Thin Section Analysis of Neolithic Pottery from Holbeck Park, Barrow in Furness, Lancashire (HP02)

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Samples of four Neolithic pottery vessels from an excavation at Holbeck Park, Barrow in Furness, Lancashire, were submitted for thin section analysis by Carol Allen (Table 1).

Table 1

TSNO	Sherd No	Petrofabric	Context	C Allen sample no
V3532	11	1	107	TS4
V3531	9	2	107	TS3
V3530	2	1	107	TS2
V3529	1	1	107	TS1

The vessels come from two different fabrics but all have a similar coarse gravel temper. However, without samples of local boulder clays from the area it is not possible to say whether the vessels were deliberately tempered or the gravel naturally present in the parent clay, in which case the clay would have been a boulder clay.

The thin sections were produced by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965) which distinguishes various carbonate minerals. However, in this instance there were no carbonate minerals present.

Description

Fabric 1

The following inclusion types were noted in the three samples of Fabric 1:

- Biotite Granite. Abundant angular fragments of granite up to 2.0mm across containing (in order of frequency) quartz, perthite, plagioclase feldspar, biotite and opaque minerals. The feldspar is altered to fine-grained mica. Some of these fragments are extremely angular, consisting in section of thin slivers of rock which would surely have been eroded quickly in a river or beach environment.
- Microgranite. A single subangular fragment consists of a groundmass of fresh perthite crystals, up to 2.0mm long, and smaller crystals of quartz and feldspar with moderate alteration (some of which appear to be zoned, with a thin outer zone containing less alteration products.
- A two-mica granite. A couple of angular granite fragments up to 3.0mm long contain abundant muscovite, arranged either as sheaves or radially, fresh plagioclase feldspar, opaque minerals, strained quartz and biotite.

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- Vein quartz? A single fragment c.3.0 by 1.5mm consisting of parallel elongated crystals of quartz.

The groundmass consists of light brown optically anisotropic baked clay minerals with sparse angular quartz inclusions and moderate rounded dark brown grains up to 0.1mm across.

Fabric 2

The following inclusion types were noted in the one sample of Fabric 2.

- Rounded quartz. Sparse monocrystalline grains up to 0.4mm across.
- Feldspar. Moderate angular plagioclase fragments up 1.0mm across with moderate alteration.
- Perthite. Sparse angular fragments up to 0.5mm across.
- Biotite. Sparse sheaves of biotite up to 1.0mm long.
- Biotite granite. Sparse angular fragments of granite up to 1.0mm across containing quartz, perthite, altered feldspar, biotite, small euhedral opaque grains and a light green pleiochroic amphibole.
- Organic fragments. Sparse angular carbonised wood, up to 0.5mm across
- Rhyolite. Sparse angular fragments of altered rhyolite up to 0.5mm across with abundant opaque inclusions.

The groundmass consists of brown optically anisotropic baked clay minerals, abundant angular quartz, moderate muscovite, and rounded dark brown and opaque grains and sparse biotite and accessory minerals up to 0.1mm across.

Discussion

The following discussion is based on observations of the British Geological Survey 1:50000 geological map of the area ((BGS 1:50000 map sheet 58, Barrow in Furness)) rather than direct observation of the local geology. The two fabrics come from two quite different sets of raw materials. Fabric 1 has a groundmass which suggests the use of weathered mudstone, although there is no sign of mudstone fragments or relict clay which may indicate that the parent clay was either heavily weathered or still in a plastic state. The lack of silt-sized grains precludes a source in the local marine alluvium whilst the area from which the boulder clay at Holbeck was probably derived, immediately to the north, is composed of Silurian siltstones and mudstones, fragments of which ought to be present in the boulder clay. The light colour of the clay where not obscured by carbon darkening of the groundmass may be diagnostic and is reminiscent of Carboniferous deltaic mudstones, which do outcrop to the north of the site, although obscured by drift deposits.

There is a Neolithic and later prehistoric tradition of using coarse-grained rocks (such as quartzite, granite, basalt) as pottery temper although in most cases it is unclear whether these rocks were present in local boulder clay or sand, selected and extracted from local sand or gravel deposits manually or that the vessels were made elsewhere and brought to the site.

It is likely, however, that biotite granites similar to those found in Fabric 1 were brought close to the site as erratics from southwest Scotland (Criffel, in Dumfries and Galloway) or Shap but whether they occur to the exclusion of other rock types or whether they would have been present in small quantities and then selected and prepared, perhaps through fire cracking of larger pebbles, can only be determined through examination of local clays and sands.

Fabric 2 has a very different appearance and the groundmass in this case suggests the use of an alluvial clay, which contains finely divided fragments of various origins, including rounded quartz sand (perhaps from the St Bees Sandstone, which outcrops in the area, albeit masked by drift deposits) as well as granitic and possibly basic igneous rocks. The silty groundmass suggests that the estuarine or marine alluvium which outcrops to the south of the site is a potential source and this could also be tested by sampling and analysis.

The fabric 2 section too contained larger, angular granitic fragments, but they are much finer than in fabric 1 and do not show the extreme angularity of some of the fabric 1 examples. It is likely that they were present in the clay when dug, although this too should be tested by sampling.

Bibliography

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