Characterisation of early Anglo-Saxon Pottery from Barnetby-le-Wold, Lincolnshire

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Archaeological evaluation carried out at Manor Farm, Barnetby-le-Wold, produced a small quantity of early to mid Anglo-Saxon pottery. Assessment of this material suggested that although there were visual variations in the fabric of the vessels they were all probably produced using the same raw materials and that, by eye, this appeared to be of local origin. Furthermore, a survey of existing data on early to mid Anglo-Saxon pottery in the Vale of Ancholme and Lincolnshire Wolds area suggested that there were very few sites where 'handmade pottery of Early Anglo-Saxon date was present without also producing sherds of Mid Saxon Northern Maxey-type ware. Furthermore, the fabric appeared visually to be finer in texture than that of other handmade pottery of early Anglo-Saxon type from the area. This presented a possibility for defining a pottery type in this area which did not extend in use into the mid Saxon period, and therefore would provide a useful chronological marker.

Samples of a single vessel, a bowl with a hemispherical form and flaring rim, were take for thin section and chemical analysis.

Petrological Analysis

A thin section was produced by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). This staining distinguishes non-ferroan calcite, ferroan calcite and dolomite. The section was added to the AVAC reference collection under the code V2601.

Description

The following inclusion types were noted in thin section:

- Subangular quartz. Abundant grains up to 0.5mm across.
- Angular ferroan calcite. Moderate fragments, mainly from c.0.2mm to 0.5mm across.
- Sandstone fragments with ferroan calcite cement. Sparse fragments up to 1.0mm across. Some of these fragments have a mixture of ferroan calcite and brown clay, with the ferroan calcite apparently being secondary.
- Sandstone fragments with sparry dolomite cement. A single fragment, 1.0mm across
- Rounded quartz. Moderate well-rounded fragments from c.0.3mm to 1.0mm across.

- Fine-grained siltstone/sandstone. A single fragment, 1.5mm across.
- Coarse-grained sandstone with some kaolinite cement. Sparse fragments, up to 2.0mm across
- Organic inclusions. Sparse fragments, probably of chaff, up to 3.0mm long and 0.3mm wide.
- Rounded phosphate. Sparse fragments up to 0.5mm across.

The groundmass consists of anisotropic baked clay minerals with sparse angular quartz and muscovite laths up to 0.1mm long.

Interpretation

Most of these inclusions probably originated in Lower Cretaceous sandstones which outcrop along the western edge of the Lincolnshire Wolds. However, the coarse-grained sandstone fragments, which include the largest inclusion in the sample, are probably of more distant origin, almost certainly the lower Carboniferous of the Pennines. These fragments suggest that the parent clay is a boulder clay.

Since the Lower Cretaceous sandstones do not outcrop north of the Humber and the sample contains neither chalk or flint this clay can only have been deposited to the south of the estuary and west of the Wolds. This is precisely the location of Barnetby-le-Wold and it is therefore clear that this sample, and by implication the remaining pottery in the assemblage, was made from clay deposited east of the Ancholme, south of the Humber and west of the Wolds.

Comparanda

Grains of water-polished, well-rounded quartz, similar to those seen in this section, are a diagnostic feature of fabric ESGS. Examples of this fabric from various sites in the east Midlands and northern England have been thin sectioned (Table 1). None of these compares well with the Barnetby sample. In most cases, the rounded quartz grains are larger and not accompanied by the finer subangular quartz. Furthermore, in some cases there are no calcareous inclusions, nor voids which might have contained them, and in several cases where such inclusions survive they include rounded chalk and sometimes mudstone (perhaps of Jurassic age), which is absent in the Barnetby fabric.

Table 1

TSNO	county	locality	Comments
AG197	North Lincolnshire	Flixborough	Glauconitic, fine sandy clay. Well-

TSNO	county	locality	Comments
			rounded grains have iron-rich veins
V0518	North Lincolnshire	Barton-upon-Humber	Mudstone inclusions and sandstone with high proportion of opaque cement.
V0519	North Lincolnshire	Barton-upon-Humber	Opaque cement fragments, rounded quartz grains are larger
V0520	North Lincolnshire	Barton-upon-Humber	Rounded chalk.
V0521	North Lincolnshire	Barton-upon-Humber	Rounded chalk.
V0522	North Lincolnshire	Barton-upon-Humber	Rounded chalk, angular opaque cement, igneous erratics
V0523	North Lincolnshire	Barton-upon-Humber	Rounded chalk, mudstones, rounded quartz grains are larger.
V1141	Lincolnshire	Dunholme	Rounded grains are larger. No calcareous inclusions.
V1255	Lincolnshire	Kirkby la Thorpe	Rounded chalk, mudstone inclusions.
V1256	Lincolnshire	Kirkby la Thorpe	Rounded chalk, mudstone inclusions.
V1543	North Yorkshire	York	No calcareous inclusions. Rounded quartz is larger.
V1861	East Yorkshire	Sancton	Calcareous inclusions leached? Rounded quartz grains larger.
V1957	South Yorkshire	Doncaster	Rounded quartz grains larger.
V1993	Nottinghamshire	Brough	Calcareous inclusions leached? Rounded quartz is larger.
V2568	North Yorkshire	York	No calcareous inclusions but these might have been leached.
V2601	Lincolnshire	Barnetby le Wold	

Chemical Analysis

A sample was prepared by Peter Hill and submitted to Royal Holloway College, London, where it was analysed using Inductively Coupled Plasma Spectroscopy (ICP-AES). A range of elements was measured, including major constituents (measured as percent oxides) and minor and trace elements (measured as parts per million).

An estimate of the silica content of the sample was obtained by subtracting the sum of the oxides from 100%. Fig 1 shows the estimated silica content of the Barnetby sample and of those of the samples listed in Table 1 together with data from a boulder clay sample from Barton upon Humber. It shows that the Barnetby sample has a high silica content matched only by the boulder clay.

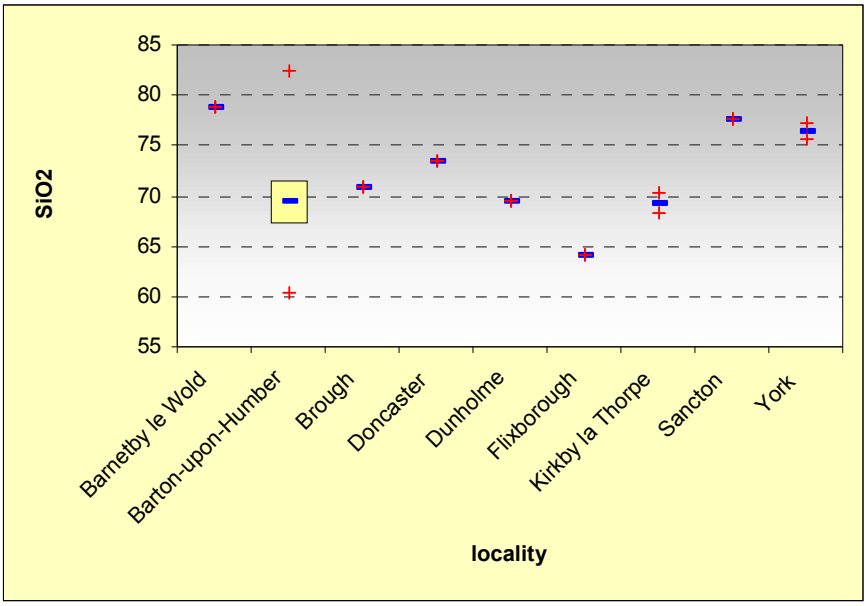

Figure 1

The data were normalised to Aluminium to take account of variations in silica content. Factor analysis was then used to study the dataset. This revealed seven significant factors. A plot of F1 against F2 (Fig 2) indicated that the Brough and Flixborough samples have a higher F1 score whilst the Dunholme sample and to a lesser extent the Barnetby sample have higher F2 scores than the remainder.

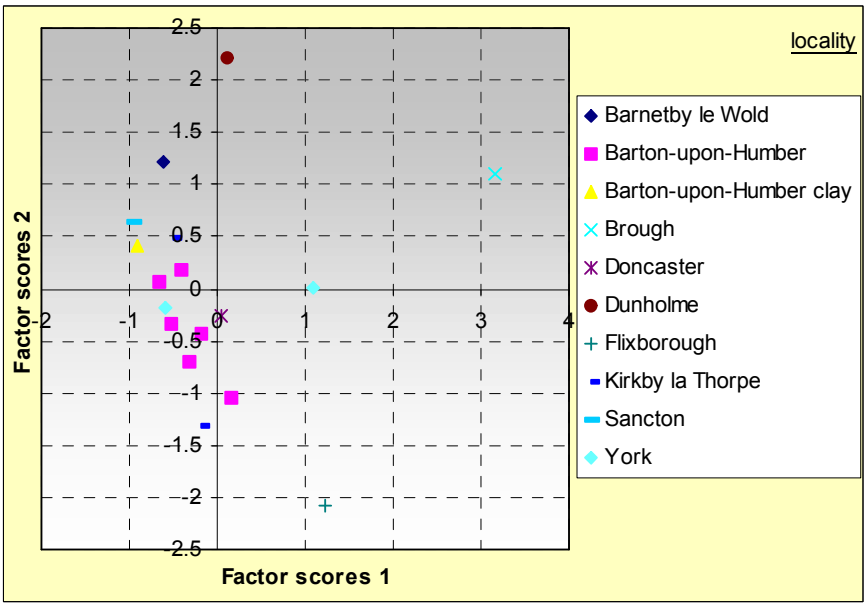

Figure 2

A plot of F3 against F4 (Fig 3) shows that one of the two York samples have a high F3 score whilst the Barnetby sample has a high F4 score, as does the Flixborough sample to a lesser degree.

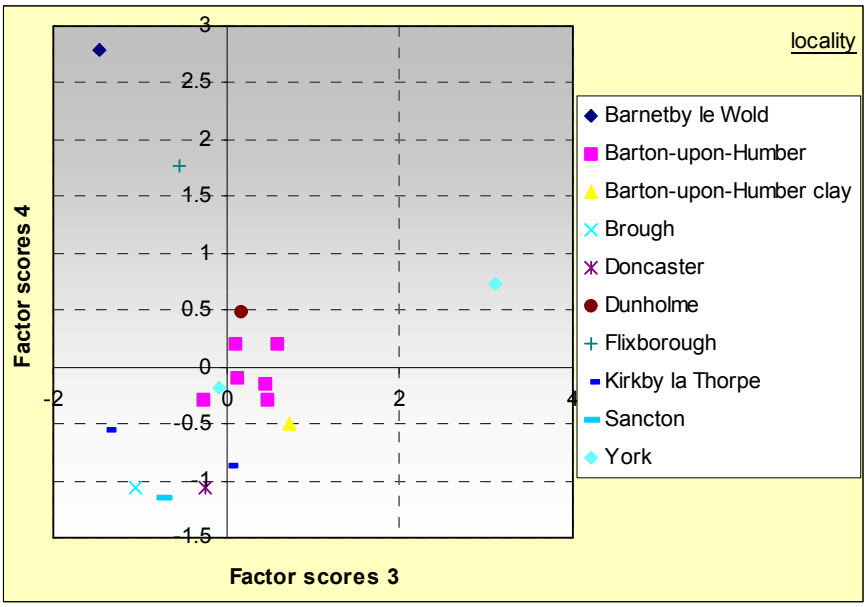

Figure 3

A plot of F5 against F6 (Fig 4) indicates that one of the York samples and the Barton clay sample have negative F5 scores and positive F6 scores whilst the two Kirkby la Thorpe, Doncaster and Dunholme samples have negative F5 and F6 scores.

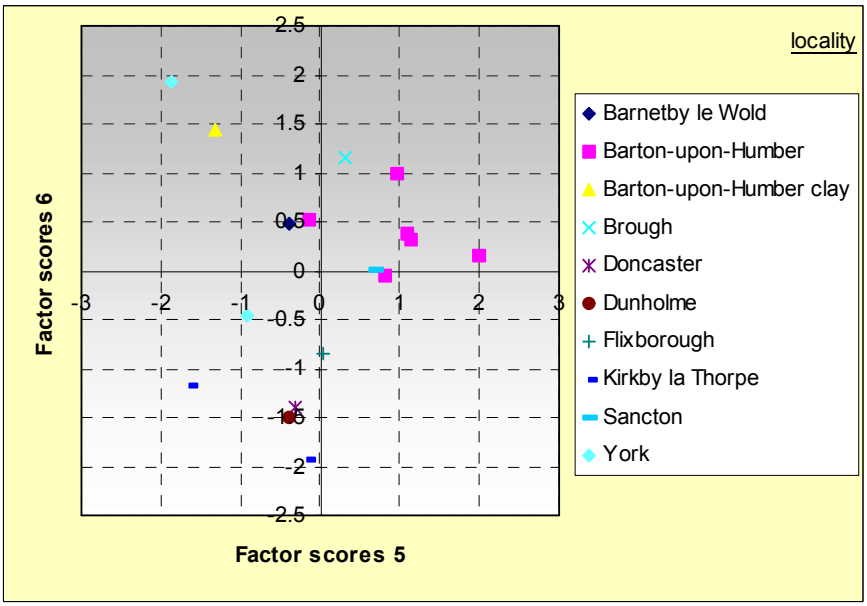

Figure 4

This analysis indicates differences in composition between the samples, with the Barnetby sample being distinguished in particular by its F2 and F4 scores. These are due in the main to Rare Earth Elements (F2) and Cobalt and Nickel (F4). Such trace elements may be affected by burial conditions, as percolating groundwater can both penetrate the fabric and be leached from it. As a check, the analysis was repeated using the least mobile elements. This analysis found only three factors. A plot of F1 against F2 (Fig 5) indicates that the Brough, Flixborough and York samples and the Barton clay sample can be distinguished whilst the Barnetby sample plots with the remainder. The F3 scores (not plotted) likewise show the Barnetby sample to be indistinguishable from the Barton and Doncaster samples.

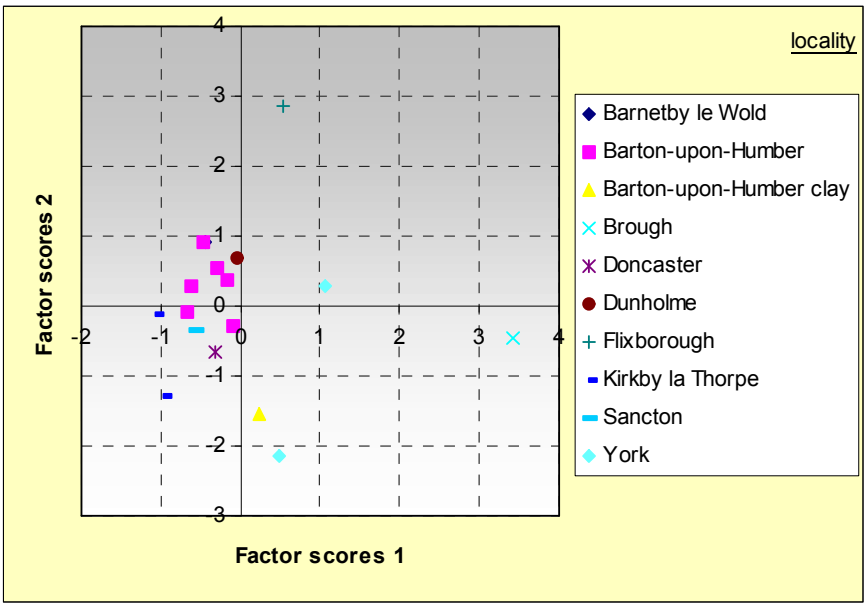

Figure 5

Discussion and Conclusions

The thin section analysis clearly indicates that the Barnetby fabric is different in detail from others which contain polished, well-rounded quartz grains of lower Cretaceous origin. Six contain chalk (4 from Barton and two from Kirkby la Thorpe); four contain mudstone probably of Jurassic origin (two from Barton and two from Kirkby), one was made from a glauconitic clay (Flixborough) and three contain fragments of sandstone with an opaque cement (all from Barton). This leaves six samples, all of which do not contain the subangular quartz found at Barnetby and where the rounded quartz grains are larger. Of these, the Dunholme and York samples probably contained no calcareous inclusions whilst the three others, from Sancton, Doncaster and Brough, either still contain ferroan calcite (Doncaster) or are leached.

The chemical composition of the Barnetby sample indicates differences between its clay and that of the remaining samples, but this is based on two Rare Earth elements and two minor

metals, which might be mobile in archaeological contexts. When only the major and least mobile elements are studied the Barnetby sample cannot be distinguished from the Barton, Doncaster, Dunholme, Kirkby la Thorpe or Sancton samples whereas there are differences in composition between these samples and those from Flixborough, Brough and York.

By combining these two lines of evidence, we can therefore characterise the following groups:

a) Barnetby le Wold

b) Barton upon Humber /Kirkby la Thorpe (containing sandstones with an iron-rich cement, rounded chalk and mudstones)

c) Flixborough (the only fabric made from a glauconitic clay)

d) Dunholme and York (larger rounded quartz grains and no evidence for calcareous inclusions)

e) Sancton, Brough and Doncaster (containing larger rounded quartz grains than Barnetby, some in a ferroan calcite matrix)

The chemical data suggest that group d might include vessels which do not originate in the Lincolnshire Wolds (e.g. the two York samples) whereas all the others are either linked to the Wolds by their petrology or chemical composition.

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
AG197	12.79	16.64	0.87	1.2	0.11	1.66	0.51	2.00	0.03
V0518	16.7	7.62	1.1	2.55	0.2	2.38	0.77	1.27	0.07
V0519	15.12	8.17	1.22	2.92	0.28	2.43	0.65	1.05	0.11
V0520	14.61	5.45	1.16	2.65	0.22	3.01	0.59	0.84	0.06
V0521	15.34	7.57	1.23	2.36	0.33	2.6	0.74	0.34	0.05
V0522	17.96	12.24	1.09	3	0.15	2.45	0.73	1.84	0.12
V0523	16.19	5.46	1.31	2.39	0.26	2.81	0.67	0.5	0.05
V1141	13.21	9.63	0.98	1.42	0.18	2.22	0.68	2.17	0.04
V1255	17.23	7.54	1.27	1.54	0.26	2.72	0.83	0.36	0.03
V1256	18.23	3.57	1.1	2.79	0.42	2.01	0.61	1	0.03
V1543	12.93	3.31	1	1.4	0.42	2.14	0.44	0.96	0.09
V1861	12.32	5.82	0.85	0.8	0.27	1.62	0.47	0.17	0.042
V1957	14.78	4.1	1.19	1.9	0.27	2.03	0.68	1.43	0.057
V1993	14.99	4.64	1.28	2.24	0.17	1.6	0.5	3.59	0.124
V2568	10.59	4.61	1.53	2.59	0.418	2.14	0.79	1.63	0.061
V2601	11.26	3.52	0.58	2.57	0.152	1.48	0.44	1.15	0.034

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
AG197	1018	92	30	54	78	12	174	128	16	56	33	79	2	3	0.8	2.1	0.9	not measured	263	23
V0518	785	125	117	64	82	16	175	139	24	264	42	141	34	7	1.9	3.7	2.1	157	150	20
V0519	411	108	54	56	53	14	134	135	25	169	38	80	27	7	1.2	3.6	2	156	110	15
V0520	598	104	58	55	50	14	142	137	16	103	34	83	22	6	1.1	2.6	1.6	80	136	16
V0521	353	117	40	98	57	15	155	117	22	143	37	100	28	6	1.5	3.6	1.9	134	112	18
V0522	770	123	32	84	41	16	232	129	16	93	40	81	28	6	2.0	2.8	1.9	62	86	16
V0523	419	119	56	56	71	15	123	131	24	101	44	101	33	8	1.4	3.7	1.9	97	105	16
V1141	407	77	35	25	62	12	179	94	25	93	58	110	59	8	1.9	5.2	3	36	224	15
V1255	285	107	32	32	54	16	135	125	32	135	47	84	49	8	1.6	5.5	2.8	39	74	14
V1256	443	95	27	78	57	17	183	126	21	123	28	45	29	3	0.9	3.5	2.3	54	100	11
V1543	756	71	25	73	38	9	180	72	14	43	32	58	33	5	1.1	2.6	1.2	58	107	11
V1861	364	80	177	58	39	11	61	101	17	65	34	59	34	5	0.9	2.8	1.7	28	74	10
V1957	506	95	36	36	37	14	134	112	22	98	36	58	37	5	1.0	3.6	2.4	143	141	9
V1993	2959	96	48	87	52	18	353	123	46	68	45	77	49	11	2.3	7.7	3.6	49	599	10
V2568	696	63	42	37	52	11	168	72	26	93	31	46	34	4	1.8	5.2	2.1	38	188	16
V2601	395	77	32	58	84	10	114	93	21	65	39	83	39	6	1.0	2.9	2.6	49	109	24

Bibliography

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