An Unidentified Sandy Ware from Micklefield, West Yorkshire (C4SA)

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The excavation at Site C4SA revealed evidence for a settlement of Roman date. However, one feature produced a sherd of unknown date which was submitted to the author and to Jane Young for comment. We believed that it was possible, from the thin, fast-wheelthrown globular form of the vessel that it was a jar of Anglo-Scandinavian date from the Stamford industry. No examples of the earliest known phase of the Stamford industry (the Castle kiln, thought to date to the 870s or soon after) had at that time been analysed and accordingly six samples from the Castle kiln were thin sectioned and chemical analyses obtained (using ICP-AES) to compare with samples of the C4SA sherd.

Description

The C4SA sample was given the identifying code V2717 and the Stamford samples were given the codes V2757 to V2762. The thin section have been added to the AVAC reference collection and the chemical data are listed in Appendices 1 and 2.

The thin sections were produced by Steve Caldwell, University of Manchester, and were stained using Dickson's method to distinguish dolomite, non-ferroan calcite and ferroan calcite.

Thin section analysis

Micklefield

The following inclusions were noted in thin section:

- Subangular quartz. Abundant monocrystalline grains up to 0.3mm across and a small amount of polycrystalline strained quartz of similar size and shape
- Fine-grained sandstone. Sparse subangular fragments up to 0.3mm across composed of interlocking quartz grains (strained and unstrained, c.0.2mm across). Also one rounded grain up to 1.0mm across.
- Rounded quartz. A single rounded polycrystalline grain (strained with formation of small euhedral crystals) 1.0mm across.
- Chert. Sparse subangular fragments up to 0.3mm across composed of cryptocrystalline quartz with a variable quantity of amorphous brown inclusions.

- Angular feldspar. Sparse untwinned, fresh feldspar up to 0.3mm across.

The groundmass consists of isotropic baked clay minerals and moderate angular quartz and has a texture which suggests it might have been formed from a calcareous marl, although the dark brown/red colour of the clay suggests that any calcareous matter was not common.

The range of inclusions present in this sample suggest that it was tempered with a sand derived from Triassic strata. Similar sands occur in South Yorkshire, Nottinghamshire and the Trent valley. The groundmass is similar to vessels produced from weathered Mercian Mudstone but is not distinct enough for a positive identification. This is also true for the sand temper, which occurs widely in Lincolnshire, for example as blown sand on the Lincolnshire Jurassic scarp and in various Quaternary sands along the fen edge and dip slope of the limestone scarp. The fabric is very different in detail from any seen in North or West Yorkshire although Triassic strata do underlie the boulder clays and other quaternary deposits which partially fill the Vale of York.

Castle Kiln, Stamford

The following inclusions were noted in the six thin sections:

- Rounded quartz. Moderate rounded grains, mostly monocrystalline and unstrained, up to 0.3mm across.
- Subangular quartz. Moderate grains up to 0.3mm across
- Chalcedony. Sparse spherical grains c.0.1-0.2mm across
- Rounded dark brown clay/iron pellets. Sparse fragments up to 1.0mm across.
- Light-firing clay pellets. Sparse to moderate rounded pellets up to 0.5mm across with no visible inclusions. There is no sign of bedding in these fragments, which are therefore not classed as mudstone. They are probably relict clay.
- Fine-grained sandstone. Sparse angular fragments up to 1.5mm across composed of interlocking quartz grains c.0.1mm to 0.2mm across.
- Calcite-cemented fine-grained sandstone. Sparse angular fragments up to 1.5mm across composed of angular quartz grains up to 0.2mm across in a matrix of non-ferroan fine-grained calcite (micrite).
- Plagioclase feldspar. Sparse fragments up to 0.3mm across.

The groundmass consists of light-firing laminated anisotropic baked clay minerals with few visible inclusions.

Interpretation of petrological data

Although in the hand the Micklefield and Stamford wares have a similar texture, thin section analysis reveals clear differences between the two groups, both in their inclusions and the groundmass. Of these, the most important is that the Stamford ware was produced in a light-firing clay with a low iron content (albeit a somewhat higher iron content than later Stamford ware). The Stamford potters are known to have exploited the Lower Estuarine beds which outcrop below the Northampton Sands along the Jurassic scarp and are exposed more extensively where the Welland cuts through the scarp. Despite some variation in colour, and presumably therefore iron content of the groundmass, the Stamford samples were all produced from this same light-firing clay. Therefore, thin section analysis allows us to disprove a possible Stamford origin for the Micklefield sample. It also suggests a source to the southeast of Micklefield, probably south of the Humber but does not pinpoint any source or provide sufficient distinctive features for thin section analysis to even pinpoint this source.

Chemical Analysis

A range of major and minor elements were measured using Inductively Coupled Plasma Spectroscopy under the supervision of Dr J N Walsh, Royal Holloway College, London. The major elements were measured as percent oxides (Appendix 1) and the minor and trace elements were measured in parts per million (Appendix 2).

Although silica content was not measured, it was estimated by subtracting the total quantity of measured major elements from 100%. For the Micklefield sherd the estimate is 66.47%and for the Stamford ware is 67.00% +/- 2.57%. Both wares therefore have similar silica contents.

The raw ICPS data were normalised by division by the Aluminium values and the resulting data were then examined using factor analysis, alongside samples from the Torksey kilns, as an example of a Trent valley sand-tempered ware probably utilising weathered Mercian Mudstone clay, and Stamford wares from Wetherby, Durham and Viborg (Denmark).

Figure 1 shows a bi-plot of the two factors revealed by factor analysis of the major elements. It shows that the Micklefield sample is similar in composition to the Torksey samples and that the Stamford samples form a discrete cluster, although sharing their negative F1 scores with the other Stamford ware samples.

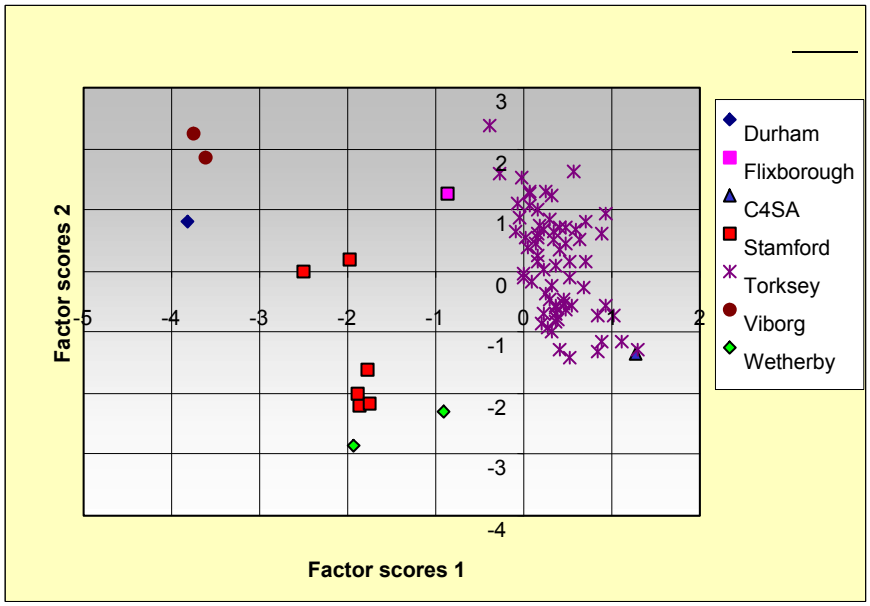

Figure 1

Conclusion

The C4SA sherd is clearly not a Stamford product but does appear to have been produced in the East Midlands, i.e. south of the Humber, possibly in the Trent valley.

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2717	18.50	8.65	1.78	0.29	0.43	3.02	0.73	0.07	0.060
V2757	22.07	2.53	0.26	1.35	0.30	0.79	1.18	0.49	0.006
V2758	20.97	3.23	0.28	3.05	0.40	1.04	1.11	0.65	0.020
V2759	27.14	3.84	0.30	1.68	0.29	0.56	1.38	0.15	0.010
V2760	27.64	3.44	0.28	1.24	0.28	0.58	1.43	0.18	0.009
V2761	26.91	3.52	0.31	1.31	0.25	0.55	1.36	0.10	0.014
V2762	24.75	5.04	0.29	1.24	0.25	0.51	1.29	0.10	0.010

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2717	496	110	26	91	50	17	99	118	21	60	44	79	38	8	2	5	3	69	71	25
V2757	194	162	22	170	51	19	77	101	23	83	40	75	42	8	1	5	3	70	48	20
V2758	259	148	16	186	48	15	118	92	43	94	93	203	128	23	4	11	4	56	41	17
V2759	150	202	19	425	62	20	72	138	58	95	141	291	188	33	6	15	5	72	39	24
V2760	153	198	22	388	68	23	66	153	40	99	78	179	122	22	4	10	4	80	64	32
V2761	141	193	21	372	67	21	57	146	39	91	72	159	102	19	4	10	4	83	44	25
V2762	122	189	19	398	61	20	56	147	58	82	140	291	175	32	6	15	5	154	50	27