Petrological Analysis of Iron Age Pottery from Holdingham, Lincolnshire (HRM04)

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Eight samples of Iron Age pottery from Holdingham were submitted for thin section analysis. The samples are of two classes, shell-tempered and sandy-tempered. The shelly wares were grouped visually into three fabrics SHCC, SHCV and SHSM, whilst the sandy wares were both visually assigned to the same fabric, QUCM. Following thin section analysis, however, it is clear that one of the sand-tempered samples was mis-classified and is actually another shelly ware.

Table 1

TSNO	Context	subfabric	PetroFabric
V3452	O79	SHCC	Fabric B
V3453	207	SHCV	Fabric B
V3454	203	QUCM	Fabric A
V3456	205	SHCV	Fabric B
V3457	060	SHCC	Fabric B
V3458	079	SHSM	Fabric A
V3459	111	QUCM	Fabric A
V3460	164	SHSM	Fabric C

Methodology

Thin sections were produced by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). This staining distinguishes ferroan calcite (stained blue) from non-ferroan calcite (stained pink) and dolomite (unstained).

Shell-Tempered wares (Fabrics A and B, V3452-v3459)

Description

The thin sections of the shell-tempered wares indicate that each sample has a slightly different composition, but that the range of inclusion types present is quite limited and these differences are due mainly to variations in the frequency of the different types which are listed below:

- Bivalve shell. These range from being sparse to abundant, are between 0.3mm and 1.0mm long and are mostly composed of non-ferroan calcite with a nacreous structure (i.e. similar to mother-of-pearl). Several fragments have traces of a ferroan

calcite coating and in some cases it seems that the fragments were rounded before being coated. A few have bore holes, filled with ferroan calcite.

- Punctate brachiopod shell. These range from being completely absent to moderately common and come from shells which are c.0.1mm to 0.2mm thick with a lattice of holes piercing the shell. The fragments range from c.0.3mm to 1.0mm long and are often partially coated with ferroan calcite.
- Echinoid shell. These range from being complete absent to moderately common and are usually rounded fragments up to 0.3mm across composed of ferroan calcite.
- Sparry ferroan calcite. These range from being sparse to abundant and from less than 0.1mm to 0.5mm across. The grain size of the calcite crystals is usually c.0.1mm.
- Limestone fragments. These are either sparse or absent but when present are composed of bivalve, punctate brachiopod and echinoid shell fragments, cemented with ferroan calcite and with pores filled with marl. The fragments range from c.1.0mm to 2.0mm across.
- Rounded quartz. These range in frequency from complete absence to moderate and consist of rounded grains, often with a high sphericity, and a maximum grain size of c.0.4mm.
- Rounded chert. These range in frequency from complete absence to sparse and share the high sphericity and size range of the rounded quartz grains.

The groundmass of all the samples is similar, consisting of optically anisotropic baked clay minerals with sparse to abundant ferroan calcite and sparse rounded dark brown grains up to 0.1mm across.

Table 2 indicates the incidence and abundance of these inclusion types and allows the samples to be divided into two petrological groups: Fabric A contains no punctate brachiopod or echinoid shell and Fabric B contains moderate punctate brachiopod and echinoid shell. There is, however, no correlation between the incidence of these types and the presence of limestone, rounded quartz, bivalve shell or ferroan calcite.

Table 2

TS No	Bivalve	Ferroan calcite	Punctate Brachiopod	Echinoid shell	Rounded quartz	Limestone	PetroFabric
v3452	Moderate	Moderate	Moderate	Moderate	Absent	Absent	Fabric B
v3453	Moderate	Moderate	Moderate	Moderate	Sparse	Absent	Fabric B
v3454	Sparse	Abundant	Absent	Absent	Moderate	Absent	Fabric A
v3456	Moderate	Sparse	Absent	Sparse	Moderate	Sparse	Fabric B
v3457	Moderate	Moderate	Sparse	Moderate	Sparse	Sparse	Fabric B
v3458	Sparse	Sparse	Absent	Absent	Moderate	Absent	Fabric A
v3459	Sparse	Moderate	Absent	Absent	Sparse	Sparse	Fabric A

Interpretation

The limestone fragments and the groundmass suggest that the clay used to make these vessels was derived from weathered Jurassic marl in which partially cemented fossil shell is present. Numerous rocks in the central Lincolnshire area might match this criteria although the presence of punctate brachiopod and echinoid shell probably discounts the Great Oolite formation, which seems to be the source of shell found in Mid Saxon, Anglo-Scandinavian and medieval shelly wares in the Lincoln area. Three of the samples, V3454, V3458 and V3459, do not contain either punctate brachiopod or echinoid shell, and could therefore conceivably be made from an outcrop of Great Oolite formation limestone. However, the groundmass of these three samples is similar to the remaining shelly wares and it is uncertain how significant the absence of these inclusion types is. The groundmass of the mid Saxon and later shell-tempered wares is not calcareous but is otherwise similar (2006, wares MAX, LSS, LSH and POTT).

A likely source would be weathered Cornbrash, which outcrops at Holdingham and is a poorly cemented shelly limestone with interleaving bands of clay (1980). The quartz sand is a cover sand, derived ultimately from Triassic sandstones but present in wind-blown and fluvial sands throughout central Lincolnshire.

Despite the petrological evidence which indicates that a very local source is possible, it is nevertheless possible that the vessels were produced on a larger scale and very similar fabrics were noted at Washingborough, in the Bronze Age (Vince 2006). Furthermore, shell-tempered wares containing punctate brachiopod and echinoid shell were made in the Roman period at Harrold, Bedfordshire, in the Late Saxon period at St Neots, Cambridgeshire and in the medieval period at Olney Hyde and Harrold, in Bedfordshire. In all these cases the parent clay appears to be of Upper Jurassic origin.

Sand-Tempered ware (Fabric C, V3460)

Description

The following inclusion types were noted in the thin section:

- Subangular and angular quartz. Abundant well-sorted grains ranging from c.0.1mm to 0.2mm across.
- Rounded quartz. Moderate grains, mostly with a high sphericity, ranging from c.0l2mm to 0.5mm across.
- Chert. Sparse fragments of similar size and shape to the rounded quartz.
- Fine-grained sandstone. Sparse fragments of similar size and shape to the rounded quartz. The sandstone contains subangular quartz grains c.0.1-0.2mm across in a silica cement.

- Wood charcoal. Moderate fragments, some subangular, up to 1.5mm long. It is not clear whether these are recent charcoal or fossil and partially replaced by clay/iron.
- Voids. Moderate round voids up to 1.5mm across, some with an altered limestone filling. The voids do not appear to have been shell fragments.
- Grog. Sparse subangular fragments of light grey grog up to 1.0mm across, some having a different texture from the groundmass.

The groundmass is optically isotropic with no visible quartz, mica or calcareous inclusions.

Interpretation

It is difficult to interpret this section, partly because of the reduced firing and heat alteration of the calcareous content, and partly because it is an unusual combination of inclusions. Fossil wood is sometimes found in Jurassic clays, but usually in a much lower frequency than in this instance, whilst charcoal is sometimes found as a tempering material in Roman coarsewares although it is rarely discussed. Grog too is a common Roman coarseware temper but rarer in pre-conquest contexts. The rounded quartz/chert/sandstone sand is a typical cover sand whose widespread occurrence has been mentioned above. All of the inclusions presence could occur in the Holdingham area but the source could have been anywhere in the Trent Valley or central Lincolnshire.

Bibliography

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