Characterisation studies of Anglo-Saxon pottery from Carshalton, Surrey (SCO03)

As a result of an assessment of the Anglo-Saxon pottery from Church Hill, Carshalton, Surrey, excavated by Sutton Archaeological Services (Site Code SCO03) a sherd was selected for further analysis. The aims of the analysis were to identify the rock and mineral inclusions present and to use these and the chemical composition of the sample to try and provenance the fabric.

Description

A thin section of the sample was prepared by S Caldwell of the Department of Earth Sciences, University of Manchester, and stained using Dickson's method. This staining allows ferroan calcite (blue stain) to be distinguished from non-ferroan calcite (pink stain) and dolomite (unstained). An offcut from the sample was mechanically cleaned to remove encrustations and soil and to minimise the effect of leaching by groundwater during burial. The resulting sample, weighing 1 to 2 gm, was crushed and submitted to Dr J N Walsh, Department of Geology, Royal Holloway College, London, for Inductively Coupled Plasma Spectroscopic Analysis (ICPS).

Petrological Analysis

Study of the thin section (V1990) revealed abundant subangular and rounded inclusions ranging from c.0.2mm to 2.0mm across. These inclusions form a mixed sand which includes the following types:

- sparry ferroan calcite including grains with concave facets indicating that they form the matrix to an oolitic limestone.
- Non-ferroan calcite ooliths
- Angular fragments of sandstone with grains up to 1.5mm across and a kaolinitic matrix. These are likely to be fragments of Carboniferous sandstone of Millstone Grit type
- Fragments of sandstone with subangular quartz grains in a sparry ferroan calcite matrix
- Laths of muscovite up to 0.5mm long
- Elongated voids, probably once containing organic inclusions such as chaff

The groundmass consists of anisotropic baked clay minerals with few inclusions apart from sparse rounded dark brown iron-rich grains..

The source of the calcareous sandstone is unknown, but similar rocks occur in the Jurassic and Cretaceous strata of midland and southeastern England. The oolitic limestone is clearly of Jurassic origin. The range of lithologies found within this type suggest that a number of strata contributed to the temper and this is consistent with a detrital sand. Millstone Grit type sandstone is found in

Quaternary fluvioglacial deposits throughout midland England. A river or glacier travelling southwards from the Peak district and across the Jurassic belt would have produced a range of inclusions similar to those in this sample. By contrast, the pre-Anglian terrace sands which outcrop on the highest terraces south of the present -day Thames are said to contain material of Triassic and north Walian origin, absent from this sample ({Sumbler 1996 #44853}, 115-8).

In sum, the thin section evidence suggests that the sand temper is a calcareous fluvio-glacial sand. Most of the till and fluvio-glacial deposits in the Thames Basin outcrop north of the Thames but it is possible that the sand temper comes from one of the higher Thames terraces south of the river.

Chemical Analysis

The frequency of major, minor and trace elements were measured using the RHCL standard procedure with the addition of lead (Pb). The major elements were measured as percent oxides and the remainder as parts per million. The frequency of quartz and organic matter, neither of which are measured in this process, was estimated by subtracting the total quantity of measured elements from 100%, giving a value of 69.66%. The data were then normalised by division by the value for $Al2O3$ in order to minimise the dilution effect caused by the variable amount of silica and organic matter present and the resulting data were compared with pottery and clay samples of local origin from various sites in Surrey and Greater London. A number of these comparative datasets were extremely different from the SCO03 sample and had the result of making differences between that sample and the remainder difficult to study. They were therefore excluded from comparison and the resulting data examined using the Winstat for Excel Factor Analysis package. Amongst those samples excluded were medieval whitewares from Kingston and Southwark and medieval wheelthrown greywares from a variety of kilnsites, from north of the Thames. More significantly, a group of early to mid Anglo-Saxon cheff-tempered wares from Staines were also excluded at this stage. A bi-plot of the two most important factors, F1 and F2 (Fig 1) shows that the SCO03 sample is similar in composition to some from Brockley Hill, the City of London, Westminster and Fulham and rather different from samples from Barking, Clapham, Clerkenwell, Enfield, Harmondsworth and Islington. A bi-plot of F3 against F4 separates the City of London samples whilst the Westminster samples are still plotted close to the SCO03 sample.

Within the City of Westminster samples, the closest match to the Carshalton sample comes from a group of vessels which contain coarse gravel temper including fragments of brown-stained flint. A source for these has been suggested in the area to the southwest of London. These samples, however, are petrologically distinct from the SCO03 sample but do support a local source for the vessel. Nevertheless, this result should be reviewed as further chemical analyses for pottery made in southwest London, Surrey and sites further west become available.

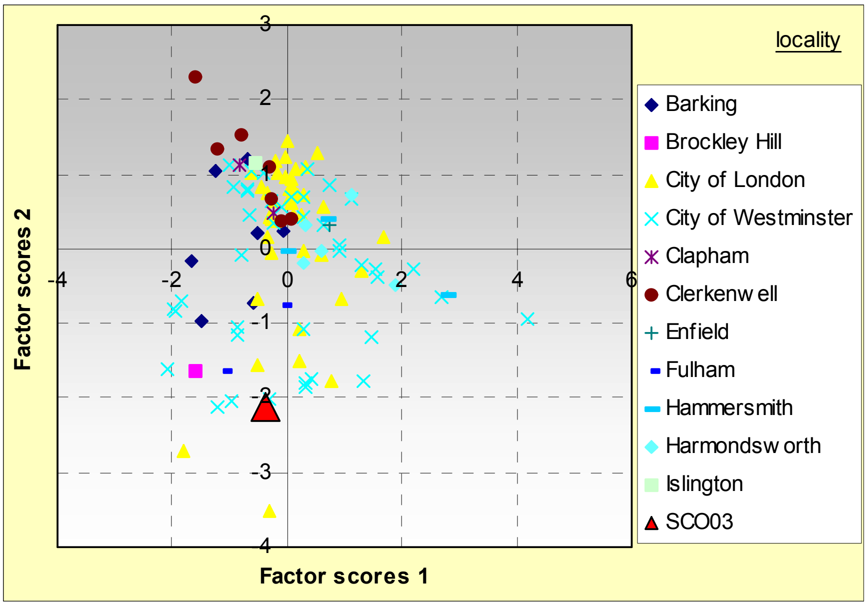

Figure 1

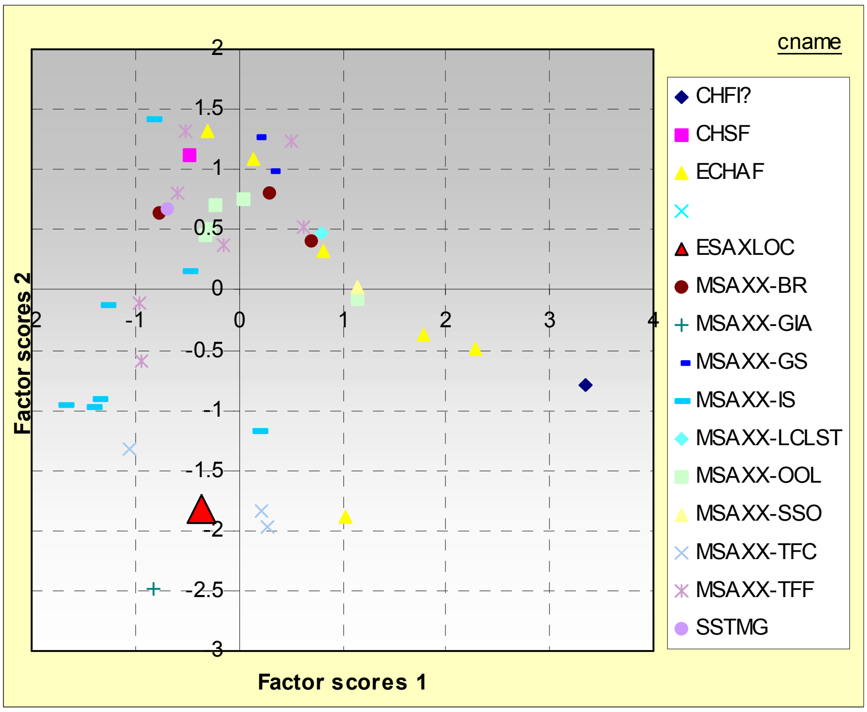

Figure 2

Conclusions

Thin section and chemical analysis suggest that this sample contains a calcareous sand of fluvio-glacial origin. A source for this sand to the south of the Thames is possible although the lack of distinct 'southern' rocks, derived from the lower Cretaceous, makes this unlikely. The chemical analysis, however, suggests that there are similarities between the clay in this sample and that of Anglo-Saxon vessels from the south-west of the Thames basin. Nevertheless, a source in Oxfordshire is perhaps preferable and the data should be re-examined when analyses of vessels from this area become available.

Appendix

Appendix 1a. ICPS Data major elements measured as percent oxides

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V1990	14.98	6.56	0.85	2.73	0.25	2.37	0.58	1.94	0.078

Appendix 1b. ICPS Data 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
V1990	730	90	26	41	54	14	252	110	21	66	43	68	44.18	6.232	1.372	4	2.3	100.92	125	14