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PETROGRAPHIC ANALYSIS

Patrick S. Quinn and Kevin V. E. Cootes

BACKGROUND, SAMPLE MATERIALS, AND AIMS OF ANALYSIS

Thin section petrographic analysis was conducted on a fragment of the Early Bronze Age collared urn. The aim of this analysis was to characterise its likely raw materials and technology and assess its compositional relationships with contemporaneous, stylistically similar pottery from other sites across the Peak District National Park and further afield.

METHODOLOGY

A small piece of the urn sherd was impregnated with epoxy resin and prepared as a standard petrographic thin section at the Institute of Archaeology, University College London. It was studied at magnifications of 25–400× under the polarising light microscope and characterised in terms of its constituent raw materials and manufacturing technology. The sample was compared to the results of a large study of prehistoric pottery from numerous sites within the Peak District National Park, which included several Early Bronze Age urns (Cootes 2013), in order to detect matches. Candidate samples were compared to The Roaches urn under the microscope using the original thin sections from that project.

PETROGRAPHIC COMPOSITION

The urn sample is characterised in thin section by a non-calcareous fabric containing many argillaceous inclusions of possible grog as well as abundant silt-sized quartz, feldspar, and mica, plus sparse, rounded sand inclusions in a non-calcareous clay matrix with many voids (Plate 8 A/B). The rounded sand-sized inclusions include mono- and polycrystalline-quartz, some of the latter exhibiting a foliated texture, untwinned feldspar, micaceous siltstone, and chert. These sparse inclusions appear to be naturally-occurring in a non-calcareous clay source that also contained more abundant, angular silt-sized inclusions of quartz, feldspar, biotite, and less commonly muscovite mica. The sherd has a relatively poorly sorted grain-size distribution with a large siltstone inclusion of 2.5 mm in the prepared thin section. Many argillaceous inclusions occur in the sherd, which have a similar colour and composition to the rest of the fabric, but are picked out by the presence of ring voids. These contain angular silt and in some cases rounded sand-sized inclusions as the rest of the fabric, and have positive optical density. Many of the argillaceous inclusions have an angular shape and sharp boundaries and therefore resemble grog. A couple of examples, however, have a finer composition that is more suggestive of mudstone or dried clay, and some have merging boundaries in places which is not characteristic of grog. They could represent grog temper of a similar fabric as the parent vessel, clay temper, or poorly hydrated remnants of powdered clay that was wetted to manufacture the vessel. In addition to the shrink voids associated with the argillaceous particles, the sample also contains many meso-elongate voids in places as well as some macro-elongate voids. The sherd was fired in a moderately oxidising atmosphere at a temperature of <850°C, due to its brown colour and optically active clay matrix.

RAW MATERIALS AND PROVENANCE

The main inclusion types in The Roaches urn are grog and quartz, both of which are not particularly indicative of ceramic raw material provenance (Quinn 2013, 124). With this in mind, determining the production location of the parent vessel from which it came is likely to be difficult. Two rare inclusions of micaceous siltstone and chert are perhaps more suggestive of origin. Siltstone beds occur within several Carboniferous sedimentary units that underlie the Staffordshire Moorlands and form the high ground of The Roaches, such as the Millstone Grit Formation (Aitkenhead *et al.* 2002). Though siltstone occurs in contemporaneous classic sedimentary rocks from other parts of the Dark Peak, the presence of an inclusion of this rock type might provide support for a local origin. On the other hand, the single inclusion of chert may indicate that the raw materials used to manufacture The Roaches urn may not have been local in origin. Chert does not appear to be present in the non-marine and estuarine strata mentioned above, or the occasional marine incursions that they contain. This lithology is instead more characteristic of the limestone deposits of the White Peak to the north and east. A combination of the two inclusions could suggest an origin close to the border of the two areas, or the use of eroded alluvial material from both sources. Such an interpretation is perhaps pushing the limits of what is sensible based on two small inclusions, so should be treated with caution, especially as the clay used for the urn could have come from a glacial or periglacial deposit and it is known that chert is found in these well away from the limestone plateau (John Barnatt *pers. comm.*).

COMPARISON TO CONTEMPORANEOUS CERAMICS

Several fabrics within the extensive study of prehistoric ceramics from the Peak District National Park by Cootes (2013) were found to contain grog temper. These amount to nine sherds out of the total of 238 analysed and all but two originate from Early Bronze Age to Middle Bronze Age urns on the White Peak. The majority of these sherds, which fall into Fabrics 5, 11 and 18 of Cootes (2013) have a very fine inclusion-poor base clay to which grog temper has been added. This contrasts with the more inclusion-rich, silty base clay that has been interpreted for The Roaches urn in this report. Two exceptions are samples from a beaker from Dove Dale Thorpe Cloud (Plate 9 A/B) and another from a collared urn sherd from Gratton Hill (Plate 9 C/D), both of which contain more silt-sized quartz, polycrystalline quartz and mica. The sample from Thorpe Cloud is still less silty than The Roaches urn sherd and contains a couple of possible granitic rock inclusions in the thin section prepared by Cootes (2013). The sample from Gratton Hill is texturally a better match for the sample analysed in this report in terms of its silt content and the presence of some sand-size rounded quartz and polycrystalline quartz inclusions (Plate 9 C/D). It contains several types of grog, one fragment of which is very fine and bears some similarities to the material that may be mudstone in The Roaches sherd.

The use of grog temper in non-calcareous clay is consistent with the results of Cootes' (2013) petrographic investigation of Early-Middle Bronze Age ceramics across the Peak District. The utilisation of a variety of materials available within the general locality was a defining signature of sites located on the White Peak, with differences between individual paste recipes indicating single vessel construction on an ad hoc basis. In contrast, the examination of comparable urns recovered from excavations on the higher land of the Eastern Gritstone Moors revealed a distinct preference by prehistoric potters for the utilisation of basic igneous rocks of basalt and dolerite as ceramic temper, and to a lesser extent chert. Examples of this phenomenon occur at Eaglestone Flat, Stanton Moor, and a single vessel from Totley Moor above Sheffield. Geological sampling traced the origin of the basalt and dolerite temper to a variety of exposures spread across the White Peak, indicating a close connection between the two landscape zones by distinct but related groups. The urn from The Roaches is different, as with urns from the White Peak it presumably reflects a separate local tradition in this part of the Peak.

References

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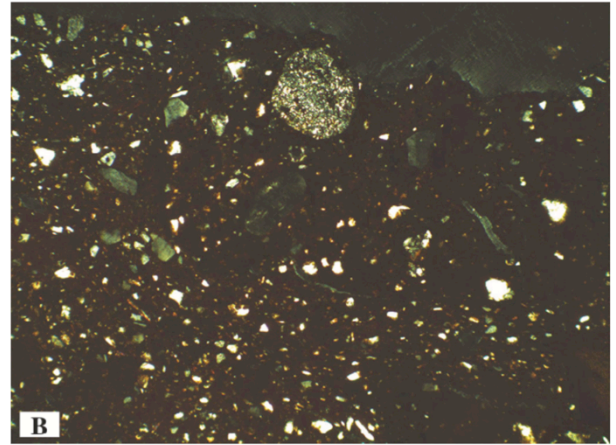
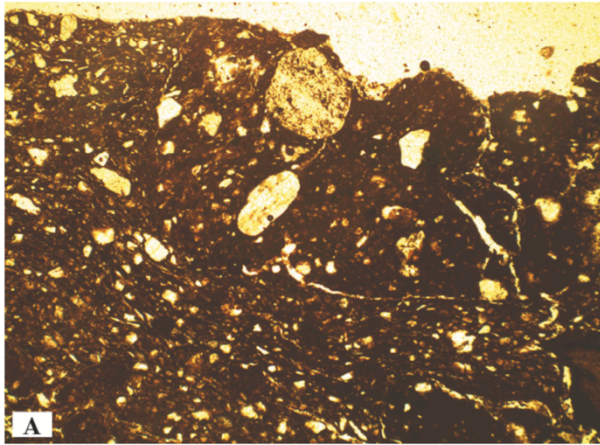


Plate 8 The Roaches urn thin section, showing inclusions in the fabric

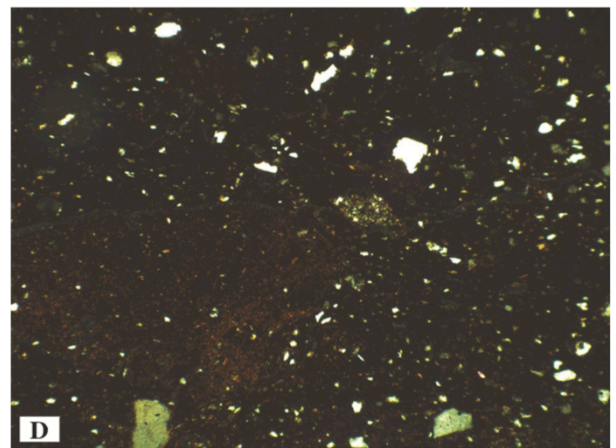
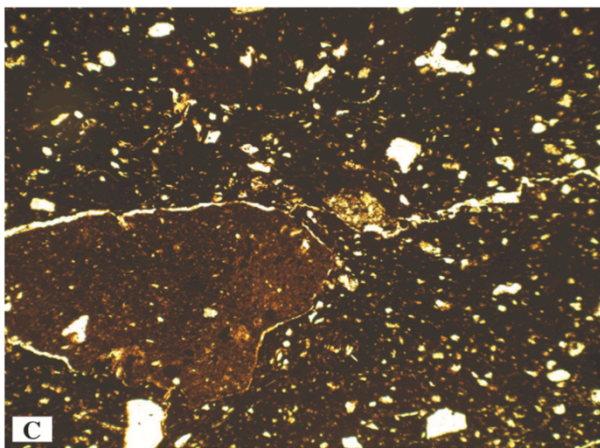
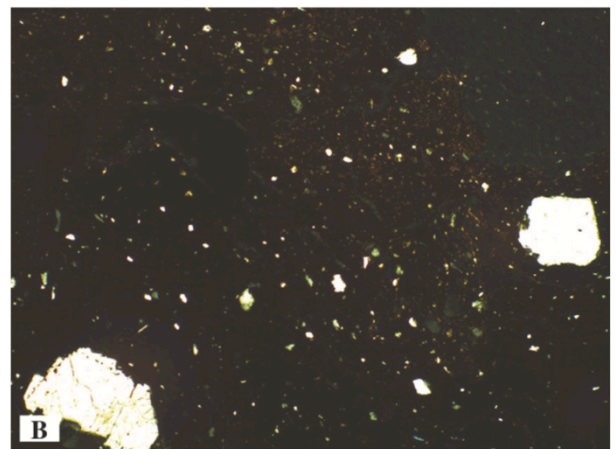
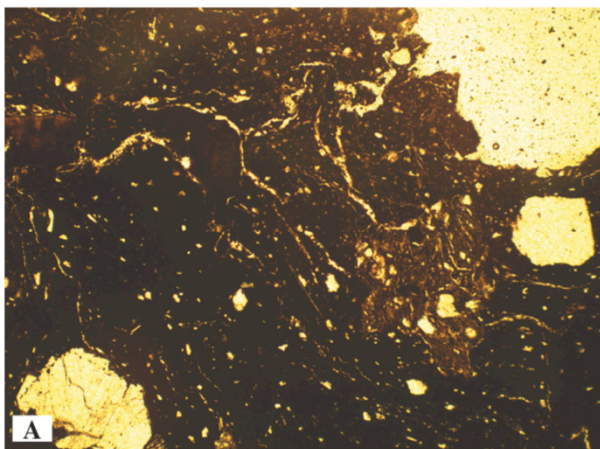


Plate 9 Examples of thin sections: A/B from a beaker at Dove Dale Thorpe Cloud, C/D from a collared urn at Gratton