

Characterisation studies of a possible Anglo-Saxon vessel from Beckford, Gloucestershire

Alan Vince

A pottery vessel found in excavations at Beckford, Gloucestershire, has proved difficult to parallel and has been rejected by prehistoric, Roman, Anglo-Saxon and medieval pottery specialists familiar with pottery in the Severn Valley. It is therefore probably a stray from some other part of the country. The vessel has a calcareous fabric with large, partially leached, inclusions visible to the naked eye. It was therefore submitted to the author for thin section and chemical analysis in an attempt to narrow down its source as a first step towards establishing its date and cultural associations.

Thin Section Analysis

A thin section was produced by Steve Caldwell at the University of Manchester (V3675) and stained using Dickson's method, which distinguishes dolomite from ferroan and non-ferroan calcites (Dickson 1965). The following inclusion types were noted:

- Limestone. Abundant rounded fragments, some with a brown stained crust, ranging from c.0.2mm to 1.5mm across. The limestone is non-ferroan calcite with a light pink stain and is a mixture of micrite and sparry calcite (with an average grain size of c.0.1mm). Sparry calcite also occurs within the micrite fragments, either filling veins or perhaps as casts of bivalve or ostracods shells but mostly seems to have formed through the recrystallisation of the micrite. Some of the micrite fragments appear to have formed as algal limestone but lack the tubes found in recent blue-green algae concretions being more similar to the algal mats (stromatolites) found most often in Palaeozoic limestones.
- Quartz. Abundant well-sorted subangular monocrystalline, unstrained grains c.0.2mm to 0.4mm across. Some well-rounded grains are present and at x20 magnification some of these are seen to be polished.
- Chert. Sparse subangular fragments c.0.2mm to 0.4mm across. These fragments are all unstained and have a finer texture than most Carboniferous chert. They might therefore be flint, although the texture is slightly coarser than most flints.
- Glauconite. Sparse rounded grains of brown (altered) glauconite, c.0.2mm – 0.4mm across.
- Organics. Sparse voids up to 0.4mm across with carbonised organic contents, surrounded by a darkened halo.

The groundmass consists of optically anisotropic baked clay minerals, abundant calcareous inclusions up to 0.1mm across and sparse angular quartz and muscovite laths, also up to 0.1mm long.

Interpretation

The most distinctive mineral within this thin section is altered glauconite. The grains, despite their colour, appear fresh and may have been formed *in situ* rather than entering the fabric as part of a detrital sand. Within the British Isles glauconite seems to have been deposited in

The Alan Vince Archaeology Consultancy, 25 West Parade, Lincoln, LN1 1NW

<http://www.postex.demon.co.uk/index.html>

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marine conditions in which there was a low terrigenous contribution. Such conditions occurred within the Upper Jurassic, Lower Cretaceous and Tertiary periods (although in the latter case the grains may be reworked from earlier deposits). Detrital glauconite occurs in sediments derived from the erosion of deposits of this age. Since no such deposits occur within the Severn Valley nor within the catchment area of the Warwickshire Avon it is likely that the vessel was not made from locally-available clay. If the limestone is of Palaeozoic date then the source area would have to lie close to the outcrop of such limestones and to the Upper Jurassic or more recent rocks. The nearest suitable area to Beckford would be at the eastern end of the Mendip hills. If, on the other hand, the limestone is not Palaeozoic then it might be of Jurassic, Lower Cretaceous or Recent in date, in which case large parts of southern and eastern England should be considered. The quartz/chert sand includes polished grains which are absent from local sand deposits of Jurassic or earlier origin and the recent sands derived from them. They occur in Lower Cretaceous sands and in detrital sands of Tertiary and more recent date. Like the glauconite, they point to a southern or eastern source.

Chemical Analysis

A sample was prepared for chemical analysis and submitted to Royal Holloway College, London, where it was analysed using Inductively-Coupled Plasma Spectroscopy. The results consist of the frequency of a range of major elements, expressed as percent oxides (App 1) and a range of trace elements, expressed in parts per million (App 2).

Since no similar fabrics were known to the author it was decided to compare the results with all samples of local origin in the AVAC database from sites in the Severn Valley. Factor analysis of this data indicates that the Beckford sample is not chemically distinct from definite local wares except for its calcium content which is higher than that of any other sample from Gloucestershire, Herefordshire or Worcestershire. These comparative samples include limestone-tempered vessels and vessels produced from Triassic marl. Similarly high calcium contents are known from Upper Jurassic clays, for example the Kimmeridge clay sampled at Ely and various yellow bricks and tiles from sites in the East Midlands.

Conclusion

Thin section analysis suggests that this vessel is not of local origin whilst the chemical analysis, without samples to compare with it, is of little immediate use. Nevertheless, the calcareous groundmass of this vessel does distinguish it from local wares from the Severn Valley.

Bibliography

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

Appendix 1

TSNO	Al₂O₃	Fe₂O₃	MgO	CaO	Na₂O	K₂O	TiO₂	P₂O₅	MnO
V3675	8.38	3.48	0.53	19.1	0.1	0.9	0.49	1.11	0.043

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V3675	261	58	15	46	22	7	383	62	18	69	19	35	30	1	1	3	2	23	41	11