GeoArch

Report 2023/13

Assessment of materials from Le Câtillon, Jersey

Dr Tim Young
11h May 2023

Assessment of materials from Le Câtillon, Jersey

Dr T.P. Young

Abstract

The submitted material comprised approximately 5.7kg of hand-collected material from the excavation of hoards at Le Câtillon in 2012. Of this, 3.4kg, was an assemblage of large pieces of partially reddened, possibly burnt, stone from context (009). Most of the reminder of the collection was of heat affected material that had been provisionally classified variously as furnace lining/hearth material, burnt clay, burnt daub and daub?. This was divisible into two types of material: ceramic 1, a gravelly fired clay, and ceramic 2, a very fine silty material with scattered angular granules and organic inclusions. Other submitted materials included pottery sherds and tiny fragments of burnt bone.

Direct evidence for metallurgical activity is entirely lacking from the assemblage. No slag was present in the collection; material previously suggested to be iron smelting slag was a highly bloated ceramic material, possibly a burnt potsherd.

Ceramic 1 may be interpretable as from the floor of a hearth, with the material showing some resemblance to descriptions of the weathered surface that underlies the local loess. This surface formed the approximate base of hoard pit [004] and may potentially have similarly formed a convenient base to cut features, including a hearth or hearths elsewhere on the site. The pale residues on the burnt surface have not been analysed during the assessment, but at present there is no reason to suspect they rise from a metallurgical process.

Ceramic 2 appears to include a variety of forms of indurated loess, apparently with organic inclusions that could be interpreted as a temper, but are not necessarily so. Some of this material is certainly heat-affected, but it is possible that some of the has been indurated by other (e.g. diagenetic) processes.

The burnt potsherds are most likely to have arisen from the burning of waste material, rather than as over-firing during pottery manufacture, but that cannot be excluded.

Contents

Abstract 1

Contents 2

Methods 2

Description of the assemblage
- General 2
- Ceramic 1 2
- Ceramic 2 2
- Pottery 2
- Burnt bone 3

Distribution of the assemblage 3

Interpretation 3

Further work 4

References 4

Table 1: Summary Catalogue 5
Table 2: Residue facies by context 7

Methods

All materials were examined visually, using a low-powered binocular microscope where required. As an assessment, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

This assessment was conducted in May 2023. The work was commissioned by Dr Jenni Butterworth of Drakon Heritage and Conservation.

Description of the assemblage

General

The submitted material comprised approximately 5.7kg of hand-collected material from the excavation of hoards at Le Câtillon in 2012. Of this, 3.4kg, was an assemblage of large pieces of partially reddened, possibly burnt, stone from context (009). Most of the reminder of the collection was of heat affected material that had been provisionally classified variously as furnace lining/hearth material, burnt clay, burnt daub and daub?. This was divisible into two types of material: ceramic 1, a gravelly fired clay, and ceramic 2, a very fine silty material with scattered angular granules and organic inclusions. Other submitted materials included pottery sherds and tiny fragments of burnt bone.

The summary catalogue is presented in Table 1 and a summary of materials by context in Table 2.

Ceramic 1

This material comprised a poorly indurated clay bearing angular gravel. The fragments were up to approximately 40mm in thickness and displayed a consistent internal variation. The basal parts were yellowish, becoming slightly reddened upwards. In this zone the inclusions may particularly show reddening of their surfaces. The reddened zone forms the majority of the thickness of the specimens and is typically overlain by a zone of grey colour of variable thickness of up to 15mm, but typically less. The upper surface of the material is variable. In many pieces the upper surface is white, but sometimes with the gravel inclusions taking on a slightly purple colour. In others, a thin veneer of fired clay, sometimes with a blackened surface, overlies the grey zone. In all of the pieces showing the upper surface, it appears to be planar.

In total, 1.06kg of ceramic 1 was recorded.

This material is most likely to be interpretable as a burnt surface, showing heat alteration of the underlying substrate. The texture of the ceramic is very poorly sorted and poorly compacted, so does correspond to typical texture for a processed clay. It might even represent a natural substrate.

One fragment alone has a thin (<1mm) layer of maroon coloured material extending a short distance across the planar surface. This could just possibly be a slaggy or clinkery melt, but detailed analysis would be needed to demonstrate this; alternatively, the material could simply be a mineral precipitate forming on the interface of the layer.

Ceramic 2

A second ceramic material was of variously indurated silt, with occasional coarser quartzose inclusions, small voids (probably after an organic component) and in rare cases carbonised organic material. The silt commonly shows dark patches which are distinct from the organic materials and appear to be localised developments of, probably, a manganese oxide.

At its least heat altered, this silty lithology has a grey colour (where organic material is preserved), but brownish colour where it has a porosity after the organic component. Higher degrees of probable heat alteration involve the appearance of reddish colours and possibly a reduction in porosity. The material is typically friable and many of the smaller examples are well-rounded.

A total of 1.11kg of ceramic 2 was recorded.

One fragment shows elongate cylindrical voids, with possible lateral branching, which could be indicative of the incorporation of thin plant stems. Most of the moulds of organic material appears to be more equant and granular.

This material is extremely silty with, it would appear, a low proportion of clay. Thus, it would appear unlikely to have been malleable or cohesive when wet. It would make a poor daub, and probably even a poor hearth lining. Of the metallurgical technical ceramics, it most closely resembles the silty materials employed for early moulds, but the morphology of the pieces indicates that this material was not in the form of moulds.

Pottery

Two small pieces of pottery were included in the submitted collection, for it was thought they might have metallurgical associations.

The first (a colour coated ware sherd from context (009) weighing 1.85g; CATII/009/012) was

provisionally thought to have slag attached, but the accreted material does not appear to be slag. The sherd is slightly fracturing and delaminating; it is also discoloured. It is likely that it is has been burnt.

A second sherd (a 10.51g sherd of coarsely-tempered greyware from context (001); CATII/001/031) had been provisionally interpreted as having been employed as a crucible. The outer surface as clean and unaltered (greyware pots used as crucibles usually have a secondary outer clay coating, the 'extra outer layer' (EOL) of Bayley 1992) no such layer is present). The inner surface is strongly and evenly heat affected, showing bloating extending inwards to a depth of 2mm (and locally more). Bloating is a product of the partial melting of a ceramic material that release volatiles (typically CO2 and/or H2O) on heating. The gas becomes trapped by the extremely viscous partial melt with the resultant bubbles (vesicles) causing the entire fabric to expand. The vesicles are exposed and open, probably as a result of slight over-cleaning, but there are no preserved internal residues or traces of metal prills. The vesicle size is constant across the sherd. These features make it more likely that the sherd has been heated strongly on the inside, perhaps through disposal into a fire, rather than having been used as a crucible.

The collection also includes an arcuate mass of strongly bloated grey ceramic weighing approximately 26g (CATII/009/038). This shows pale inclusions on its surface of approximately the same size as the inclusions in CATII/001/031. The piece is typically 18mm thick, locally rising to 34mm in the most bloated section. The concave face is less bloated. It is uncertain if the convexity of the piece is at all related to its original form, or a product of the differential bloating from the one side. A tiny area of green glassy slag remains on the concave surface There are some parallels between this piece and the slightly heated affected greyware sherd (CATII/001/031). It appears quite possible that this piece too was a greyware sherd before being heated and undergoing extreme bloating.

The burnt potsherds are most likely to have arisen from the burning of waste material, rather than as over-firing during pottery manufacture, but that cannot be excluded.

Burnt bone

Sample CATII/016/002 was a small collection of fragile calcined bone, possibly the remains of a single, now fragmented, small burnt bone.

Distribution of the assemblage

The distribution of resides by context is summarised in Table 2.

Within the submitted collection, ceramic 2 occurs widely in the fills of both pits [004] and [008], but ceramic 1 occurs mostly in pit [004].

The provisional account of the excavation (Waterhouse 2016) suggests that both ceramic materials might have had a wider distribution in more of the excavated contexts.

Interpretation

Direct evidence for metallurgical activity is entirely lacking from the assemblage. No slag was present in the collection, despite specific mention of iron smelting slag from context (009) by Waterhouse (2016, 20), who mentioned that a sample had been analysed by XRF (Waterhouse 2016, 51). In the description of Pit [008] Waterhouse (2016, 39) stated:

> 'A piece of purple slag with many small bubbles from pit fill 009 was tested with an XRF instrument, showing it to have a high iron content with no other minerals present'.

Thus, it seems likely that the 'iron smelting slag' and the 'purple slag with many small bubbles' are one and the same – and that description allows the identification of the piece as sample CATII/009/038. This piece has been identified here as a fragment of highly bloated ceramic, probably burnt potsherd.

The examples of fired clays could be from metallurgical hearths, but there is no specific evidence linking the burnt materials to a metallurgical rather than any other sort of hearth.

The two types of possible hearth ceramic were recognised at the time of excavation, for Waterhouse (2016) reports:

> 'Layer 014 was spread over 018 across the western half of the pit and was the first to contain significant quantities of burnt material. Its colour was reddish from the large quantities of burnt clay present, including some substantial pieces. This material included two fabrics: one fine and varying in colour from dark brown to bright orange; the other is coarser and more heavily affected by heat, usually being bright orange with occasional purplish-grey surviving surfaces. The finer material is probably burnt daub, a common find on later prehistoric sites in the island, while the coarser is considered to be furnace lining material.'

This section of the report is also interesting for there are no burnt clays present in the submitted collection from context (014).

The natural succession in the area of the excavation, as described by Waterhouse (2016) is:

- bedrock of andesite (not seen)

- overlain by context (022) described by Waterhouse as:
  'composed of frost-shattered semi-angular pieces of greenish-fawn andesite bound up with stiff clay, the stone element presumably being derived from natural bedrock beneath'.
  He further stated:
  'The upper surface of 022 was of small gravelly fragments with a rusty tint, increasing in size over the excavated depth of 15cm. The deepest archaeological feature, hoard pit 004 (& possibly 055) partially entered layer 022, but its toughness may have prevented the diggers from sinking it any deeper.'

- overlain by context (003), which Waterhouse described as:
  'a 65cm to 80cm thick layer of pale orange loessy clay. Although this layer appeared to be entirely natural undisturbed loess, occasional black flecks were observed in it. It is not certain whether these were charcoal

or black iron oxide, but both are occasionally found in loess.

This suggests a means of interpreting the 'fired clays' from the site which, although speculative, might provide a way forward: the description of the top of context (022) resembles the observations above of ceramic 1 and that of context (003) the observations of ceramic 2.

The origin of ceramic 1 on present evidence could be attributed to the heat alteration of a surface cut to the level of the top of context (022). That of ceramic 2 is probably to be sought in the generation of an indurated reworked loess-derived soil. For some of the material classed as ceramic 2, that induration is probably also due to heat alteration. It is possible however, that some of the material attributed to ceramic 2 and showing no reddening, might have become indurated by other means.

Although the cut of pit [004] extends to the top of (and just into) context (022) and thus provides a contender for the source of ceramic 1, this was not necessarily the case. Almost all the ceramic 1 described in this report derives from the fill of pit [008], which appears not to have reached context (022), so another origin, outside the confines of the excavation trench might be possible. Waterhouse does, however (2016, 39), list the coarse clay (the ceramic 1 of this report) as having been recovered from contexts (005), (013), (014), (027), (031), (065) and (072) within pit [004], so the association of ceramic 1 with pit [008] may just be function of which clay finds became incorporated into the curated collection.

Waterhouse mentioned that the trench is near the limit of the loess, and so context (022) presumably rises to be near surface in the immediate environs and thus be more likely to have formed the base of a hearth than it does within the area of the trench. Potentially, a hearth pit cut to the level of the top of (022) could produce ceramic 1 on its base and ceramic 2 in its sides, but many other settings could also have produced ceramic 2. Clearance or re-digging of the hearth would provide spoil rich in these materials that could find its way into the backfill of the other nearby pits.

Further work

There are limits to what could reasonably be achieve in enhancing understanding of fired and/or indurated materials present.

The following activities would, however, potentially further archaeological understanding:

1. did ceramic 1 occur more widely in pit [004] as suggested by Waterhouse? If site photographs and perhaps recollections support this assertion, then it must have multiple origins. If ceramic 1 is restricted to pit [008] (notwithstanding the single fragment recorded apparently from [004] in this study) then the similarity of the pieces would argue for them having been reworked from a single hearth.

2. Does the white material present on the surface of the ceramic 1 pieces (i.e. on the floor of the hearth the destruction of which is represented by ceramic 1) contain any clue as to its origin. It is recommended that pXRF examination of the superficial layer is undertaken.

3. What is the nature of the organic material in ceramic 2 and that formerly present in the moulds? This probably needs assessment by an archaeobotanist to examine whether any morphologically distinctive material/voids survive. This might assist with understanding whether the inclusions in this material were accidental or deliberate (i.e. as part of process of preparation of the ''clay') which would help determine whether ceramic 2 is simply mixed loess or a deliberate material.

4. Petrographic investigation might help determine whether the grey/brown variants of ceramic 2 have indeed been fired, or whether they have been indurated by other (natural) means. This would be a difficult procedure and might not be feasible. As an alternative, X-Ray diffraction of selected samples of the material might be an alternative approach. An investigation of the magnetic susceptibility of these materials might also aid this distinction. Whether such approaches would be archaeological valuable would depend on the value placed upon understanding whether all, or just some, of ceramic 2 was affected.

References

BAYLEY, J. 1992. Non-ferrous metalworking in England Late Iron Age to early medieval. Unpublished PhD thesis, University of London.

WATERHOUSE, R. 2016. Two Iron Age & Roman Coin Hoards from Le Câtillon, Grouville, Jersey; Interim Archaeological Report, January 2014 with minor revisions to March 2016. Unpublished Report.

Table 1: summary catalogue of submitted macroscopic materials. Weights in g. Assm = assemblage.

context	find	weight	number	notes
001	031	10.51	1	sherd of coarsely tempered grey ware. Inner face has bloated to a depth of 2mm (and deeper in small areas). The face is now abraded and the vesicularity exposed, with no indication of surviving residue
002	015	204	5	pieces of heated affected coarse ceramic, cf. 13/1 and 12/01 grey zone variable 4-15mm, in areas dark smooth surface is preserved on its top
		3.68	1	silt with voids, fired to distinctly reddened colour
		5.2	1	isolated lithic clast separated from coarse material in the 204g group
		29.46	1	buff-coloured silts similar to 005/003. shows 3 parallel holes passing along one face - probably plant stems
003	004	4.37	1	similar to other silty material, silt, coarse rounded sand, occasional granules, bleck flecks and voids, but heated to a more strongly oxidised colour locally (pink/grey), rounded lump
003	010	1.52	1	coarse grained igneous rock with large feldspar phenocrysts
		4.06	1	fine grained igneous rock with large chlorite-filled vesicles
003	011	412	13	13 pieces of gravelly fired ceramic, superficial grey layer becomes very dark in one piece (Cf. 13/1, 12/1, 2/15)
		7.81	1	silt with preserved organic temper, grey
		2.49	1	silt with voids buff/grey
		14.5	1	dense grey siltstone with some vids and a planar face
		10	dust	debris from abrasion of coarse ceramic
005	003	328	8	fragments of a buff coloured fired clay. Largest piece suggest material smoothed into a hollow and built up to give a smooth concave upper surface. The material is finely silty, broadly resembling the loam used for moulds, but shows little evidence for strong heating. There are lots of small holes - but not convincingly able to be distinguished between organic temper and post depositional rooting. There are also black areas - some of which appear to be clasts, but others appear to be post-depositional (MnO migration?)
005	004	205	7	two large and seven small pieces of gravelly fired ceramic, superficial grey layer very thin (Cf. 13/1, 12/1, 2/15)
		36.13	18	cavity bearing siltstones ranging from very low fired buff/brown to well fired oxidised material
		4.15	2	silts carrying surviving organic temper
		33.32	1	large block of oxidized fired silt, front smooth to planar surface.
		0.78	1	angular chip of hard fired red silt with dark blotches and some coarse temper
		1.82	1	coarsely gritted soft ceramic, cream coloured, probably almost unfired part of coarse material above
009	012	1.85	1	pale pottery with coloured surface, delaminating and cracking - probably burnt. Accretion on both surfaces does not appear to be slag
009	038	25.98	1	large curved fragment of bloated ceramic. Piece typically 18mm thick, rising to 34mm in most bloated section. Inner face is less bloated - but it is unclear if this is a feature, or simply that the less bloated material has forced the curvature. A tiny area of glassy slag remains on interior. There are some parallels between this and the slightly heated affected greyware sherd 001/031
009	039	21.2	2	gravelly oxidised ceramic
		9.93	1	silt with a thin maroon slag layer? On surface
		6.34	1	pale grey ceramic - almost white
		7.22	1	coarse igneous rock - probably a clast from the ceramic
		617	70 plus dust	silty ceramic in various degrees of heat alteration, some with planar surface

009	042	630	15	various angular fragments of reddened, probably heat altered but not certainly so, stone
009	043	1730	12	various rocks, including 2 large pebbles, showing colour changes of red and dark grey suggestive of heating but not certainly caused by heating
009	044	1080	1	burnt block of weathered coarse-grained rock, highly fractured near planar surface
010	002	1.63	1	buff coloured silt very similar to 005/003
		4.85	1	brownish silt with granule grade angular clasts. Probably an artificial ceramic
011	003	4.23	4	angular fragments of brown, just very slightly brightened by oxidation, silt with some coarse angular inclusions. Some pieces appear to show remnants of a planar surface, but no other morphological features. Small black flecks and holes may link this to large fragments elsewhere
012	001	62	1	as 013/001, but with thinner grey layer
013	001	124	1	fired gravelly poorly consolidated ceramic, 40mm thick, outer 7-12mm is greyish, locally with almost white surface coating and occasional purple-coloured clasts. The ceramic contains very iron-rich gravelly material. White probably needs checking whether it is a simple ash.
016	001	9.13	2	similar to other silty materials in the collection, but more indurated and showing cracking
016	002	0.14	assm	fragmenting burnt bone

Table 2: distribution of residue facies by context

Context	Context notes	ceramic 1 (gravel(	ceramic 2 (silt)	bloated pottery	pottery	rock	burnt bone
001	topsoil			11			
002	topsoil	209	33				
003	subsoil loess	422	29			6	
005	burnt fill in [004]	207	402				
009	primary fill of Roman hoard pit [008]	35	627	26	2	3440	
010	coin hoard in [004]		6				
011	dark brown fill of cut [023]		4				
012	dirty loam fill of [004]	62					
013	reddish material in [004]	124					
016	loess fill within [004]		9				<1

GeoArch

geoarchaeological, archaeometallurgical & geophysical investigations

Unit 6, Block C,
Western Industrial Estate,
Caerphilly,
CF83 1BQ

Office: 029 20881431
Mobile: 07802 413704

E-Mail: Tim.Young@GeoArch.co.uk
Web: www.GeoArch.co.uk