken by the author from those sampled for the South Yorkshire/North Derbyshire fabric series but the two factors together also separate the 2008 from the 2007 samples.

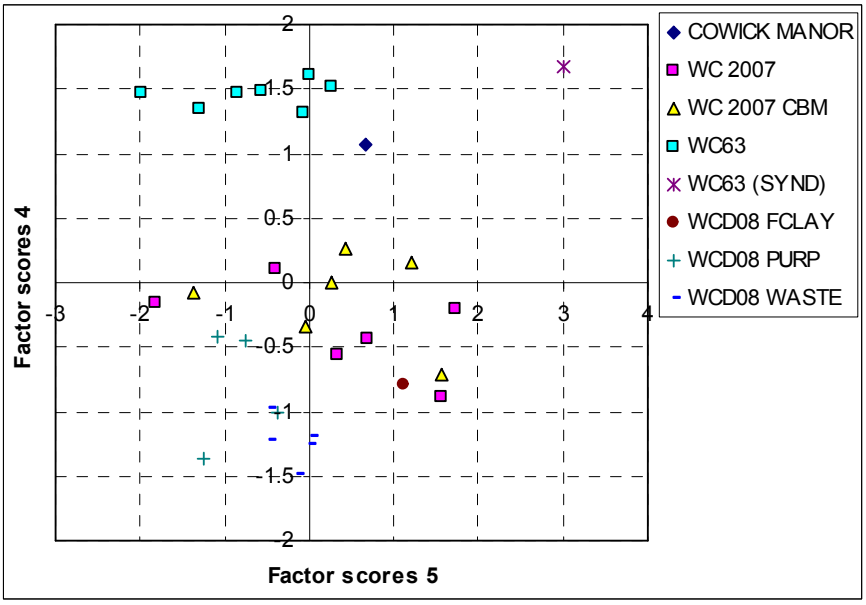

Figure 3

Conclusions

There is no evidence for a difference in composition between the brown-slipped 2008 samples and the definite waste from the site. This supports the suggestion that the brown-slipped vessels were produced on site.

This conclusion is further supported by the clear distinction between the 1963 excavation samples and the remainder and between the 2007 and 2008 samples. There are differences between the sample analysed for the South Yorkshire/North Derbyshire fabric collection and those analysed for the author. These differences are probably due to measurement errors since they affect two elements: copper and samarium, and the only other sample with a high samarium value was also analysed for the South Yorkshire/North Derbyshire fabric collection (Fig 4). The high copper value might be the result of contamination by glaze. Several of the WCD'08 samples show high lead values which are clearly the result of glaze contamination but, since copper was not used as a colourant on the 2008 pottery, the copper values are typical of a background count (App 2).

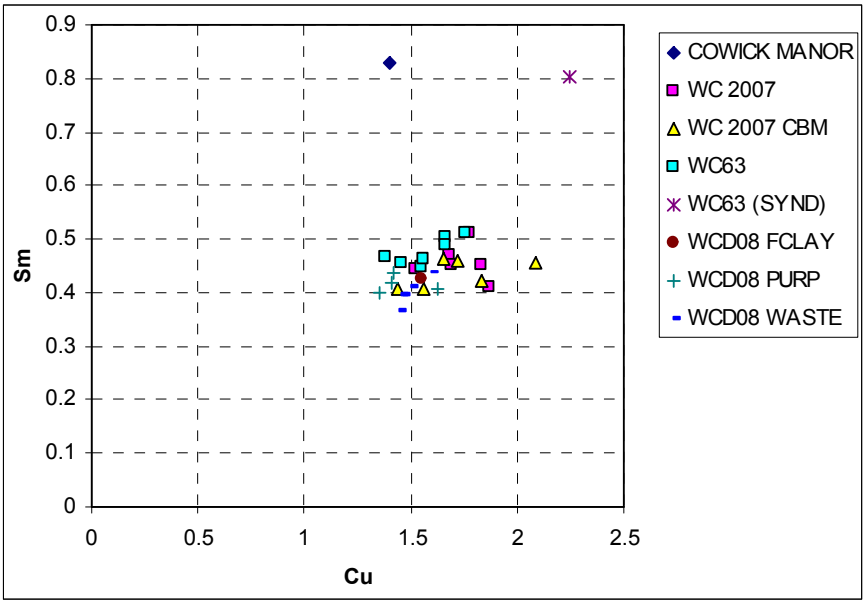

Figure 4

Bibliography

Cumberpatch, C. G. (2004) South Yorkshire and north Derbyshire medieval ceramics reference collection. http://ads.ahds.ac.uk/catalogue/specColl/ceramics_eh_2003/

Didsbury, P. and Watkins, G. (1992) "The Pottery." in D. H. Evans and D. G. Tomlinson, eds., *Excavations at 33-35 Eastgate, Beverley, 1983-86*, Sheffield Excavation Reps 3 J R Collis Publ, Sheffield, 81-120

(2002) *WinSTAT(r)*. Fitch, Robert K. R. Fitch Software. 2001

Vince, Alan (2007) *Characterisation Studies of Humberware pottery and ceramic building material from West Cowick, East Yorkshire (OSA07 EV08)*. AVAC Reports 2007/93 Lincoln,

Watkins, J. G. (1987) "The pottery." in A. Armstrong and B. S. Ayers, eds., *Excavations in High Street and Blackfriargate*, Hull Old Town Rep Ser 5

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V5008	18.75	6.95	2.67	1.47	0.41	3.34	0.78	0.17	0.095
V5009	18.59	6.86	2.41	1.28	0.37	3.27	0.76	0.13	0.091
V5010	17.12	6.00	2.02	1.30	0.37	3.16	0.69	0.12	0.086
V5011	18.68	6.90	2.32	2.17	0.44	3.30	0.74	0.12	0.097
V5012	19.15	6.83	2.50	1.38	0.41	3.39	0.77	0.12	0.089
V5013	21.88	7.57	3.18	1.59	0.44	3.76	0.87	0.17	0.115
V5014	19.96	7.20	2.51	1.31	0.47	3.62	0.80	0.18	0.095
V5015	20.52	7.39	2.81	1.37	0.44	3.68	0.84	0.15	0.108
V5016	19.08	6.66	2.55	1.37	0.35	3.35	0.77	0.21	0.093
V5017	19.04	6.73	2.35	0.98	0.37	3.44	0.79	0.21	0.085

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V5008	469	89	30	103	59	17	113	120	27	76	45	84	47	8	2	5	3	753	93	20
V5009	455	85	28	96	58	17	109	120	29	85	46	83	48	8	2	5	3	2,029	90	19
V5010	472	68	25	97	51	15	108	99	19	39	40	72	42	7	1	4	2	607	83	16
V5011	469	84	27	106	57	16	121	119	25	62	44	81	46	7	2	5	3	35	89	19
V5012	468	87	28	112	58	17	112	121	26	80	45	87	47	8	2	5	3	37	90	19
V5013	504	107	34	134	71	20	118	141	33	73	55	103	57	9	2	6	3	27	106	23
V5014	507	93	27	106	52	17	114	119	26	64	46	85	48	8	2	5	3	402	99	19
V5015	511	101	29	113	62	18	117	126	23	63	48	91	50	9	2	5	2	2,084	98	20
V5016	496	115	27	98	56	17	114	123	26	80	46	88	48	8	2	5	3	1,125	96	19
V5017	499	117	31	103	48	17	109	123	26	75	46	84	48	8	2	5	3	627	97	17