Characterisation Studies of an Amphora from Union Terrace Car Park, York

Alan Vince

A base sherd identified as a possible example of a flat-based amphora of Gauloise type was recovered from excavations carried out at Union Terrace Car Park, York, by Field Archaeology Specialists Ltd. However, unlike published descriptions of Gauloise fabrics, 1998, the fabric of this example contained no mica. To test the identification, samples were taken for thin section and chemical analyses. These indicate that the vessel was made from a calcareous clay, but contained no inclusions which might help pin point its source and has a chemical composition which distinguishes it from examples of northern European, French, Spanish and Italian calcareous whitewares.

Thin Section Analysis

A thin section was prepared by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). The section was assigned the catalogue number V4007 and added to the AVAC reference collection.

The following inclusion types were noted in thin section:

Quartz. Moderate angular, subangular and rounded quartz grains, mostly c.0.2mm across. The angular grains have straight sides and appear to be overgrown.

Flint? Sparse angular fragments up to 0.3mm, some with staining around the edges.

Feldspar. Sparse small euhedral laths, whose needle-like shape suggests they may be feldspar rather than quartz, up to 0.2mm long and c.0.05mm wide.

Calcite. Sparse sparry calcite inclusions up to 1.0mm long. Some have an isotropic spherical test with fine-grained non-ferroan filling and are clearly microfossils.

Muscovite. Rare laths up to 0.1mm long.

Marl. Sparse angular fragments of mixed non-ferroan calcite/brown clay with some signs of lamination, up to 1.0mm long.

Clay/iron. Moderate rounded dark brown grains up to 0.3mm across. Most show a reaction rim with the surrounding groundmass.

The Alan Vince Archaeology Consultancy, 25 West Parade, Lincoln, LN1 1NW
http://www.postex.demon.co.uk/index.html
A copy of this report is archived online at
http://www.avac.uklinux.net/potcat/pdfs/avac2006148.pdf

The groundmass consists mostly of optically isotropic baked clay minerals, with sparse quartz, dark brown amorphous grains and calcareous inclusions, all up to 0.1mm across. In some areas, however, the groundmass is calcareous, containing a high proportion of fine-grained calcareous inclusions.

The characteristics of this fabric are very similar to those of medieval and later tin-glazed wares and yellow-firing bricks, made from highly calcareous marls. The quartzose sand contains what appears to be flint (although it could conceivably be devitrified lava) and this would suggest an origin close to an area of Cretaceous rocks. Similar fabrics have been noted in eastern England (for example, Upper Jurassic marls from the Kimmeridge clay) and the Low Countries. Calcareous marls from Spain (Valencian lustreware), southern France (medieval amphora from Perpignan) and central Italy (Central Italian maiolicas) have not be seen to contain similar inclusions and in most cases contain fine rock fragments which distinguish them from this sample. On balance, therefore, although no close source can be assigned on the basis of the thin section a western or northern French, Low Countries or English origin is likely.

Chemical Analysis

A sample was analysed at Royal Holloway College, London, under the supervision of Dr J N Walsh using Inductively-Coupled Plasma Spectroscopy. A range of major elements was measured and expressed as percent oxides (App 1) and a range of minor and trace elements was measured and expressed in parts per million (App 2).

The data were normalised to aluminium and compared with a range of samples of calcareous fabrics. Calcium, strontium and phosphorus were omitted because of their mobility (Table 1).

cname	Description	Sitecode	Total
Cambridge Yellow	Yellow-firing brick of recent date	RBA02	1
CITG	Central Italian Maiolica, some of Pisan origin	GRC klb2001 sou124	1 1 2
hull brick	Red-firing bricks from Hull, some calcareous	bhw98	3
Hull Yellow	Calcareous bricks from Hull	bhw98	2
LVAL	Late Valencian Lustreware	soton wacher	1
SNTG	South Netherlands Maiolica, most probably made in Antwerp	kws94 shapwick sou124 SOU128 WW/16A/03	1 1 1 1 1
TGW	Various tin-glazed wares of varying origins	deansway fnb02 wcm 100543	1 1 1
YNT	York Union Terrace amphora	ynt'06	1

Grand Total	20

Factor analysis of this dataset revealed four factors with eigenvalues over 1. A plot of the first two factors (Fig 1) revealed that the YNT amphora has a negative F1 score similar to that of English calcareous whitewares, from Hull and Cambridge, but that the F2 scores do not differentiate any of the samples. Negative F1 scores are the result of low nickel, cobalt, scandium, chromium, vanadium and two rare earth elements, cerium and samarium. In addition the YNT sample has the highest iron content and lowest potassium content of the samples in the dataset.

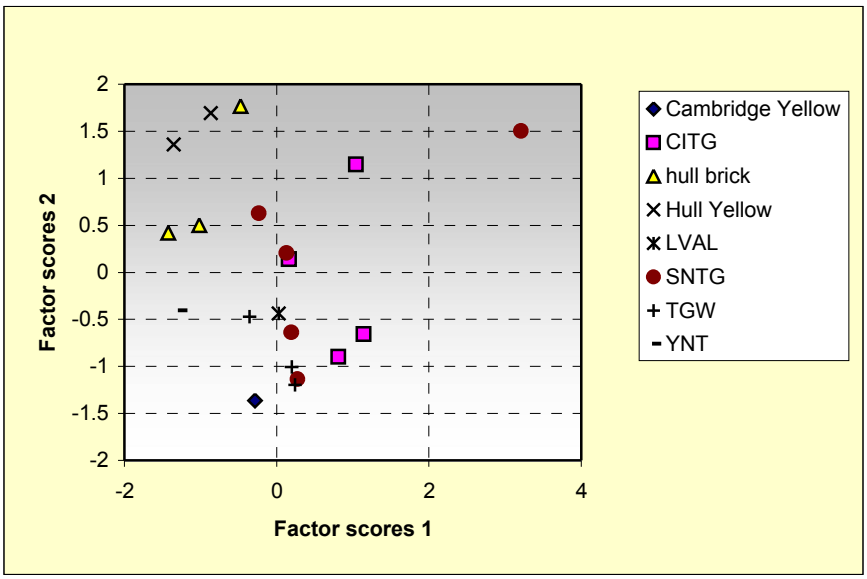

Figure 1

A plot of the F3 against F4 scores (Fig 2) shows that the YNT sample has a negative F4 score, similar to samples of South Netherlands Maiolica and a negative F3 score, which distinguishes it from samples of Italian and Spanish calcareous whitewares.

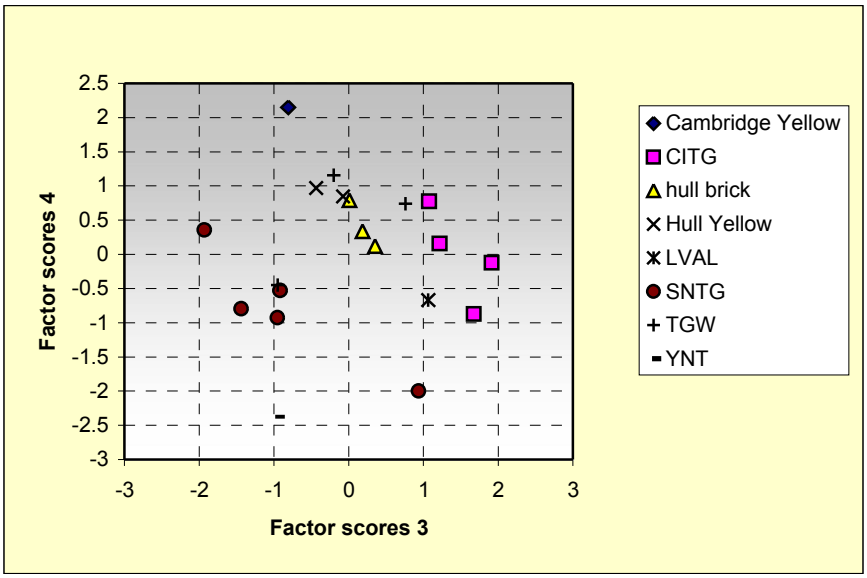

Figure 2

Conclusions

The thin section and chemical analysis of this amphora base indicate that its fabric is more similar to English and Low Countries calcareous whitewares than to Mediterranean calcareous whitewares. The lack of micas differentiates this fabric from that of the Gauloise amphorae (Peacock and Williams 1986, Classes 27-30 and 55 and a closer parallel would be the North Gaulish White ware 4 (1998, 75. The thin section of sample in the National Roman Fabric Collection has a similar description. North Gaulish White ware 4 was produced in the Amiens/Noyon areas which are situated outside of the Paris basin.

Bibliography

Peacock, D P S and Williams, D F (1986) *Amphorae and the Roman Economy: an Introductory Guide*. London,

Tomber, R. and Dore, J. (1998) *The National Roman Fabric Reference Collection: A Handbook*, Museum of London//English Heritage//British Museum, London

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V4007	14.49	7.32	0.62	7.5	0.14	0.67	0.95	0.25	0.061

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V4007	342	87	20	12	24	13	157	93	24	108	36	67	37	6	1	4	3	9	36	12