Living on the Edge

Archaeological investigations at Steart Point, Somerset

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Appendix 2
Petrographic Report of Thin-Section Analyses

by Imogen Wood

Aims of Analysis

Five covered thin-section (TS) slides were produced for petrographic analysis, selected to determine the character and/or validity of variations observed within the macroscopically classified 'Rock-tempered' fabric group (TS2–5). TS1 had been classified as Q401, being a possible later medieval sandy ware sherd. A secondary consideration of this analysis was establish if any similarities could be found between the Steart Point fabrics and the nearby site of Brent Knoll (Wood forthcoming), which also produced medieval rock-tempered fabric types.

Geology

The solid geology within the site consists of Mercia Mudstone Group and the Lower Lias (Brown 1980). In places the solid geology is overlain by Pleistocene sediments, which comprise sands and gravels, undifferentiated Head deposits, and alluvium interspersed with peat layers. The upper alluvium is equivalent to the Wentlooge palaeosol, which is thought to have formed as a result of land drainage during the Romano-British period (Allen and Rae 1987).

Methodology

The thin sections were analysed using a polarizing petrographic microscope (Zeiss Axioskop 40), using a range of 50-100x magnification. The minerals and rock fragments listed below are in order of frequency within the matrix, ranging from *abundant* to *rare*.

Results

Thin Section 1

Macroscopic Fabric type Q401 context (20504)
Hard, coarse fabric with moderate (10%) rounded quartz sand (< 2 mm) and sparse (7%) sub-rounded grog (2–3 mm)

Microscopic description: oxidised fabric; temper 20%

- Quartz, abundant, grains are well-rounded to sub-rounded, 0.3–0.1 mm
- Limonite/clay pellet, iron oxide, common, dark brown/red, soft rounded pellets, nearly opaque in thin section, some particles contain grains of quartz, degree of high plasticity in production, range of sizes, well-rounded to sub-rounded in shape, 1.5–0.4 mm
- Red Sandstone, coarse, sparse, composed of quartz and alteration mineral and Biotite, sub-rounded, 1.0–0.2 mm
- Red Sandstone, rare, fine quartz in dark matrix, well-rounded, 1.5–0.8 mm

Matrix: Abundant angular quartz and occasional mica cleavage flakes in an optically-anisotropic clay

This is a Red Sandstone and quartz-rich fabric in a matrix of fine estuarine locally-sourced clay. The common inclusions of iron-rich clay pellets, not grog as suggested in the macroscopic analysis, suggests this was a waterlogged clay containing degraded Red Sandstone and angular quartz. There is little degree of processing in production suggesting little or no temper was needed.

Thin Section 2

Macroscopic Fabric type R400 context (21303)
Hard, silty fabric containing rare (1%) poorly sorted, sub-rounded, sandstone (2–4 mm) and quartz sand (<1 mm).

Microscopic description: reduced fabric; temper 25%

- Red sandstone, fine, common, quartz grains in dark brown matrix leaching weathered minerals with rare Biotite mica cleavage flakes, well-rounded, 1.9–0.5 mm
- Red sandstone, coarse, scatter, composed of quartz with rare Biotite mica, sub-rounded, 1.7 mm
- Limonite, iron oxide, scatter, dark brown pellets, nearly opaque in thin section, well-rounded, 0.9 mm

- Quartz, sparse, well-rounded, 0.5 mm
- Strained quartz, rare, sub-rounded in shape, 1.3 mm
- Epidote, rare, possible alteration product of Biotite, pink/green, rare, no visible structure
- Mudstone, rare, matrix of fine quartz grains in lamella structure, rounded, 1.7 mm

Matrix: very fine clay, few visible inclusions in an optically-anisotropic clay

This fabric is markedly different to the other thin sections from Steart Point. This is due to the lack of angular inclusions and their overall large size, suggesting it is tempered with river sand. The degree of abrasion and rounding to the grains suggests the use of sand from the lower reaches of (possibly) the River Parrett. The range of minerals and rock fragments would suggest a large catchment area.

Thin Section 3 and 4

Two sherds from this context were thin-sectioned for analysis, A and B.

Macroscopic Fabric type R405 context (20535)
Hard, coarse fabric with sparse (3–5%) poorly sorted, sub-rounded fragments of pale, soft, flaky, rock with a distinct sparkly appearance (1–4 mm), sparse (5%) poorly sorted, sub-rounded quartz sand (0.25–1 mm) and rare (2%) sandstone (< 3 mm).

Microscopic description (3A): reduced fabric; temper 25%

- Quartz, common, sub-angular, 0.5 mm
- Red sandstone, scatter, quartz conglomerate, rounded to well-rounded in shape, rare Biotite mica cleavage flakes in matrix, 1.2 mm
- Red sandstone coarse, scatter, quartz rich with traces of altered micas, rounded, 1.0 mm
- Limonite, scatter, well-rounded, 0.6 mm
- Biotite, sparse, cleavage flakes, 1.0 mm
- Mudstone, rare, matrix of fine quartz grains in a lamella structure, generally rounded and oblong shaped pieces, 1.0 mm

Matrix: Abundant sub-angular quartz in an optically-anisotropic clay

The quartz and biotite are weathered minerals derived from the same parent Red Sandstone rock. The relative uniformity of the grain sizes suggests an element of processing in production.

Microscopic description (4B): oxidised fabric; temper 10%

- Quartz, abundant, well-rounded, 0.5 mm
- Red Sandstone, coarse, common, angular, 1.9–0.6 mm
- Mudstone, rare, dense quartz with laminated structure, rounded, 0.5 mm
- Limonite, iron oxide, rare, dark brown pellets, opaque in thin section with some containing grains of quartz and mica, well-rounded to rounded but in varying size, 0.4 mm.

Matrix: Common angular quartz 0.2mm in an optically-anisotropic clay

This fabric has a Red Sandstone temper in a fine quartz and mudstone clay. The lack of finer grained sandstone suggests the clay was sourced in an area further away from the sandstone. The size and angularity of the Red Sandstone suggests possible crushing before addition.

Thin Section 5

Macroscopic Fabric type R403 context (20526)
Hard, coarse fabric with moderate (10%) poorly sorted, rounded pieces of unidentified laminar rock (possibly shale) 1–4 mm along with moderate (10%) sub- rounded quartz sands (0.5–1 mm) and sparse (7%) sandstone (1–2 mm).

Microscopic description: reduced fabric; temper 20%

- Quartz, common, sub-angular, 0.3 mm
- Red sandstone, fine, scatter, fine quartz grains in in dark brown iron-rich matrix, well-rounded, 2.5–1.0 mm
- Red sandstone, coarse, scatter, quartz rich in dark matrix, angular, 1.9–0.2 mm
- Limonite, iron oxide, sparse, dark red, nearly opaque in thin section with occasional quartz grains, well-rounded, 0.9 mm
- Strained quartz, rare, rounded, 2.0 mm

Matrix: relatively fine clay with occasional sub-angular quartz and sandstone grains in an optically-anisotropic clay.

This is a fine Red Sandstone rich fabric with sub-angular quartz inclusions. The combination of rounded fine Red Sandstone and more angular grains suggest this is a clay purely derived from the Quantocks area with little processing in production. This is broadly similar to a fabric from Brent Knoll (Wood forthcoming, TS3, fabric R402).

Thin Section 6

Macroscopic Fabric type R404 context (20518)

Hard, silty fabric containing rare (1%) poorly sorted, sub-rounded, sandstone (2–4 mm) and quartz sand (< 1 mm).

Microscopic description: reduced fabric; temper 20%

- Quartz, common, angular, 0.5–0.2 mm
- Red sandstone, coarse, scatter, quartz rich with alteration minerals in dark brown matrix leaching weathered minerals, angular, 1.0–0.3 mm
- Red Sandstone, fine, scatter, quartz grains in dark brown matrix with rare Biotite mica cleavage flakes, sub-rounded, 1.0–0.4 mm
- Mudstone/slate, rare, dense quartz in dark matrix, rounded oblong in shape, 1.9 mm
- Limonite, rare, opaque in thin section, rounded, 0.8 mm
- Strained quartz, rare, sub-rounded, 0.2 mm

Matrix: fine quartz-rich clay with rare mica in an optically-anisotropic clay

This fabric is very similar to thin sections TS3 and TS4. The finer sub-rounded and angular Red Sandstone grains suggest a Red Sandstone-derived clay.

Discussion

The results of the thin section analysis suggest there is some variability in the sourcing of clays and the production techniques employed. The majority of the fabrics are derived from Sandstone-rich derived clay with a varying range of minerals with the exception of TS2 (R400). The lack of limestone and chert inclusions rules out the Mendips side of the immediate area for this fabric group. It is reasonable to assume that these sandstone clay fabrics derived from a suite of rocks and minerals consistent with the Quantock Hills area, most likely the alluvium in river valleys leading off this geology. This is consistent with Fabric 2 identified by Roger Taylor (2008) from medieval pottery found at Brent Knoll village. However, the presence of Limonite would suggest a more waterlogged clay source perhaps closer to Steart Point. The composition of minerals in TS5 (R403) and the lack of mudstone would indicate a source located on the Quantocks and one that did not receive much processing in production.

The larger coarse Red Sandstone inclusions identified in some of the pottery is not distinctively red in macroscopic analysis due to the leaching of iron oxides and alteration of the matrix, which has resulted in making the quartz grains more visible, presenting as a highly-reflective friable rock fragment. In thin section the coarse Red Sandstone has abundant quartz and some mica in an iron rich matrix with leached clay minerals. Some fragments of quartz are set in a recrystallized and silicified iron rich matrix and some fragments contain strained and deformed quartz occasionally including Biotite mica.

The fabrics of TS3, TS4 (R405) and TS6 (R404) suggest a source area at the base of the Quantocks, as indicated by the larger more angular Red sandstone fragments in the fabric. It is possible that these were added as tempering material. The common inclusions of iron-rich clay pellets (not grog) in TS1 (Q401) would suggest this was a waterlogged clay containing degraded Red Sandstone and angular quartz. There is little apparent degree of processing in production, suggesting little or no temper was needed. The abundance of fine quartz grains in the matrix of TS1 would certainly fit the description of a 'Sandy Ware' making it a good candidate for Later Medieval Sandy Ware.

The wider range of minerals and higher degree of rounding seen in TS2 (R400) is the exception. The fabric strongly suggests a sand temper derived in the lower reaches of the River Parrett or estuarine sands along the Steart and Berrow flats. It is directly comparable with a sample from a medieval assemblage at Brent Knoll (Wood forthcoming, TS2, fabric R400).

The results of the analysis highlight the variability within one clay source area and offer a valuable contribution to further understanding the production of Sandstone-rich coarsewares in west Somerset.

It may be noted that there are documentary references to medieval pottery manufacture in the 13th and 14th centuries at Bridgwater, about 4–7 km to the south of the site, and at Nether Stowey, about 10 km to the south-west (Le Patourel 1968, 125).

This assemblage suggests that pottery production on a household scale was thriving along the River Parrett zone in this period. However, caution should be taken in assigning a more precise source location for the clay and/or temper due extent of the River Severn tidal bore which reaches Bridgwater and may in the past have gone further inland. This would transport not only derived minerals and rock fragments from the River Parrett but also the River Severn.