

Characterisation studies of medieval coarsewares from Wawne, East Yorkshire (OSA02 EX02)

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A small quantity of handmade, unglazed medieval coarsewares were present at Wawne. Some were probably used in the earliest phase of settlement, in the mid 12th century or later, whilst others, from their size and condition, were thought possibly to predate the settlement and relate to an earlier phase of ploughing, perhaps in the late 11th to mid 12th centuries.

To try and define these wares more precisely, 12 samples were chosen for petrological and chemical analysis (Table 1). Following the system used at Beverley, those samples with a black core and, sometimes, oxidized surfaces were coded as Reduced Chalky ware whilst those with light brown surfaces, with or without a reduced or black core were coded as Staxton-type ware. It was realised, however, that none of these latter sherds were identical to those produced at Potter Brompton and Staxton, in the Vale of Pickering and one of the objectives of this study was to test whether or not there was indeed any difference in composition between the two groups or whether they were simply different potting traditions carried out using indistinguishable materials.

Table 1

TSNO	Action	cname	Context
V2087	TS;ICPS	REDC	1127
V2088	TS;ICPS	REDC	1130
V2089	TS;ICPS	REDC	1139
V2090	TS;ICPS	REDC	1161
V2091	TS;ICPS	QC	1203
V2092	TS;ICPS	QC	1220
V2093	TS;ICPS	STAX	1139
V2094	TS;ICPS	STAXT	1149
V2095	TS;ICPS	STAXT	1151
V2096	TS;ICPS	STAXT	1163
V2097	TS;ICPS	QC	1197
V2098	TS;ICPS	STAXT	1220

The results of this analysis were to show that the Reduced Chalky and Staxton-type wares do indeed have identical fabrics. Furthermore, they compare closely with three samples of Reduced Chalky ware from Beverley itself (V576-8). However, three samples, two initially classed as 'Reduced Chalky' and one as 'Staxton-type' have a quite different fabric in thin section. Since the source of these three sherds is quite unknown at present, they have simply been coded as QC, the Humberside code for wares with a mixed calcareous and quartzose sand or gravel temper.

As for the coding of the remaining samples, it is by no means certain that the two groups are actually distinct, even in terms of typology and treatment, and it is probably more accurate to group the two wares together.

Petrological analysis

Thin sections were produced by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). This staining distinguishes non-ferroan and ferroan calcite from dolomite. Each section was then examined and a list of inclusion types present in the samples was made. The sections were then re-examined in detail, recording the presence/absence of each type, the size range, sorting and other relevant characteristics. The resulting data was then used to divide the samples into sub-fabrics and a description written for each sub-fabric.

Quartzose Calcareous Coarseware (QC)

Three samples of this fabric were identified in thin section, V2091, V2092 and V2097. Each of the samples comes from an oxidized vessel, sometimes with a light grey core. However, in contrast with the Reduced Chalky and Staxton-type ware samples, there is no sharp boundary between the core colour and the margins and no evidence for carbon present in the body. The samples have a moderately-well sorted sand temper and inclusionless groundmass. The inclusions consist mainly of subangular quartz grains up to 0.5mm across with some larger rounded quartz grains, up to 1.0mm across, which may be of lower Cretaceous origin. The next most common inclusion consists of fragments of an oolitic limestone. This limestone contains non-ferroan calcite oolites, up to 1.0mm across, most of which are present as individual oolites. It is normally only possible to distinguish a single coating in the oolites, which have been mainly altered to amorphous micrite. The cement in one case consists of sparry non-ferroan calcite but is usually sparry ferroan calcite. Rare rounded examples of sparry non-ferroan calcite, a marl consisting of a mixture of clay and ferroan calcite and echinoid shell were also present. Sparse rounded fragments of chalk were present and identified by their microfossil content. They have a pinker or redder colour than the oolitic limestone and this may be due to their natural colour rather than to staining. Rounded or subangular opaque grains are present in all the samples.

A very small proportion of the sand is feldspar, mostly small microcline grains, and there are also a few rounded fragments with a perthitic texture. Sandstones with a ferroan calcite cement, sandstones with an opaque cement, chert and fresh angular flint are present but rare.

The groundmass consists of baked clay minerals with few visible inclusions. Laminations running approximately parallel with the walls of the vessels were prominent in each sample.

The source of this ware is completely unknown. The oolitic limestone is most probably of upper Jurassic age, and the nearest source to Wawne is the Lincolnshire Limestone. However, the fabric also includes material of Upper Cretaceous age: chalk and flint. The clay matrix is similar in appearance to those of Jurassic age and was probably oxidized and non-organic when dug. This however does not

help to localise the source since organic Jurassic clays oxidize easily when not waterlogged. The lack of either fine-grained basic igneous rock or a significant quantity of rounded chert suggests that neither the sands of the Trent valley or those derived from glacial deposits on either side of the Humber could have been the source of the sand in these samples. However, the presence of chalk and fresh flint excludes potential sources further south – even as close as Lincoln, since the outcrops of the chalk and Jurassic oolite are further and further apart as one moves southwards from the Humber.

Reduced Chalky and Staxton-type wares

The remaining nine samples all have a very similar appearance. All are from vessels with a dark grey or black core. The outer surfaces too may be dark but are more often oxidised, with a sharp boundary between the core and the margin. This is probably an indication that the parent clay was organic and that there was still carbon present in the clay after firing. This dark core is not a feature of Beverley glazed wares or Beverley Coarsewares, nor of any of the ceramic building material from Wawne, Beverley or Hull.

The samples all have a sandy texture with sparse larger rounded calcareous inclusions, which are typically burnt out, leaving a void which may be lined with light brown alteration products. Three samples of Reduced Chalky ware from Lurk Lane in Beverley, however, still have their calcareous inclusions present and these show that in the main they consisted of rounded chalk. The most common inclusions are quartz grains, of which the larger grains are well-rounded and probably include examples from lower Cretaceous deposits. The next most common inclusion type consists of rounded fine-grained basic igneous rock fragments up to 0.5mm across, followed by angular flint, plagioclase and microcline feldspars, mudstone or clay pellets and opaque grains up to 0.3mm across. Occasional fragments of rounded micaceous siltstone and chalcedony were noted. The groundmass consists of moderate to abundant quartz and muscovite silt.

The characteristics of this fabric are consistent with an East Yorkshire source and include material which is probably derived from the Boulder Clay. More specifically, there is a strong similarity between this fabric and that of Beverley glazed ware, some of which also contains rounded chalk grains, albeit less common than in this fabric. The ware may therefore be a Beverley product or it might have been produced at a separate East Yorkshire locality exploiting very similar raw materials.

Chemical analysis

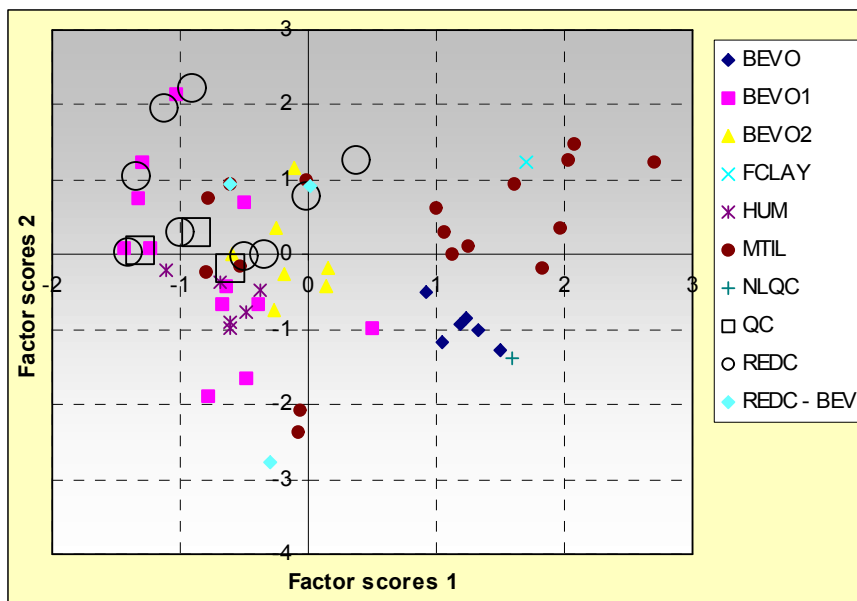
Sub-samples for chemical analysis were taken from all 12 samples and submitted to Dr J N Walsh, Royal Holloway College, London, and analysed using Inductively Coupled Plasma Spectroscopy. A range of major, minor and trace elements were measured. The approximate percentage of silica was calculated by subtracting the sum of the major elements from 100% (Table 1). This indicates that the two wares have similar silica percentages, although the mean percentage is higher for the REDC/STAX samples. Three samples of REDC from Lurk Lane, Beverley, were also included. Unlike the Wawne samples, these three retained their chalk inclusions, which may explain their lower mean silica content.

Table 2

% Silica	QC	REDC	REDC - BEV	Grand Total	
70-1		2	2	2	6
71-2		0	1	0	1
72-3		1	0	0	1
73-4		0	1	0	1
74-5		0	2	1	3
75-6		0	0	0	0
76-7		0	2	0	2
77-8		0	1	0	1
Grand Total		3	9	3	15
Mean	71.28%	73.85%	71.99%	72.96%	

The data were then normalised by dividing each measured element value by that of Al₂O₃. This procedure was carried out to counteract the dilution effect caused by differences in quartz content. The data were then analysed using Factor Analysis. This analysis found, surprisingly, that within this dataset the principal factor determining similarity and differences in composition depended to the greatest extent on the MgO content. MgO is present in dolomite, which was not noted in any of the samples, and has a higher mean value in the QC samples than in the remainder, although their ranges overlap. Factor 1 scores also depend on negative weightings for Ce and La, two Rare Earth elements. For these, however, there is no apparent difference between the QC and remaining samples either in their ratio or absolute frequency. The second Factor includes high weightings for P₂O₅, Ba, Sr and Zn, all of which are likely to be associated with post-burial phosphate enrichment, and are all much higher in the Lurk Lane samples, and negative scores for Li, TiO and MgO. This may indicate that leaching of these three elements occurred at the same time as the phosphate deposition (or that these elements were enriched during burial at Wawne. The chemical differences between the QC and other samples are therefore relatively few and are probably masked by the post-burial alteration of the samples.

A second analysis was carried out omitting P₂O₅, Ba, Sr, Zn, and CaO and including data from samples of Beverley pottery and CBM, together with the Wawne CBM data. A plot of F1 against F2 for this analysis (Fig 1) shows that the dataset divides into two, with the QC and the REDC/STAXT samples having similar compositions to the Beverley pottery samples whilst the CBM samples are distinguished by high F1 scores, to which high Fe₂O₃, MgO and Na₂O values are the main contributors. The QC and the REDC/STAXT samples have high F2 scores, but within the range found in the Beverley glazed wares. The main elements contributing to these scores are Rare Earth elements, Nd, La, Sm and Dy.



Factors 3 and 4 provide no further information about the relationship of these fabrics and a plot of F3 against F4 (not illustrated) is dominated by an extremely high F4 score for one of the QC samples, the result of a high Ni and Co content. The Ni and Co content of the other two QC samples falls within the same range as for the remaining samples. It is not known why the sample should have such a high Ni/Co content and both the Fe₂O₃ and MnO values are no higher than those in the rest of the dataset.

A third Factor Analysis analysis was carried out including samples of pottery from the production site of Staxton, in the Vale of Pickering. These had a clearly distinguishable composition, confirming that the Staxton-type ware from Wawne is not from Staxton.

In this case, the chemical analysis provides supporting evidence for a Beverley source for the Reduced Chalky and Staxton-type ware samples but also suggests a local source for the QC samples, in contrast to the petrological analysis.

Appendix: ICPS Data

Major elements measured as percent oxides

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2087	14.76	7.12	1.34	1.05	0.66	2.47	0.72	0.92	0.04
V2088	15.94	6.81	0.92	1	0.62	2.14	0.67	0.41	0.058
V2089	14.03	4.05	0.67	0.99	0.69	1.52	0.61	0.3	0.107
V2090	14.35	4.21	0.71	1.04	0.66	1.57	0.68	0.33	0.04
V2091	13.1	4.23	0.96	5.87	0.26	1.73	0.51	0.3	0.044
V2092	13.66	4.67	1.06	6.4	0.31	2.08	0.56	0.34	0.081
V2093	16.68	3.95	0.89	1.28	0.68	1.77	0.82	0.25	0.02
V2094	13.72	4.66	0.65	2.05	0.52	1.43	0.63	0.24	0.046
V2095	16.25	4.26	0.85	1.25	0.71	1.73	0.71	0.21	0.025
V2096	14.66	4.95	0.97	1.67	0.59	1.7	0.67	0.29	0.032
V2097	14.01	5.05	1.12	6.25	0.31	2.26	0.54	0.38	0.065
V2098	16.64	6.02	1.24	1.85	0.62	1.97	0.73	0.23	0.036

Minor and trace elements measured as parts per million

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2087	478	95	28	66	43	14	153	116	23	53	43	93	44.556	8.4	1.644	4.4	2.2	63.94	89	16
V2088	682	92	40	69	55	15	110	101	24	58	45	99	46.342	8.5	1.5595	4.3	2.2	197.76	76	17
V2089	633	75	33	65	41	12	103	89	18	50	36	84	36.942	6.6	1.1975	3.3	1.7	64.77	67	12

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2090	605	77	22	62	37	12	112	90	19	62	37	76	37.882	6.2	1.2895	3.3	1.8	51.35	67	12
V2091	476	84	15	69	36	11	154	101	18	51	35	66	36.002	5.7	1.0885	3.3	1.9	42.9	52	9
V2092	633	97	23	64	121	12	171	107	19	54	36	74	36.942	6.1	1.1665	3.3	2	41.64	57	105
V2093	565	94	20	84	33	13	131	97	15	49	44	89	44.274	7.1	1.2025	3.1	1.7	60.62	74	15
V2094	484	75	18	60	32	11	122	87	15	44	37	78	37.506	6.2	1.167	2.9	1.6	54.48	45	11
V2095	617	89	23	76	40	15	121	102	20	51	45	99	45.966	8.4	1.487	3.9	1.9	59.95	76	15
V2096	626	86	19	72	42	14	130	99	23	53	43	99	44.65	8.3	1.5525	4.5	2.2	54.44	57	16
V2097	707	90	20	72	43	12	169	102	21	51	39	79	39.95	6.6	1.2475	3.5	2	49.59	63	14
V2098	608	98	20	88	47	16	144	114	24	55	50	105	51.324	9.2	1.799	4.6	2.2	48.46	69	16

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Bibliography

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