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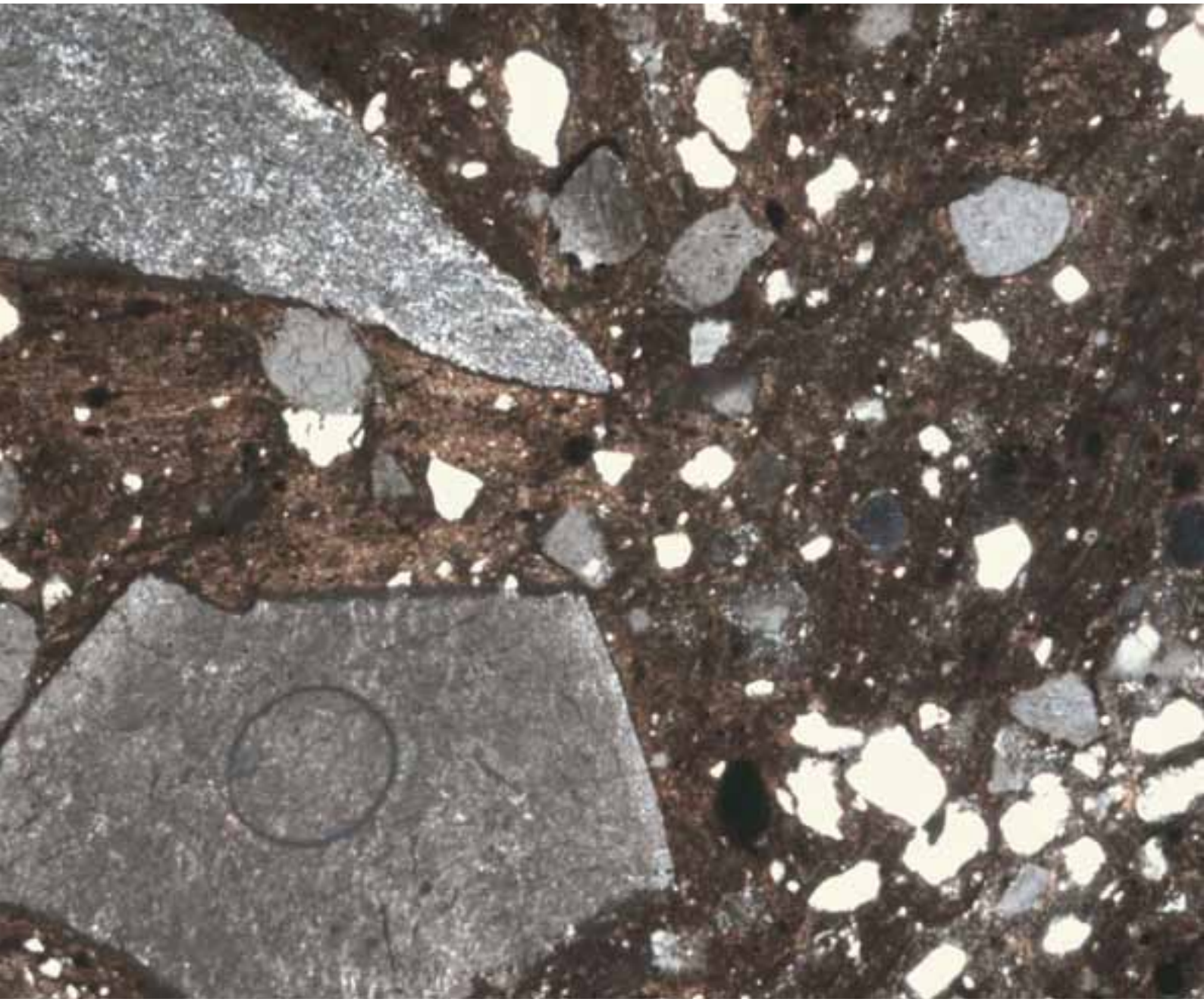
COMPARISON OF CLAY WITH FLINTS FROM SILBURY HILL AND LOCAL NEOLITHIC POTTERY FABRICS

Harriet White and Matthew Canti



INTERVENTION
AND ANALYSIS

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Comparison of clay with flints from Silbury Hill and local Neolithic pottery fabrics

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SUMMARY

The excavations at Silbury Hill in 2007-2008 raised questions concerning the truncated nature of the old ground surface (Canti, 2011), leading to a consideration of whether clay had been removed to make ceramics. This study investigates whether or not the Silbury Hill clay-with-flints was a potential raw material for Neolithic ceramic manufacture, by comparing modern clay-with-flints and thin-sectioned examples of suitable local pottery.

The results demonstrate that some coarse flint-containing fabrics were manufactured from naturally gritty clays. Although a direct link cannot be made between the Silbury clay and local ceramic examples, it could, nevertheless, have been a viable material for pottery manufacture.

CONTACT DETAILS

Harriet White, Institute of Archaeology, 31-34 Gordon Sq., London WC1H OPY
Matthew Canti, English Heritage, Fort Cumberland Eastney PO4 9LD, UK

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Introduction

During the excavations at Silbury Hill in 2007-2008, questions concerning the truncated nature of the old land surface (Canti 2011) led initially to a consideration of whether material had been removed, at the time of the Hill's construction, to be used for some practical purpose. An obvious possibility would be that the clay could be used to make ceramics. The aim of this petrographic study, therefore, is to investigate whether or not the Silbury Hill clay-with-flints was a potential raw material for Neolithic ceramic manufacture.

Sample Material

The material analysed comprised clay-with-flints from beneath Silbury Hill made into briquettes after removal of the >2mm fraction, then fired to 700°C, 800°C, 900°C and 1000°C, each receiving dwell times of 30 minutes and 1 hour at the top temperature. The briquettes were then prepared as standard thin sections.

Thin sections from Neolithic pottery of Peterborough and Windmill Hill types recovered from excavations in Wiltshire, and held in archive at the Department of Archaeology, University of Southampton were made available for comparison. In addition, thin sections of Grooved Ware from Durrington Walls (DW07) were kindly lent from the Alan Vince collection (held by APS, Heckington, Lincs.)

Method

The ceramic thin sections were examined at magnifications of 25x to 400x under a polarizing light microscope and the fabrics characterised following Whitbread's (1995, 379-388) thin section descriptive system.

Results

Silbury Hill clay-with-flints

The Silbury Hill clay-with-flints is characterised petrographically by its coarse fraction (>100µm, and occupying about 10% of the total field) containing predominant angular to sub-rounded fine sand to very coarse sand-sized flint (Figures 1 and 2). The flint fragments are grey under crossed polars (XPL) and colourless to yellow in plane polarised light (PPL). Few sub-rounded grains of fine to medium sand-sized monocrystalline quartz, and sub-angular to sub-rounded fine to coarse sand-sized iron oxide inclusions, very rare to absent sub-rounded medium to coarse sand-sized grains of chalcedonic quartz, and angular fine sand-sized calcite are also present in the coarse fraction. The fine fraction (<100µm, and occupying about 10% of the total field) comprises predominant sub-angular to sub-rounded monocrystalline quartz, rare white mica and very rare to absent sub-angular feldspars (plagioclase and microcline). The Silbury Hill clay-with-flints contains

clay pellets (about 2% of the total field). The clay pellets are rounded and up to 1.25mm in size, have high optical density and are dark red brown in XPL and dark brown to black in PPL. They may contain conchoidal fractures and monocrystalline quartz silt.

The colour and optical activity of the Silbury Hill clay-with-flints micromass is dependent on firing temperature and dwell time. Fired from 700 °C, 30 minutes dwell time to 900 °C, 30 minutes dwell time the micromass is slightly optically active, orange red in XPL and yellow brown in PPL (Figure 1). From 900 °C, 60 minutes dwell time to 1000 °C, 60 minutes dwell time the micromass in optically inactive, red brown in XPL and brown in PPL (Figure 2).

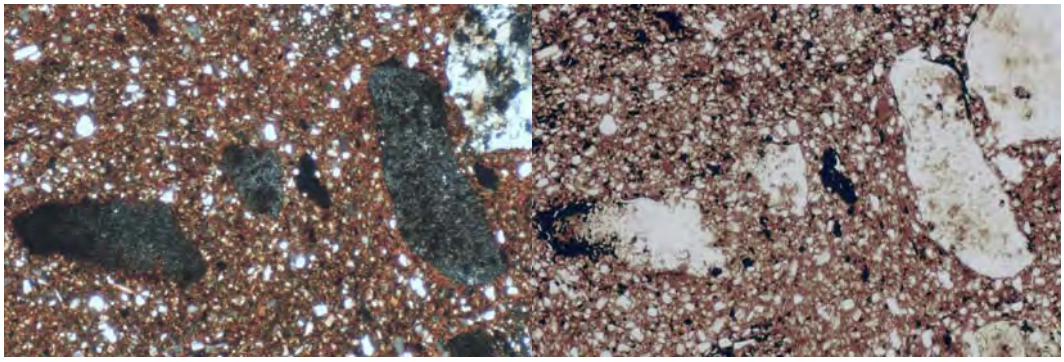

Figure 1: Thin section photomicrographs of Silbury Hill clay-with-flints, fired at 700°C for 30 minutes. Left image is taken in XPL and right image is taken in PPL. Showing sub-angular flint inclusions (grey) and chalcedonic quartz (top right). Width of image is 2.8mm.

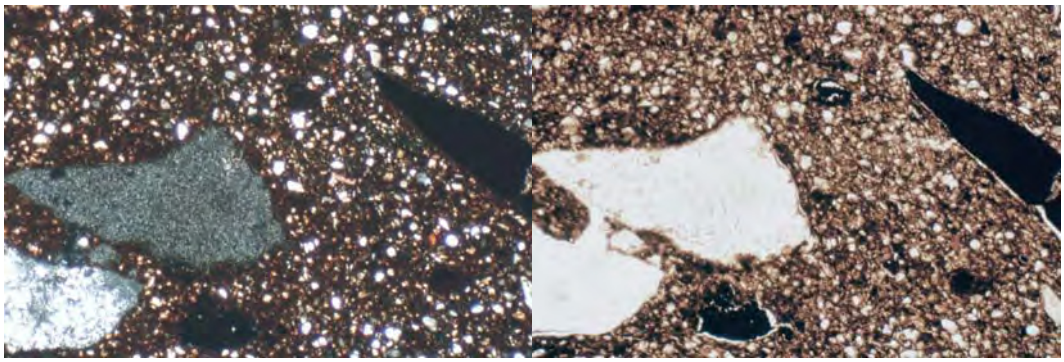

Figure 2: Thin section photomicrographs of Silbury Hill clay-with-flints, fired at 1000°C for 30 minutes. Left image is taken in XPL and right image is taken in PPL. Showing angular flint inclusions (grey in XPL), and iron oxide inclusions (black in XPL and PPL). Width of image is 2.8mm.

Comparative Neolithic Pottery

None of the Grooved Ware from Durrington could have been made from Silbury clay-with-flints, nor could the majority (ca. 50 different samples) of the Wiltshire Windmill Hill and Peterborough Wares examined. However, a small number of ceramic fabrics from

Avebury and its environs show similar petrographic attributes. These fabrics are described below:-

Fabric 1: Samples N160 (Windmill Hill Ware), Avebury and N184 (Peterborough Ware), West Overton

The micromass is optically active, yellow brown in XPL and yellow brown in PPL. Inclusions occupy approximately 20% of the total field. The coarse fraction (>100µm) comprises predominant medium to very coarse sand-sized, angular to sub-rounded flint and very few fine sand-sized sub-rounded quartz and flint. The flint is colourless to pale brown in PPL. The fine fraction (<100µm) comprises silt to very fine sand-sized quartz and rare white mica. Rounded clay pellets occupy about 1% of the total field. These have high optical density, are red brown in XPL, dark red brown in PPL, and are up to 0.7mm in size (Figure 3).

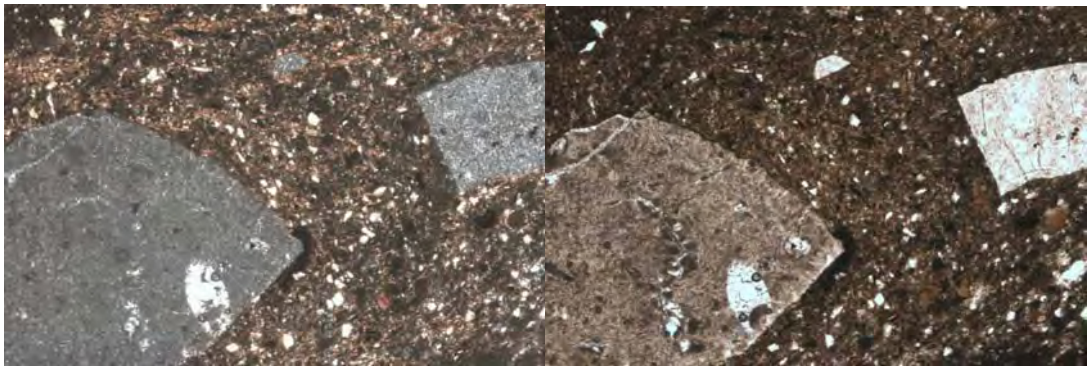

Figure 3: Thin section photomicrographs of Fabric 1, Sample N160 (Windmill Hill Ware). Left image is taken in XPL and right image is taken in PPL. Showing angular flint inclusions (grey) in a silt and very fine sand-sized quartz matrix, similar to the Silbury Hill clay-with-flints (Figures 1 and 2). Width of image is 2.8mm.

Figure 4: Thin section photomicrographs of Fabric 2, Sample N161 (Peterborough Ware). Left image is taken in XPL and right image is taken in PPL. Showing angular flint inclusions (grey) in a silt to sand-sized quartz matrix. Width of image is 2.8mm.

Fabric 2: Samples N159 (Windmill Hill Ware) and N161 (Peterborough Ware), Avebury

The micromass is optically slightly active, red brown in XPL and brown in PPL. Inclusions occupy about 30% of the total field and the coarse fraction (>100µm, approximately 25% of the total field) is composed of predominant medium sand-sized sub-rounded quartz, and few medium sand to granular-sized grains of angular to sub-angular flint. The flint is pale yellow to brown in PPL. The distribution of the quartz inclusions is heterogeneous, with grains closed (bottom right, Figure 4) to open-spaced (top right, Figure 4). The fine fraction (<100µm, approximately 5% of the total field) comprises silt-sized quartz and very rare black iron oxide nodules. Textural concentration features are present (< 2% of the total field) as rounded to distorted clay pellets.

Discussion

Flint-containing Neolithic pottery is commonly thought of as being 'flint-tempered', that is, the coarse flint inclusions were intentionally added by the potter to enhance clay workability, or the physical properties of the finished pot (for example Cleal 1995, 187). It is interesting to note that the Silbury Hill clay-with-flints has petrographic features in common with the examples of Windmill Hill and Peterborough Wares from West Overton (Fabric 1). Most notably, the fired clay and ceramic fabric both feature coarse, sub-angular inclusions of flint in a fine quartz-rich matrix, with rare white mica and clay pellets. Though there are variations that indicate a different source clay for the pottery (for example, coarse iron oxide inclusions are present in the clay-with-flints, but absent in the ceramic fabric), the findings do suggest the ceramic fabric may have been prepared using the naturally gritty, flint-containing clay, rather than being flint-tempered. This link between clay-with-flints and Neolithic pottery manufacture has previously been made with regard to Windmill Hill Ware, recovered from the site of Windmill Hill, where ceramic fabrics were related to clay-with-flints from the Marlborough Downs (Hodges 1965, 43-44 and Plates XVI a-c).

While Fabric 2 also has similar mineralogical attributes to the Silbury Hill clay-with-flints, such as coarse flint in a quartz-rich matrix, with quartz silt and iron oxide nodules contained in the fine fraction, the apparent bimodal grain-size distribution (medium sand to granule-sized flint in a medium sand-sized quartz matrix) is indicative the clay was tempered.

The results of this petrographic analysis demonstrate that while some coarse flint-containing fabrics were manufactured by tempering the clay (Fabric 2), it also appears to be the case that naturally gritty clays were exploited for pottery manufacture (Fabric 1). While a direct link cannot be made between the Silbury Hill clay-with-flints and Fabric 1, due to some variation in the coarse and fine fractions, the Silbury Hill clay-with-flints would have been a viable clay source for pottery manufacture.

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