ADS SUPPLEMENTARY MATERIAL

On the verge of Wessex? A prehistoric landscape at Oldlands Farm, Bognor Regis, West Sussex

AND

Fragmentary remains of a probable 13th – 15th century croft at Oldlands Farm, Bognor Regis, West Sussex

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Tables

ADS SUPPLEMENTARY MATERIAL

THE PALAEOENVIRONMENTAL RESULTS

Pollen Analysis of waterhole [1391] by Cath Langdon and Rob Scaife

Introduction

Pollen analysis of a series of samples was undertaken on the sediment fills of a waterhole feature [1391]. An initial assessment of pollen preservation and potential for environmental reconstruction was undertaken in 2015 (Scaife 2015). The study proved successful and as a result, a fuller analysis has been carried out. It is apparent that the site was in proximity to marine, salt marsh condition throughout its period of sedimentation history and that the region had been largely cleared of trees for agriculture.

Methodology

Standard techniques for the extraction of the sub-fossil pollen and spores were used on these sub-samples of 2ml volume (Moore and Webb 1978; Moore *et al.* 1992). Micromesh sieving (10 micron) was also used to assist with removal of fine silica in these predominantly minerogenic samples. Counts of 400 or more total pollen were made where preservation permitted. This was not always achieved due to poor low absolute pollen values in sediment of brackish/marine origin which overlies lower humic and polliniferous sediment.

The pollen data obtained are presented in standard pollen diagram form. The pollen data have been calculated as a percentage of dry-land pollen (the sum) and for marsh taxa as a % Sum + Marsh and ferns as a % Sum + Fern spores. Large numbers of reworked geological (pre-Quaternary) palynomorphs (pollen, spores and dinoflagellates) were also present throughout the sequence.

Taxonomy used in general follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994). An extensive pollen reference collection was available to aid identification.

These procedures were carried out in the Palaeoecology Laboratory of the School of Geography and Environment, University of Southampton.

The pollen data (Figure 21)

Pollen preservation was found to be very variable in this sediment sequence. This is in a large part due to the differing sediment types and their environment and mode of deposition. Preservation and absolute numbers were better in the lower part of the sequence, which is the lower and more humic mineral sediment and peat. In contrast, preservation was poor in the upper, highly minerogenic sediment above 1.23m and was absent in the uppermost levels. Changes in the pollen spectra at 1.23m and 1.70m are evident, and as such, three local pollen assemblage zones (l.p.a.z) have been recognised. These are delimited and described in Table 1 below.

Assemblage zone	*Palynological characteristics*
l.p.a.z. 3 ***1.20m to 0.40m*** ***Lactucoideae-Poaceae***	This upper zone has similarly low values of tree and shrub pollen with sporadic *Betula, Quercus, Alnus* and *Prunus/Malus* type. Herbs remain dominant with lower taxonomic diversity. High values of Lactucoideae (to 55%) replacing the dominance of Poaceae in l.p.a.z. 1/2. Poaceae are reduced (max. 35%) but remain relatively important and include cereal pollen (7%). *Plantago lanceolata* remains with low values along with Chenopodiaceae and *Polygonum aviculare* type. Marsh and aquatic taxa are poorly represented with only *Typha angustifolia* type (peak to 6%). Ferns comprise *Dryopteris* type (4%), *Pteridium aquilinum* (peak to 16%) and occasional *Polypodium*. Pre-Quaternary palynomorphs attain high numbers across the lower zone
l.p.a.z. 2 ***1.70m to 1.20m*** *Plantago lanceolata*-Poaceae	This l.p.a.z. is characterised by increased values of *Plantago lanceolata* (to 20%), Lactucoideae (to 20%). Poaceae remain dominant (to 60%). *Cereal* type and other herbs noted in l.p.a.z. 1 remain. Halophytes, *Spergularia*, *Armeria* 'A' line and *Plantago maritima* are present. Trees and shrubs remain at low levels although there appear minor increases in *Quercus* (to 5%) and *Corylus avellana* type (6%) from mid-zone at 1.48m.
l.p.a.z 1 ***2.44m to 1.70m*** ***Poaceae-Cereal type-Pteridium aquilinum***	Herbs are dominant with Poaceae most important (to 68%). *Plantago lanceolata* (to 16%) and *Anthemis* type (peak to 19%) Asteraceae are also present in higher values than subsequent zone 2. Cereal pollen has highest values in the lower levels (to 9%) and is present throughout. Halophytes are present with *Armeria* 'B' line and *Plantago maritima*. There are few trees and shrubs with taxa comprising small numbers of *Betula*, *Quercus*, *Corylus avellana* type, *Alnus* and *Fraxinus*. Marsh and aquatic taxa comprise occasional Cyperaceae, *Potamogeton* type, and *Typha angustifolia* type. Fern spores include occasional *Pteridium*, *Dryopteris* type and *Polypodium*.

Table 1. Local pollen assemblage zonation of Bronze Age watering hole; feature [1391].

Discussion and interpretation

The pollen data can be considered in relation to the on-site vegetation and changes in the aquatic and marginal aquatic vegetation that colonised the waterhole and its fringing zone. The latter shows the proximity of the waterhole to saline conditions and to pollen derived from airborne and possibly some fluvial transport from the drier soils of the interfluves and from more regional sources. These two aspects are discussed separately below.

3.i.) The on-site vegetation and environment

3.i.a.) For a possible waterhole or pond, there are only small numbers of aquatic and wetland fen taxa present. This is in contrast to sample BP10 <297>, from a Bronze Age well or watering hole from nearby Medmerry in which greater numbers of freshwater aquatic taxa were recorded (Langdon and Scaife in prep). Preservation is poor in the upper levels above the stratigraphical change to more oxidised at 1.23m (l.p.a.z.2) and may have destroyed much of the typically fragile aquatic pollen. This is not the case for the lower l.p.a.z. where, pondweed and/or arrow grass, (*Potamogeton* type) is present with occasional marginal aquatic sedge and reed mace and/or bur reed (*Typha angustifolia* type). It is possible that the feature was cleaned out or was disturbed or polluted.

3.i.a.) Marine status: There are clear indicators of saline conditions throughout the history of the sediment basin with a final and more dominance when the waterhole was transgressed. Taxa recovered from zones 1 and 2 include *Armeria* types (thrift and sea lavender), *Spergularia* (spurrey), *Plantago maritima* (sea plantain) and Chenopodiaceae (goosefoot, orache and samphire). These are indicative of nearby salt marsh habitats. It can be noted that *Armeria,* although only sporadically present, is very poorly represented in pollen spectra and as such this belies its importance. There is a marked stratigraphical change at 1.23m also at the l.p.a.z. 2/3 transition from the humic sediment fill of the waterhole to a probable salt marsh or probably mud flat habitat. This probably also represents a gap in the pollen sequence caused by a hiatus in the sedimentation or erosion of the transgressive contact. Pollen is, unfortunately very poorly preserved and with low APF values in the upper sediment of l.p.a.z. 3.

Thus, the water hole was probably a shallow water feature with pondweed (but possibly arrow grass within the same pollen taxon) fringed by typical fen herb vegetation comprising sedges (*Cyperaceae*), bur reed and/or reed mace (*Typha angustifolia* type). There are indications that the feature was in close proximity to areas of salt marsh (l.p.a.z. 1-2) and that the feature was transgressed by mud flat and/or salt marsh.

3.ii.) The dry-land-terrestrial flora

There is a major contrast in pollen preservation between less oxidised humic grey-brown sediment in l.p.a.z. 1 and 2 (2.38m to 1.24m) and overlying l.p.a.z. 3 the latter comprising oxidised (grey/orange) silt. Better preservation in l.p.a.z. 1 and 2 is accompanied by a greater taxonomic diversity. There is, in general, a paucity of tree and shrub pollen with only sporadic occurrences of birch (*Betula*), oak (*Quercus*), alder (*Alnus*) and hazel (*Corylus*). All of the trees recorded are anemophilous and produce substantial numbers of pollen which, with the possible exception of ash (*Fraxinus*) may be disseminated over great distances. As such, these largely represent the more regional flora probably at some distance from the site.

Herbs are dominant in all of the pollen zones, reflecting the overall openness of the local environment. Two local pollen assemblage zones (l.p.a.z. 1-2) reflect the changing herbaceous flora and especially in relation to agricultural activity during this phase of the Bronze Age. Initially, in l.p.a.z 1 numbers of cereal pollen are (albeit slightly) greater and with other herbs of disturbed ground indicate a phase of greater arable activity at least in proximity to the site (i.e. within the pollen catchment). It can be noted that the representation of arable taxa in pollen sequences is less recognisable than for pastoral habitats. Overall, during phase l.p.a.z.1, where pollen preservation is relatively good, the local environment was open treeless agricultural land. It appears that this was primarily grassland/pasture but with the possibility of some local arable cropping or crop processing.

Zone 2, appears to show a change to a more pastoral land use, however, it can also be suggested that existing, previously heavily grazed pasture was allowed to grow with resulting flowering in a meadow pasture. Grasses (*Poaceae*) attain especially high values throughout and may derive both from the on-site habitat and also from grassland/pastoral habitats. These along with ribwort plantain (*Plantago lanceolata*), medick (*Medicago*) and clover (*Trifolium* and *Asteraceae* types) are all highly indicative of a strongly pastoral environment, at least in proximity to the site. This was consistent throughout. Cereal pollen is also present in zone 2 and as arable activity tends to be less well represented in pollen spectra, the importance of arable farming here may be underestimated. Whilst there is the strong possibility that cultivation was taking place in proximity, it should be noted that the cereal pollen could also derive from secondary sources. As this is a waterhole and may have been used by animals, it is also highly likely that the pollen of cereals and any associated arable weed may have come from animal (or human) faecal material or even from domestic waste which was deposited in the waterhole. Pollen becomes trapped in the cereal inflorescence and remains in human and animal feed. Once ingested, the pollen is readily preserved in human or other animal stomach and intestines and, as a result, is frequently found in archaeological features where such waste was deposited. This possibility is enhanced by the cyst of the intestinal (whip) worm, *Trichuris* in zone 2, the upper pond fills. A further possibility is that cereal pollen may have been liberated and dispersed during crop processing.

The fact that this feature/context is thought to have been a water hole/pond also supports a pastoral component to the agrarian economy. Thus, in both of the lower pollen assemblage zones, there is evidence of both pastoral and arable land use activity and, as might be expected, the Bronze economy was of mixed character.

At 1.23m there is a stratigraphical change from grey-brown humic silt to orange-grey silt, which is clearly more oxidised through l.p.a.z. 3. This change marks a change/transition from the humic sediment facies of the water hole fill to that of brackish/marine sediment, which seals the feature (see above). The palynological consequence of this change was a much poorer pollen-preserving environment. This is also manifested by the reduction in taphonomic diversity with less robust pollen types having been destroyed and the more robust types being differentially preserved. This is especially clear with the sharp rise in numbers of very resilient dandelion type (*Lactucoideae*) pollen. There is also a substantial representation (not shown) of reworked geological palynomorphs derived from reworking of older sediment.

In l.p.a.z.3 the pollen data are, therefore, badly skewed in favour of the *Lactucoideae* and is typical of poor preserving conditions, especially in alluvial sediment (Dimbleby 1985). In spite of the differential preservation, it is probable that the *Lactucoideae* types, although over represented, also suggest, as for l.p.a.z. 2, that the local environment was pastoral and certainly open. Cereal pollen (large and robust) is present throughout also showing continuation of arable activity and the mixed economy noted.

4.ii.b.) Dating and pollen: This waterhole feature has been dated by artefacts (pottery and a log ladder) to the Bronze Age. Pervious pollen analysis of a Bronze Age well or watering hole from Medmerry has shown a degree of woodland clearance during this time but with considerably more aboreal pollen than that noted here (Langdon and Scaife in prep). Evidence of late-prehistoric, Bronze Age woodland is seen from the intertidal peat at Felpham, Bognor Regis with oak, lime and hazel present in quantity (Scaife 2004). Such woodland is also in evidence at other pollen sites in Sussex (Jennings and Smythe 1985; 1987; Scaife 1985; Scaife and Burrin 1992; Thorley 1981; Waller and Hamilton 1998). All of these studies show major clearances at different time but largely during the Early and Middle Bronze Age. However, these sites show continuation of woodland in substantially higher levels than noted here. This incongruity may be taphonomic due to the fact that the pollen catchment of this small feature may have been limited to the immediate surrounding area or, that there has been reworking of pottery from the surrounding soil.

Summary and conclusions

The following principal points have been made in this pollen study.

- Pollen has been extracted from all but the uppermost levels of feature [1391] at 0.18m.

- Preservation is better in the lower half of the profile, that is, the more humic sediment filling the water hole. In contrast, the upper levels are poor, showing strong differential preservation in favour of robust pollen taxa, especially dandelion types. Pollen was absent in the upper level at 0.18m.

- Significant palynological changes occur at 1.23m which divides the pollen sequence into the lower, humic sediment fill of the water hole feature and the overlying minerogenic sediment which was laid down as a result of marine/brackish transgression.

- The three local pollen assemblage zones recognised show an open environment with few if any trees or shrubs growing in proximity to the site.

- The environment was strongly agricultural with pasture dominant, although with the possibility of arable cultivation as suggested by cereal pollen which occurs throughout.

- It is, however, also suggested that the cereal pollen may come from animal ordure deposited in this waterhole.

- Overall, the environment appears to have been very open which contrasts with other regional pollen data for the Bronze Age. This may be a taphonomic factor caused by a restricted pollen catchment in this small depositional basin.

- Being of Bronze Age date the lack of local woodland and the evidence for more intensive agriculture than previously seen in this region for this period is of interest.

- There is evidence of salt marsh (halophytes) plants indicating nearby salt marsh or ephemeral marine incursion which has fluvially transported salt marsh pollen. Diatom analysis is required to establish this.

Soil micromorphology by Dr Rowena Banerjea

Introduction

This report summarises the findings of the micromorphology analysis undertaken by Quaternary Scientific (University of Reading) on one sample <63> taken from an archaeological excavation at Oldlands Farm, Bognor, West Sussex. The sample was collected from context [353] (Figure 22) to determine the composition and formation of a very silty, amorphous deposit that is possibly from a dew pond, an artificial pond to water livestock, or cattle poaching deposit. Worked flint was recovered throughout the deposit.

Pond sediment is formed as substances continually settle from pond water onto the pond bottom to form a layer that can be several to many centimetres in thickness (Boyd 1995, 1-2). Pond sediment tends to be fine textured, with at least 20-30% clay content, and contain a higher proportion of organic matter than terrestrial soils (Boyd 1995, 4-5).

Poaching is the damage caused to turf or sward by the feet of livestock. Hooves cause compaction of the soil surface, leaving depressions which can be 10cm to 12cm deep. This can form an almost continuous layer of grey anaerobic soil, where natural activity, carried out by soil micro-organisms, is low. Heavier clay soils are more prone to poaching than sandy loams as they are less free draining (Tripney 2014).

Previous micromorphological analysis of sample <64>, context [537] (not stratigraphically related to sample <63>), was undertaken to address the same research questions. The analysis of sample <64> showed that there were two units, both fine-grained, silt loams with a well sorted silt component. Both units share more similarities with the characteristics of pond sediment than a poaching soil, and showed evidence of wetting and drying episodes, which may be the result of a fluctuating water table (Banerjea 2015).

Methodology

One thin-section, 11.5 x 7.5 cm was prepared from a monolith sample, 13 x 8 cm. The procedure followed is the University of Reading standard protocol for thin section preparation. The samples were oven-dried to remove all moisture and then impregnated with epoxy resin while under vacuum. The impregnated samples are then left overnight so that the resin can enter all of the pores. The samples are then placed in an oven to dry for 18 hours at 70˚C before they are clamped and cut to create a 1cm slice through the sample. The surface of the 1cm slice is flattened and polished by grinding on the BROT. The prepared surface of the 1cm slice is then mounted onto a frosted slide and left to cure. This is followed by cutting off the excess sample, so the sample is down to a thickness of 1-2 mm. The mounted sample is ground down to approximately 100 µm in thickness using the BROT. The 100 µm section was lapped on a Logitech LP30 precision lapping machine to the standard geological thickness of 30 µm.

Micromorphological investigation was carried out using a Leica DMLP polarising microscope at magnifications of x40 - x400 under Plane Polarised Light (PPL), Crossed Polarised Light (XPL), and where appropriate Oblique Incident Light (OIL). Thin-section description was conducted using the identification and quantification criteria set out by Bullock *et al* (1985) and Stoops (2003), with reference to Courty *et al* (1989) for the related distribution and microstructure, Mackenzie and Adams (1994) and Mackenzie and Guilford (1980) for rock and mineral identification, and Fitzpatrick (1993) for further identification of features such as clay coatings. Tables of results use the descriptions, inclusions and interpretations format used by Matthews (2000) and Simpson (1998). Photomicrographs were taken using a Leica camera attached to the Leica DMLP microscope.

Micromorphology enables the following properties to be examined at magnifications of x40 - x400 under PPL, XPL and OIL: thickness, bedding, particle size, sorting, coarse:fine ratio, composition of the fine material, groundmass, colour, related distribution, microstructure, orientation and distribution of inclusions, the shape of inclusions, and finally the inclusions to be identified and quantified. In addition, post-depositional alterations can be identified and quantified such as: effects on the microstructure by mesofaunal bioturbation and cracking due to shrink-swell of clays or trampling; translocation of clays and iron; chemical alteration such as the neoformation of minerals such as vivianite and manganese; organic staining as a result of decayed plant material; and excremental pedofeatures such as insect casts and earthworm granules.

Results and interpretation

Micromorphology descriptions for each deposit are recorded in Table 2, the frequency and types of inclusions within these deposits are recorded in Table 3, and the abundance of post-depositional alterations and pedofeatures within the deposits is recorded in Table 4. To determine the deposit type classification, each deposit was grouped using the following diagnostic sedimentary attributes and inclusions which provide crucial information concerning the origin of inclusions, transportation mechanisms of particles and the deposition processes. To ascertain the origin of sediment components descriptions were made of particle size, shape, and the composition of the coarse and fine fraction, particularly the frequency of rock, minerals and anthropogenic inclusions (Table 3). The depositional events are characterised by the following sedimentary attributes: sorting, related distribution, orientation and distribution of the inclusions (Table 2), and bedding structure (Table 3).

Understanding the formation processes for deposits is crucial to interpreting the depositional pathways of rock fragments and minerals, any anthropogenic debris such as charred wood and artefacts, and other types of plant remains and microfossils (Matthews 2010; Schiffer 1987). Analysis of post-depositional features provides crucial information concerning the effects of weathering, preservation conditions (Bisdom *et al* 1982; Brady and Weil 2002; Breuning-Madsen *et al* 2003; Canti 1999; Courty *et al* 1989) and stratigraphic integrity of the deposit (Canti 2003; Canti 2007; Courty *et al* 1989; Macphail 1994).

Microstratigraphic and unit classification

Micromorphological analysis has separated Context [353] into two microstratigraphic units, units 1 and 2. Both these units share the same fine-grained, silt loam, particle size, have bimodal sorting (well sorted silt, and moderately sorted sand), have an embedded and coated related distribution, and locally oriented and clustered quartz silt grains with other particles that are unoriented, unrelated, random and unreferred in distribution (Table 2). The units differ from each other in their groundmass, which is predominantly a mosaic speckled b-fabric in unit 1, due to a greater amount of silty clay translocation, and more dotted or stippled-speckled in unit 2, both units have the same colour: mid brown and dark orange brown (PPL) and orange/grey (XPL) (Table 2).

Both units have a narrow range of mineral and anthropogenic inclusions, and the mineral component predominantly consists of quartz silt (all shapes), 60-70% (Table 3). There are some flint fragments, 5%, charred wood (unit 1 only), 5%, (Table 3). It is unclear if the flint fragments are anthropogenic in origin as some are rounded in shape, unlike the angular shape, which occurs in fragments of worked flint (Fladmark 1982; Macphail and Goldberg 2010, 609).

Anthropogenic inclusions

Charcoal fragments in unit 1 are the only anthropogenic inclusions recorded in this slide. Charcoal fragments, 5%, are sub-angular in shape and <0.6mm in size (Table 3).

Post-depositional alterations

Both units showed evidence of weathering, specifically silty clay translocation, the movement of iron, manganese neomineral formation, and mica weathering, as well as changes to the microstructure caused by the shrink-well of clays drying (unit 2) and mesofaunal bioturbation (Table 4).

Weathering

Silty clay translocation occurs in both units 1 and 2, but it is most abundant in unit 1, which is one of the key attributes that distinguish the two units (Table 4). The translocation of clay and silty clay particles is influenced by factors related to water flow, chemical conditions and energy and gravity. Movement can occur under any kind of climate, although temperate environments provide the best evidence (Courty *et al* 1989). Clay coatings that have a different colour from the surrounding sediment matrix suggest that the fine clay material has translocated from elsewhere (Brammer 1971; French 2003), and so as the clay coatings are similar in colour to the sediment matrix, this suggests *in situ* weathering of units 1 and 2. The silty clay coatings themselves do not show characteristics of fragmentation by the movement of sediment, which may have occurred through repeated disturbance if poaching had occurred; although, clay translocation can be problematic to attribute to specific times in the formation of the archaeological record.

Both units show the translocation of iron, which coats inclusions, has impregnated silty clay coatings, and has formed nodules; however, these alterations are more abundant in unit 1. Mica weathering and the neoformation of manganese nodules also occur (Table 4). These chemical alterations indicate that redox processes fluctuated in this sequence as a result of wetting and drying. Free iron is highly mobile only when present in the ferrous state which occurs under anaerobic conditions (Courty *et al* 1989). Manganese neomineral formation, including nodule formation, occurs in all units, (Table 4). Silty clay coatings are impregnated iron compounds which have formed as a result of weathered muscovite (Bisdom *et al* 1982). These silty clay/clay coatings are also frequently impregnated with muscovite mica particles.

Manganese may accumulate at the top of either the water table or the capillary fringe (Bartlett 1988; Rapp and Hill 1998). Fluctuating water tables lead to alterations of reducing and oxidising conditions (Brammer 1971; Brown 1997; French 2003; Lindbo *et al* 2010). Manganese neomineral formation has a strong association with the decaying organic matter. Organic matter becomes oxidised as Mn(III) accepts electrons to become Mn(II). The pH rises and the rate of redox is slowed. As organic matter is lost by oxidation, black precipitated MnO_2 will become evident. Most critical redox happenings occur in areas where the O_2 supply is partially restricted either by limited aeration or a predominating electron supply. Most of these regions are redox interfaces such as: meeting points between roots or microbial surfaces and the soil surface; aggregates and soil pores; sediments and free water; the boundary between organic and a mineral horizon (Bartlett 1988).

Bioturbation

Bioturbation from root and/or mesofaunal activity is most abundant in unit 1, evident by channels and chambers in the microstructure, >25% (Tables 2 and 4). Fragments of ferruginous plant tissue occur in void spaces and may be from roots.

Discussion and conclusions

Units 1 and 2 within sample <63> have similar sediment attributes, and show similar post-depositional alterations to units 1 and 2 in sample <64>, which was the subject of previous analysis; both these units share the same fine-grained, silt loam and the silt component is well sorted as those in sample <64> (Banerjea 2015). Unit 1 is a more oxidised surface of context [353].

As also observed sample <64> (Banerjea 2015), units 1 and 2 show evidence of oxidation in the colour; the sediment is not gleyed and shows some biological activity, which may not be expected in an anaerobic poaching soil (Tipney 2014). Units 1 and 2 share more similarities with the characteristics of pond sediment. Pond sediment tends to be fine textured, with at least 20-30% clay content, and contain a higher proportion of organic matter than terrestrial soils (Boyd 1995, 4-5). There is substantial silty clay translocation, and translocation of iron, which coats inclusions, has impregnated clay coatings along with weathered mica particles, and has formed nodules, and the neoformation of manganese indicate that redox processes fluctuated in this sequence as a result of wetting and drying, which can be caused by fluctuating water tables.

However, as with sample <64> (Banerjea 2015) there is not a high frequency of organic matter within units 1 and 2, but this may have been decayed as a result of repeated wetting and drying processes due to water tables fluctuation. It is possible that units 1 and 2 in sample <63> and units 1 and 2 in sample <64> represent slow sedimentation under still water, where the fine material has settled and silted up the pond.

Charcoal Analysis by Marvin Demicoli and Lucy Allott

Introduction

Following excavation works at Oldlands Farm, an initial selection of samples moderately rich in charcoal was made for assessment. Subsequently this list was refined to include only those for which charcoal within the feature/deposit was of intrinsic interest and had potential to contribute to the interpretation of that feature/deposit. As a result eight charcoal samples were selected for full analysis. Three of the selected samples came from possible cooking pit or furnace features dated to periods 1 and 2.2, while the other five samples come from features defined as cremation burials as well as other features from which burnt bone was retrieved dating to periods 2.1 and 2.2.

This analysis aims to consider the evidence contributing to the following questions:

- Is there evidence for fuel wood selection and does this change through the different occupation periods or within different features and areas of the site?

- Where were fuel and timber resources being sourced from? What is the nature of the woodland vegetation in the area and is there evidence to suggest that this changes during the different occupations?

- Is there evidence for management of woodland resources and what is the nature of this management?

Methodology

Charcoal fragments were extracted from the flots and residues of each sample. Fragments >4mm were considered suitable for analysis as, in general, fragments of this size provide sufficient surface area once fractured for identification. However, from each sample at least 10 fragments within the 2-4mm size range were also analysed. Up to one hundred charcoal fragments (or fewer where the total suitable for analysis did not reach 100) were analysed in total from each sample. These were added to the ten fragments analysed from each sample during the assessment phase (Allott and Vitolo 2015). The fragments were fractured along three planes (transverse, tangential longitudinal and radial longitudinal sections) following standardised procedures (Gale and Cutler 2000) and viewed under a stereozoom microscope for initial sorting and an incident light microscope (at 50, 100, 200 and 400x) to facilitate identification. Anatomical features visible in the archaeological specimens were compared with modern reference material held at University College London and with those documented in reference atlases (Hather 2000; Schoch et al. 2004; Schweingruber 1990) in order to provide taxonomic identifications. Where possible identifications have been made to species level, however genera, family or sub-family names are given where anatomical differences between taxa are insufficient to enable satisfactory identification. These distinctions are made with reference to Schweingruber (1990). For several taxa such as oak, where there are only two native deciduous trees, identifications can be refined due to the limited range of native species within Britain. Cf., denoting 'compares with' is used as a prefix to the species or generic name where identifications are uncertain as a result of poor preservation or limited size of charcoal specimens. Nomenclature used follows Stace (1997).

Results

Taxa recorded during the analysis are presented below and are given together with fragment frequencies for each sample as well as comments in Table 5. Presence/absence data is recorded by phase for each taxon in Table 6 to examine evidence for changes in assemblage composition through time irrespective of the relative abundance of each taxon.

The following taxa or groups of taxa have been recorded:

Fagaceae:	*Quercus* sp., oak (two native deciduous oaks - either *Q. robur* or *Q. petraea*)
Oleaceae:	*Fraxinus excelsior*, ash
Betulaceae:	Co*rylus avellana*, hazel
	Alnus cf. *glutinosa*, alder
Rosaceae:	*Rosa* sp., wild rose

Sub-families:

Prunoideae:	*Prunus spinosa/avium/domestica*, blackthorn/wild cherry/plum
Maloideae:	including *Crataegus monogyna*, hawthorn; *Malus* sp., apple; *Sorbus* sp., rowan, whitebeam; *Pyrus* sp., pear;

Salicaceae: *Salix/Populus* sp., willow/poplar (it is not always possible to separate the two genera and never conclusively due to overlap in anatomical characteristics)

All samples had relatively high amounts of unidentifiable fragments. This was due to the bad preservation of the fragments most of which were laden with post depositional sediment encrustations. Other taphonomic features that hindered identification were high levels of vitrification and distortion due to radial cracks and/or squashing of the anatomical features.

Period 1, Phase 1 – Late Neolithic to Early Bronze Age

Wood charcoal fragments for this period came from sample <36> [813] from the fill of pit [811] and sample <102> [204] from burnt mound [203]. The pit deposit produced an array of different taxa including, oak (*Quercus* sp.), hazel (*Corylus avellana*), wild cherry/blackthorn (*Prunus* sp.), Maloideae (a group of taxa which includes apple, whitebeam, rowan, hawthorn) and a possible fragment of *Populus/Salix* (poplar/willow). Oak produced the most abundant number of fragments. Hazel, hazel/alder (*Corylus/Alnus* sp.), Maloideae taxa and oak were also moderately common in the burnt mound deposit with occasional fragments of elm (*Ulmus* sp.), willow/poplar and ash (Fraxinus excelsior).

Period 2, Phase 1 – Middle – Late Bronze Age

Sample <43> [1344] was the only sample selected for analysis from this phase. It is derived from the fill of a feature related to cooking and/or funerary activity. The deposit was dominated by hazel/alder (*Corylus/Alnus*) and hazel. The poor preservation of the fragments made differentiation between hazel and alder difficult although some fragments could be securely identified as hazel while none as alder. Other identified taxa include oak and Maloidae group. Due to the bad preservation of the fragments there was also a high number of unidentifiable pieces.

Period 2, Phase 2 – Middle Late Bronze Age

The remaining six samples were dated to this second phase of the Middle Bronze Age.

Samples <16> [576] and <20> [637] came from cooking pits or furnaces (G105). Interestingly sample <16> was heavily dominated by oak fragments. These included both slow grown and fast grown oaks, with both growing conditions sometimes visible on the same fragment. Only one fragment of ash (*Fraxinus excelsior*) came from this sample. Sample <20> also had a large number of oak fragments. However, this sample also had a good representation of Maloidae wood and to a lesser extent hazel/alder and one *Prunus* group fragment.

Sample <23> [722] came from an unspecified pit feature that contained c.8g of unidentifiable burnt bone The charcoal from this sample had a high representation of ash followed by oak, hazel/alder and Maloidae group.

Samples <29> [892], <41> [1264], and <67> [999] were all related to funerary features. Sample <29>, a cremation pit, contained charcoal of hazel/alder, Maloidae group and oak. Preservation of charcoal fragments from this sample was very bad resulting in over a quarter of the analysed fragments to be unidentifiable. On the other hand, preservation in sample <41>, a cremation deposit, was relatively good. The charcoal was dominated by ash tree wood although some Maloidae type fragments were also identified. Oak and hazel/alder were present in negligible quantities and many came from the 2-4mm fraction. Sample <67> came from a truncated cremation vessel. The dominant taxon was of the Maloidae type though oak and hazel/alder were present in relatively good amounts.

Discussion

Many of the fragments displayed some degree of post depositional sediment encrustation and percolation that has led to poor preservation and/or limited the potential to obtain identifications. This type of preservation indicates that the charcoal was exposed to water after deposition or possibly to fluctuating water levels, resulting in the absorption of sediment laden water by the charred wood. Soil micromorphological analyses on this site have in fact shown that there were fluctuations in the water table in the past (Banerjea 2015; this volume). Many of the indeterminate fragments also contained signs of vitrification. Vitrification is a glossy, glass like appearance of the charcoal surface, homogenising the anatomical features (McParland et al. 2010). The cause of vitrification is still unknown but several experiments have shown that it does not result purely from exposure to high temperature fires or the charring of green or resinous woods as once thought (McParland et al. 2010). No round-wood was found in the analysis phase though three Maloidae round-wood fragments were noted in the assessment phase from sample <41> [1264] (Allott and Vitolo 2015).

Vegetation environment

In the majority of samples, there was little taxonomic diversity, indicating a certain degree of wood selection. Samples dating to the Late Neolithic/Early Bronze Age (period 1) are exceptions. The uppermost fill [813] of pit [811] and deposit [203] from burnt mound [204] revealed higher taxonomic diversities with at least five and six taxa represented, respectively. This is especially notable for pit [811] considering the low fragment count (n=25). Wood selection factors cannot be completely excluded, however, it can be inferred that a variety of vegetation environments were present in the local vicinity or were being tapped into for fuel-wood. These include various types of deciduous woodland with large trees such as oak, ash and elm (in period 1) represented with those more typically found at the margins, in open woodland, understorey or scrub (such as *Prunus*, hazel and Maloideae; Stace 1997). Willow, poplar and possible alder provide evidence for wetland environments although definitive examples of taxa from this environment are scarce and only available from period 1. This vegetation habitat may have been relied upon more for fresh wood purposes other than fuel.

The charcoal assemblages provide little indication that access to woodland resources changed significantly through the occupation. The absence of elm and willow/poplar in the later deposits is interesting although these are only represented by single fragments and cannot be used on their own to imply an absence in the vegetation. The Middle to Late Bronze Age samples collectively show the same taxonomic range, with ash becoming more prominent in period 2.2. Ash is a large woodland tree and may have formed part of the upper canopy in mixed deciduous woodland and may have occurred in mixed or pure stands. At North Berstead, West Sussex McKenna (2014) records the first occurrences of ash charcoal in Middle Bronze Age deposits and has been recorded in Bronze Age deposits at Climping (Gale in prep) and at Medmerry in the Selsey peninsula (Allott *et al.* in prep).

Many of the taxa recorded in the charcoal from Oldlands farm such as oak, hazel and ash were also evident in pollen records from Bognor Regis (Allen *et al*. 2004) which are broadly contemporary with period 1 features at Oldlands Farm. Other tree species noted in the Bognor Regis pollen cores but not in analysed charcoal from pit [811] or burnt mound [204] include birch (Betula sp.), beech (*Fagus sylvatica*), pine (*Pinus* sp.) and other angiosperms, yew (*Taxus* sp.), lime (*Tilia* sp.), holly (*Ilex aquifolium*), dogwood (*Cornus* sp.), hornbeam (*Carpinus betulus*), alder buckthorn (*Frangula alnus*), sea buckthorn (*Hippophae rhamnoides*) and ericaceous taxa such as heathers (Allen *et al.* 2004).

By contrast, pollen from Bronze Age Waterhole [1391] at Oldlands Farm revealed low levels of tree and shrub pollen which may indicate woodlands, supporting trees such as birch, oak, hazel and alder, were at some distance from the site (Langdon and Scaife this volume). Instead, herbaceous taxa dominate the sequence and the pollen record implies an open environment with pasture prominent and perhaps some arable land-use as well as salt marsh in the near vicinity (*ibid*).

Wood selection practices

Burnt mound [204] produced a broad range of taxa. This may reflect the nature of these deposits, which are likely to contain material accumulated from multiple activities or phases of activity. Different taxa have different burning properties, burning with different calorific values that are dependent on factors such as grain density and the presence of resins for example. They may have been selected to fulfil specific purposes whether required to produce high short-lived heat or sustained, low heat fires for example rather than being regarded merely as good or poor fuels. They may also have been used in combination providing kindling or main fuel and as a further complication they may have been selected for a culturally embedded reason for which we have no modern comparisons.

There are stark differences in taxonomic representation between the samples coming from funerary related features, cooking and furnace features. Sample <16> [576] comes from a feature identified as a possible cooking pit or furnace. It is dominated by oak while sample <20> [637], also from a similar feature, has a good representation of Maloideae wood as well. Oak is known to make 'good' fuel wood (Taylor 1981), burning slowly but with a high calorific value and thus it is possible that [576] is the result of a specialised activity that demanded higher sustained fire temperatures, such as a kiln or a smelting furnace. On the other hand, Maloideae species, which do not produce such a high heat, form part of the understorey or woodland margins and may have been relatively easier to access and in less demand for other purposes such as construction. Assuming the 'principle of least effort' they are therefore more likely to also occur in everyday contexts such as cooking pits (Asouti and Austin 2005; Shackleton and Prins 1992). Sample <20> also had a large number of fire-cracked flint fragments within the residues. Fire-cracked flint has been associated with cooking and baking activities in the Bronze Age (Tapper 2011; Seager Thomas 1999) whereby high degree temperature was not a prerequisite.

Cremations

At many sites, oak and/or ash dominate charcoal assemblages in funerary deposits and in many cases may have been used as the main structural and fuel component of pyres with smaller, shrubby taxa deriving from brushwood or perhaps artefact inclusions (Gale 2006; Mooney 2014). At Claypit Lane, Westhampnett, for example, oak was the dominant species in cremation deposits (Gale 2006). At Oldands Farm, the composition of the charcoal assemblages associated with cremations is more varied, although the same taxa, oak, Maloideae, hazel and ash, recur in different proportions. The following includes assemblages containing diagnostic burnt bone as well as those with only small amounts of undiagnotic burnt bone recorded during assessment (Allot and Vitolo 2015). In sample <43> [1344] from feature [1342], which may contain the earliest cremation and associated pottery at the site (period 2.1), the wood charcoal within it is biased towards the hazel/alder type with a few fragments of Maloideae and oak. As a contrast, cremation deposit [1264] (Period 2.2) has a high number of ash wood charcoal fragments with Maloideae making a small percentage of the assemblage. Pit fill [722] also shows a predominance of ash charcoal accompanied by oak, Maloideae and hazel/alder type charcoal. On the other hand, the same cannot be said for cremations [892] and [999]. Deposit [892] had a charcoal assemblage divided equally between Maloideae and hazel/alder with oak and ash appearing only in negligible quantities. A bit less than half of the charcoal fragments from [999] were of Maloideae with the rest of the sample divided between oak and hazel/alder.

The presence of Maloideae and hazel/alder charcoal within cremation/funerary related deposits merits further investigation. Is the high number of Maloideae and hazel/alder charcoal a combustion or post combustion taphonomic artefact or were these the main fire woods selected for the pyre? Archaeological charcoal tends to be fragmented into few large and many small pieces in similar ratios irrespective of species (Chabal 1988; 1990; 1992). Thus if oak and/or ash were present within the cremation deposit they would have been recovered in their original ratios in relation to Maloideae and hazel/alder. This applies even if archaeological charcoal would have undergone further stages of fragmentation during deposition, post-deposition and recovery. Thus even in the case of [999] where the cremation vessel was found truncated, the recovered sample should still be representative of the original. Following this assumption there appears to have been a conscious selection of Maloideae and hazel/alder wood in some of the cremation burials and ash wood in others.

Cremations would have constituted a significant investment in time and resources, the choice of which could have held specific significance to the people performing the rite. Fresh wood is not ideal for producing the high temperatures needed for cremations. Thus, a supply of dry wood would have needed to be kept or else dry timber would have had to be burnt. Interestingly, the hazel/alder fragments in sample <43> [1344] had many radial cracks within them which may be associated with presence of moisture in the wood and thus possibly reflect the burning of freshly cut wood (D'Oronzo *et al*. 2013; Fiorentino and D'Oronzo 2010; Théry-Parisot and Henry 2012). Apple emits a pleasant odour when burning and was probably included to cover the smells of burning human flesh (Challinor 2007). On the other hand, oak wood also has a very distinctive smell that would have masked that of Maloideae (O'Donnell 2014), but interestingly it was not identified in large numbers within the cremations.

Unfortunately, the preservation of the cremated bones was not good enough to determine the age or the sex of the individuals and thus it is not possible to say whether these influenced the choice of tree species. Another possibility is that the choice of wood is a reflection different social status or access to resources. Oak does not dominate any of the analysed funerary deposits. It is however dominant in the industrial deposits. Is it possible that it was reserved for uses other than funerary or was access to oak wood restricted to a select group of people?

The Waterlogged Plant Remains by Mariangela Vitolo

Introduction

Following post excavation assessment (Allott and Vitolo 2015), four waterlogged samples were selected to undergo analysis. They were taken at different depths within a waterhole [1391]. A timber log ladder was recovered from the same feature and is reported on elsewhere (Mooney 2015; this volume). The log ladder was dated to cal BC 1110–1000 (BETA-409063, 2870±20 BP) and Late Bronze Age pottery was also recovered from the upper levels. The sample selection was based on the quantity and preservation of the plant remains, as well as depth. The samples from the uppermost part of the sequence were not included, because the likelihood of contamination in them was higher.

The following samples and depths have been analysed and are included in this report:

<47> [1466] 1.78-1.97 m

<60> [1399] 1.30-.140 m

<61> [1399] 1.40-1.50 m

<62> [1468] 1.50-1.60 m

Methodology

The wet sieved fractions were sorted under a stereozoom microscope at magnifications up to 40X. Most of the smallest fractions were subsampled prior to sorting. Identifications of macrobotanical remains have been made through comparison with published reference atlases (Cappers *et al*. 2006; Jacomet 2006; NIAB

2004), as well as a modern botanical reference collection held at Archaeology South-East.

Thorns and buds were only estimated, as in some of the samples they were far too numerous to be individually counted and because counting was not deemed useful to provide more information. A species list is given in Table 7; nomenclature used and most of the habitat information follow Stace (1997).

Results

A similar range of taxa were recorded from all the samples, showing only slight differences throughout the sequence. The contexts at the top and in the middle of the sequence appeared to be richer in plant remains than the ones at the bottom. Taxa that were relatively frequent in all the samples were bramble (*Rubus fruticosus* agg.), elder (*Sambucus nigra*), stinging nettle (*Urtica dioica*) and chickweed (*Stellaria media*). Other plants presented a lower but common occurrence. They included goosefoots (*Chenopodium* sp.), docks (*Rumex* sp.), knotgrasses/docks (*Polygonum/Rumex* sp.) and pale persicaria (*Persicaria lapathifolia*). Thistles (*Carduus/Cirsium* sp.) and carrot family (Apiaceae) appeared in larger numbers at the top of the sequence. Bittersweet (*Solanum dulcamara*), sedges (*Carex* sp.), hawthorn (*Crataegus monogyna*), dogwood (*Cornus sanguinea*) and hemlock (*Conium maculatum*) only appear in the top and are absent from the bottom. Mints (*Mentha* sp.) were only recovered from the two bottom samples and meadow/creeping/bulbous buttercups (*Ranunculus acris/repens/bulbosus*) from the middle of the sequence. Taxa that occurred only occasionally were violets (*Viola* sp.), self-heal (*Prunella vulgaris*), smooth sow-thistle (*Sonchus oleraceus*), black bindweed (*Fallopia convolvulus*), possible fat hen

(*Chenopodium* cf *album*), sloe/blackthorn (*Prunus spinosa*), wild carrot (cf *Daucus carota*), possible celery leaved buttercup (*Ranunculus* cf *sceleratus*) and possible groundsel (cf *Senecio vulgaris*). This same range of taxa, but in much lower amounts, was recorded during post-excavation assessment in samples from the lowermost depths in the sequence; there were not recommended for analysis.

Remains of crops generally tend to occur in charred samples, because they are more likely to be exposed to fire either during processing or cooking, or in storage accidents. The dry samples from Oldlands Farm were, however, not very productive in terms of crop remains (Allott and Vitolo 2015). Occasional remains of cereals have also been recorded from these waterlogged samples, including three fragments of emmer/spelt (*Triticum dicoccum/spelta*), consisting of a charred caryopsis and glume base and an uncharred spikelet fork. A charred caryopsis of barley (*Hordeum vulgare*) was also recorded.

Other plant material that was recorded included Rosaceae thorns, of the rose/bramble type, and buds. This material occurred more frequently in the mid to low levels of the sequence. Small bracken (*Pteridium aquilinum*) pinnule fragments were recovered throughout. Twig wood was recorded in all of the samples. Identification was attempted but, due to the high degree of anatomical variability in twig wood, identifications were not always possible. However different woody taxa appeared to be present, including the Maloideae subfamily, which includes a number of taxa (e.g. apple, pear, rowan and hawthorn), which are indistinguishable on grounds of anatomical characters.

Discussion

Preservation

A limited range of species were present in these samples. The fact that mostly woody seeds preserved, with the more fragile examples occurring only occasionally, suggests that waterlogging was not maintained at all times, due to fluctuations in the water table. This might have caused the most fragile seeds to decay and disappear from the record. Fluctuations of ground water level were confirmed both by sediment encrustations found on the charcoal (DeMicoli this volume) and by the soil micromorphology analysis (Banerjea this volume) at the site.

As mentioned above, the highest concentration of plant remains was found in the middle to the highest parts of the sequence. The lower concentration of plant remains and less varied range of taxa in the earlier fills could also be due to it corresponding to the initial silting, that perhaps happened before a diverse flora had established, as seen for example in a Bronze Age ring ditch at Stansted Airport (Carruthers 2008).

Vegetation environment

The plant remains recovered from waterlogged samples can provide information on the local environment, although in the case of Oldlands Farm preservation biases might have affected the record and some taxa might be under represented. Throughout the sequence, a similar range of taxa were recorded, suggesting that the vegetation environment and soil conditions probably changed very little over time.

Most of the wild plant taxa recovered from these samples are likely to represent the spectrum of vegetation that was growing near the waterhole, although it is possible that plant material arrived from a variety of sources and some might have travelled some distance. Almost all of the recorded plants are typical of disturbed and waste ground, including nettle, chickweed and docks. Some of these can also grow on arable land. However, given the paucity of cereal remains, it is unlikely that they reached the waterhole as crop contaminants.

Many plants are also typical of hedgerows and scrub, including hawthorn, dogwood, sloe, bramble and elder, as well as the large number of rose/bramble type thorns. It has been suggested (Carruthers 2008) that waterholes were located close to hedgerows, hedged fields or woodland clearings. The high presence of hedgerow taxa, with frequent thorns and twigs in the samples from Oldlands Farm, suggest that this might be the case here as well.

Wet environments are poorly represented by the limited presence of sedges, bracken, pondweeds and celery leaved buttercup. The low amount of aquatic species was noted in the pollen data as well (Langdon and Scaife this volume) and it is likely to be due to the aforementioned water level fluctuations which might have caused part of the plant macrofossil record to disappear. Some woodland species were also present, and the charcoal analysis identified taxa typical of deciduous woodland (DeMicoli this volume).

Economy and plant use

It was already established during assessment that the main potential of the plant macrofossils from Oldlands Farm was to provide information on the vegetation environment, rather than diet, economy and plant use. Very few of the identified taxa have an economic value and the presence of thorns and twigs suggests that it is more likely that these seeds reached the waterhole with other woody material that had accidentally fallen in and were not remains of food refuse.

Cereal remains occurred occasionally both in the dry contexts (Allott and Vitolo 2015) and in two of the waterlogged contexts. The latter included the remains of glume wheats and barley. Three of them were charred, including a fragment of wheat chaff. This material might derive from a small scale accident, perhaps during cooking or cleaning/processing of the cereals, which, given the paucity of crop remains, was likely to happen at the domestic level. Although glume wheats and barley were definitely present and occur frequently in southern England in the Bronze Age, the evidence from Oldlands Farm is too scarce to draw conclusions on the human diet and crop use at the site. It is, however, unlikely, given the paucity of crop remains in both the charred and the waterlogged samples, that cultivation and crop processing were carried out nearby. This kind of activity generally tends to leave remains, especially in the charred archaeobotanical record. On the other hand, the presence in the waterlogged samples of wild taxa that thrive in nutrient rich soils might indicate that the fields near the waterhole were used for animal grazing and therefore the economy might have relied more on pastoralism.

Comparisons with other sites in the region

The archaeobotanical evidence on the Sussex Coastal Plain is poor, particularly for the Bronze Age. At Westhampnett, wild taxa from dry contexts suggest that most of the Bronze Age vegetation probably consisted of grassland, with an element of wetland and scrub growing nearby (Hinton 2008). A very similar wild taxa assemblage to that found at Oldlands Farm occur in later (Romano-British) sites very close by, in waterlogged or semi-waterlogged contexts at Pevensey Road (Hinton 1998a) and dry contexts at Bognor Regis Community College (Hinton 1998b). At Pevensey Road mostly ruderal and open grassland species were found associated with a few aquatic taxa. Similar evidence to that of Oldlands Farm of plants that grow in hedgerows and scrub has been recorded at both later sites, but also at Middle Bronze Age waterholes located in southern England, for example at Stansted (Carruthers 2008) and Heathrow Airports (Carruthers 2010).

Although few crop remains were found at Oldlands Farm, glume wheats and barley are also recorded at other Bronze Age sites in southern England and particularly on the coastal plain, for example at Medmerry, on the Selsey peninsula, where the evidence for cereals in this period is equally limited (Le Hégarat and Allott 2014). Glume wheats were also found in Bronze Age deposits at Ford Airfield, Yapton (Hinton 2004). At this site, most of the identifiable glume bases were of spelt and only two contexts contained possible emmer. The wheat remains from Oldlands Farm were not well preserved enough to allow identification to species, but the evidence for the use of glume wheats and barley is mirrored at other Bronze Age sites in the region.

THE FINDS

The Flintwork analysis by Karine Le Hégarat

Introduction

Excavations on Land at Oldlands Farm produced 862 pieces of struck flint weighing 8622g and four flint hammerstones (630g) (Table 8). This total includes 325 chips representing 37.52% of the total assemblage. A sizeable assemblage of burnt unworked flint weighing just over 126kg was also recovered. Excluding a small residual Mesolithic - Early Neolithic component, the flintwork can largely be dated to the Middle Neolithic - Late Bronze Age. A total of 108 pieces came from Middle Iron Age and later features or from undated features, and these pieces are likely to be redeposited. Over a third of the total assemblage (37.99%, n=329) came from eight features and deposits dated to the Late Neolithic - Early Bronze Age. Two pits which produced Grooved ware pottery and two pits assigned to the same period on stratigraphic grounds will be examined separately. Half of the flintwork (49.53% of the total assemblage, n=429) came from Middle and Late Bronze Age features. The majority of these features produced just a few pieces, and features with slightly richer flint content were mainly biased towards chips.

Methodology

The pieces of struck flint were individually examined and classified using standard set of codes and morphological descriptions (Butler 2005; Ford 1987; Inizan *et al.* 1999). Technological details as well as further information regarding the condition of the artefacts were recorded. Unworked burnt flint was quantified by weight. All data were entered onto a Microsoft Excel spreadsheet. A copy of the catalogue has been deposited with the archive.

The fragments of hand-collected burnt un-worked flint were rinsed, scanned for worked pieces and quantified by piece and by weight. The burnt un-worked flint from the sample residues were scanned for worked material and quantified by weight.

Condition

A large quantity of the flintwork displays minimal signs of weathering, with slight to moderate edge modification, and a few pieces are in a remarkably fresh condition. This implies that the material has undergone negligible post-depositional disturbance, or that it was not exposed for long periods before deposition or incorporation into archaeological features. A small proportion of the assemblage is less well preserved including 14 pieces that exhibit heavy edge-damage. This suggests that a small component of the assemblage was left exposed for a long period before burial, or that it wasn't in its primary deposit.

The bulk of the flintwork was free from surface cortication, but 54 pieces displayed light and mostly partial white/bluish surface discolouration. The orange/brown colour of a few flints could be associated within the orange-brown manganese rich brickearth recorded during the geotechnical test pitting survey (ASE 2014). In total of 242 pieces were recorded as broken.

Raw material

The colour of the flint selected for the production of the lithics varies. The majority of the flints are light to dark grey, but the assemblage also contains pieces of light to dark brown and orange/brown flint. Mottled inclusions are common. Where present, the outer surface is principally thin (1 or 2 mm thick), off-white or mid brown and slightly weathered. The raw material appears to be of moderate flaking quality. It could have been collected at and around the site where it occurs as derived material in the superficial brickearth deposits covering the chalk. Flint with a greyish pitted cortex of a riverine or beach origin represents a small component of the assemblage of struck flints. The large assemblages of burnt unworked flint from contexts [508] and [637] (G105) contained a few pieces which suggest that pebbles were occasionally selected for burning activities.

The assemblage of worked flint

Grooved ware pit [811] - Landuse OA1

Pit [811] is securely dated through the presence of Grooved ware pottery and C14 dates. While the primary silting fill contained no flints, the main fill [813] produced 121 pieces of struck flint (Table 8). The assemblage is dominated by débitage products. Flakes dominate (73 pieces) over six blade-like flake indicating a flake-based industry (Ford 1987). Several flakes are crudely made, but others appear to be more carefully worked displaying thin flake scars on the dorsal face as well as limited platform preparation. A fair proportion of the pieces displayed plain platforms (including winged platforms) with limited preparation. Hard hammer struck pieces were recorded, but the hammer mode was mostly indeterminate. No primary flakes were present, but some secondary flakes displaying up to 80% of cortex were recorded. Small thin tertiary flakes were also evident. A total of six cores were present including four multiplatform flake cores, a core on a flake and a fragmentary core. While some display minimal preparation, they are irregularly worked, and one core exhibits several cones of percussion indicating mis-hits. The only modified piece consists of a crudely retouched flake.

The flintwork was examined for refits, but no knapping refits or conjoins were found. Nonetheless, similarities in the flint type suggest that elements of the same knapping sequence are likely to be present in the pit. No pieces of struck flint are burnt. Given the overall fresh condition of the flints, and the presence of cores and knapping waste including chips, it is possible that knapping was carried out in the vicinity of the feature, with some pieces being deposited into the feature. The majority of the flintwork is chronologically undiagnostic, but based on technologically traits it forms a coherent group that is likely to be contemporary with the feature and the pottery.

Grooved ware pit [258] - Landuse OA1

Pit [258], also containing Grooved ware pottery, produced a smaller amount of struck flint than pit [811]. The feature contained 87 pieces of struck flint (including 74 chips), none of which were burnt. The tertiary fill produced more material than the primary and secondary fills (Table 8). The assemblage is again flake-based. A single small multiplatform flake core (40g) was recovered from the primary fill [259], and no modified pieces were found. The high proportion of chips indicate that knapping activity took place in the vicinity of the pit.

Late Neolithic - Early Bronze Age pits [283] and [342] - Landuse OA1

Both features were found close to pit [258]. They produced eight and 56 pieces each respectively. The secondary fill of pit [342] produced more flints than the primary fill (Table 8). Although three bladelets and two blades were present, flakes dominate. Each feature contained a fragmentary core, and six modified pieces were found; two minimally retouched pieces came from pit [283] and three scrapers from pit [342]. The scrapers consist of two end scrapers (e.g. Figure 23, Ill. 6) and an end-and-side scraper (Figure 23, Ill.

7). They have been finely retouched, and are likely to be Neolithic or Early Bronze Age in date.

The remaining assemblage

The remaining pieces came mainly from Middle - Late Bronze Age features, Middle Iron Age and later features and from undated features. Middle-Late Bronze Age features produced large quantities of flints (Table 8), but once the chips are excluded, the majority of contexts produced only small amounts of pieces. The remaining assemblage (590 pieces of struck flint) can be broken down into 91.19% débitage products, 3.73% cores and 5.08% retouched pieces. Flakes dominate. A large proportion are small and display technological attributes characteristic of late prehistoric industries such as absence of platform preparation, incipient cones of percussion and pronounced bulb of percussion. The majority of the cores had been randomly reduced to produce small flakes. A small flint nodule from context [455] had been minimally used. A limited number and range of modified tools were recorded, principally scrapers, notched pieces and minimally retouched pieces.

Nonetheless, as noted above, artefacts that displayed evidence for a more careful reduction strategy were also present. These artefacts indicate the presence of Mesolithic to Early Bronze Age flints. They could represent early material that may have originally accumulated on the land surface or material that was re-used during the late prehistoric period.

A small quantity of flints (*c.* 13) are likely to be Mesolithic or Early Neolithic. No diagnostic pieces were recorded, but technological indicators point to a blade-orientating industry. All these artefacts were found residual in later features or in undated features. They consist mainly of blades and bladelets including two blades from deposit [263], two bladelets from pits [283] and [342], two blades from pit [1391] (fills [1393] and [1395]) (see Figure 23, Ill. 1), postholes [630] and [738], pit [9/005] (Ill. 2) and ditch [8/009]. In addition, ditch [330] produced a single platform blade core used to remove bladelets (Figure 23, Ill. 3), and cooking/fire pit [636] produced an unclassifiable core with blade scar removals.

Late Neolithic - Early Bronze Age poaching deposit / shallow dew pond [353] produced a flake scaled knife (Figure 23, Ill. 5). Further Neolithic to Early Bronze Age flints were found admixed with later material (in Middle Bronze Age or later features) or on their own in undated features. This material includes flakes with platform preparation, a core face / edge rejuvenation flake from ditch [6/006], a finely made knife from context [8/002] (Figure 23, Ill. 8), a flake core made on a broken polished axe from context [595] (Figure 23, Ill. 4) as well as a composite tool from ditch [446].

The assemblage of burnt unworked flint

A substantial quantity of burnt unworked flint amounting just over 126kg was recovered. The majority of the fragments were heavily calcined to a grey or white colour, but fragments that displayed red tinge were also occasionally recorded. The burnt material was recovered in varying quantity from various features spread across the site. While a large proportion of features/deposits contained only small amounts of burnt material, the largest assemblages came from Late Neolithic as well as Middle to Late Bronze Age features. They include a range of pits (cooking/fire pits and refuse pits) as well as a burnt mound and its associated pit (Table 17). Samples from the burnt mound produced two radiocarbon dates that fall within the Late Neolithic: 2861-2500 cal BC and 2872-2620 cal BC.

Discussion

The flint assemblage represents a long period of human presence at and around the site ranging from the Mesolithic to the Late Bronze Age. It contains a small Mesolithic / Early Neolithic component, but the bulk of the assemblage can be dated to the Middle Neolithic/Late Bronze Age.

Evidence for Mesolithic or Early Neolithic activity was only represented by residual material. No actual diagnostic pieces such as micro-burins or microliths were recovered, but a few blades, bladelets and two cores, all products of a blade-based industry, indicate that the area was subject to low-level visitations during that period.

Overall, with the exception of a few stratified sites, evidence for Mesolithic presence on the Coastal Plain remains scarce, limited mainly to surface finds. In the vicinity of Oldlands Farms, excavation north of Hazel Road, North Bersted (to the west of the site) in 1975 produced 21 pieces dated to the Mesolithic period, seven of which came from a small hollow (Pitts 1980, 155-158). Wymer (1977) in his Gazeteer of Mesolithic sites records 30 blades and flakes uncovered by coastal erosion just south of the site. Although small, the assemblage from Oldlands Farm contributes to the broader picture of Mesolithic/Early Neolithic activity in the area.

A single fragmented polished axe re-used as a core was recovered from an un-dated channel fill (context [595]; WC1). It could represent a curated object, and it may have been selected for deposition during the Bronze Age period. The presence of a Neolithic polished axe fragment is significant because Neolithic evidence in the local area remains limited, although a ditch excavated during the large-scaled evaluation on the north-western edge of Bognor Regis in 2009 produced a large quantity of Early Neolithic flints in association with ceramic (Cotswold Archaeology 2009).

Late Neolithic / Early Bronze flintwork was found across the site. Contemporary pits [258], [283], [342] and [811] produced varying quantities of worked flint. The pits were dated through the presence of ceramic and stratigraphic association. The 272 pieces of flint from the pits consist principally of knapping débitage, and modified artefacts occur only sporadically. No diagnostic pieces were present, but based on technological and morphological grounds, the majority are likely to be contemporary with the ceramic and the features. The fine retouches on three scrapers from pit / sump [342] is certainly consistent with a Neolithic or Early Bronze Age date. The most coherent assemblage out of these four pits came from context [811]. This group could represent waste from a single knapping event carried out around the feature. However, if it represents a cooking/fire pit, the 121 pieces of unburnt worked flint would have become incorporated into the feature after the pit was used as a cooking/fire pit. No knapping refits or conjoins were found, but this might be due to collection bias (only the material from the secondary fill was available). Pits [258], [283], [342] contain occasional pieces of earlier or later date.

A further two knives that are typical of the Late Neolithic - Early Bronze Age were recovered. They come from Late Neolithic - Early Bronze Age poaching deposit or shallow "dew pond" [353] OA1 and subsoil deposit [8/002]. Scale-flaked knives are sometimes found in connection with burials.

The large well-stratified group from context [811], the assemblages from the other three pits ([258], [283] and [342]) and the flints found either in later or undated contexts confirm Late Neolithic - Early Bronze Age activity in the area, although based on the worked flint, this activity seems to have been small and localised. The assemblage provides evidence for flint knapping and the use of tools including the use of scrapers and knives. Early Bronze Age activity in the adjacent area of the site appears to have also been small. An Early Bronze Age flint assemblage has been recovered, in association with ceramic, to the west of the site, north of Hazel Road, North Bersted (Bedwin and Pitts 1978).

Work at the site produced large quantities of burnt unworked flint the majority of which are associated with Late Neolithic and Middle-Late Bronze Age features. Burnt unworked flints are commonly recorded on sites from the Coastal Plain, were they seem to be frequently associated with burnt mounds complex. At Oldlands Farms burnt unworked flints were recovered from a variety of features - a burnt mound, several cooking/fire pits, refuse pits and ditches, and they are likely to have been used for different activities.

The interest of the burnt mound from Oldlands Farm is that with two Late Neolithic dates, it represents the earliest known burnt mound in West Sussex. The function of burnt mounds remains unclear. They may represent remnants of activities involving the immersion of heated pieces of flint to heat or boil water, activities such as cooking, brewing, leather working, dying, salt producing and bathing (English Heritage 2011; Barfield and Hodder 1987; O' Drisceoil, 1988). Alternative uses could have been to dry corn (Cunliffe 2002, 410-11) or to obtain tempering material for ceramics. The sheer quantity of burnt material recovered from the site, the intense degree of its burning and the absence of other stones imply that the material was deliberately selected for its properties and that it was intentionally heated. Whatever its function, the material relates to a significant activity (or activities) carried out at the site during the Late Neolithic period.

The flintwork indicates a more substained phase of flintworking during the Mid-Late Bronze Age. Again, the assemblage indicates knapping and use of flint tools (mostly scrapers but also notched pieces). The assemblage is in keeping with the results from previous interventions in the close vicinity of the site (Wessex Archaeology 2007; Cotwolds Archaeology 2008), and it reflects the well-recorded pattern of exploitation of the Coastal Plain during that period. However, no large groups were found, and admixtures with earlier (Late Neolithic - Early Neolithic) artefacts were evident.

Illustrated Flint catalogue:

Mesolithic – Early Neolithic:

1. Blade. Middle Bronze Age / Late Bronze Age sump / water collection pit [1391], fill [1393], G56, landuse WH1. Residual Mesolithic – Early Neolithic

2. Blade. Late Neolithic – Early Bronze Age pit [9/005], fill [9/006], G103, landuse OA8. Residual Mesolithic – Early Neolithic

3. Single platform blade core. Middle Bronze Age / Late Bronze Age ditch [330], fill [331], G28, landuse R2. Residual Mesolithic – Early Neolithic

Neolithic:

4. Multiplatform flake core made on a broken polished axe. Undated alluvial channel deposit [595], fill [594], G126, landuse WC1

Middle Neolithic – Early Bronze Age:

5. Scale-flaked knife. Late Neolithic poaching deposit or shallow dew pond [353], G6, landuse OA1

6. End scraper. Late Neolithic cooking pit or fire pit [342], secondary fill [343], G12, landuse OA1

7. End-and-side scraper. Late Neolithic cooking pit or fire pit [342], secondary fill [343], G12, landuse OA1

Late Neolithic – Early Bronze Age:

8. Knife. Subsoil [8/002]

The Prehistoric Pottery by Anna Doherty

A fairly large assemblage of prehistoric and Roman pottery was recovered site, quantified by stratigraphic period in Table 10. Of particular note is a small group of Grooved Ware stratified in contemporary pits. The largest quantity of pottery, including a number of funerary-related vessels, belongs to a period spanning the Middle Bronze Age and the earlier part of the Late Bronze Age. The following report focuses on these more significant elements. Small assemblages dating to Period 3 and 4 (Middle/Late Iron Age and Roman) have been reported on in full in the post-excavation assessment (ASE 2015) and are briefly summarised below.

Period	Description	Sherds	Weight (g)	ENV
1	Late Neolithic/Early Bronze Age	105	622	43
2	Middle/Late Bronze Age	1786	14591	672
3	Middle Iron Age-Early Roman	418	4232	141
4	Roman	270	3060	66
Unstratified, residual in later features etc		33	309	23
Total		2612	22814	945

Table 10. Quantification of prehistoric and Roman pottery by stratigraphic period.

The pottery was examined using a x20 binocular microscope. Prehistoric fabrics were recorded according to site-specific fabric codes, formulated in accordance with the guidelines of the Prehistoric Ceramics Research Group (PCRG 2010). In the absence of a regional pottery types-series for Sussex, Roman fabrics were recorded using an adapted version of the Southwark/London typology (Marsh and Tyers 1978; Davies et al 1994) (with some additional codes for local types) which will be published in a forthcoming summary of Roman pottery from the West Sussex coastal plain (Doherty in prep a). Reference is also made to the type-series for Rowland's Castle wares (Dicks 2009). Data were recorded on pro-forma sheets and entered into an Excel spreadsheet.

Site-specific fabric type-series

FLIN1 Moderate to common well-sorted flint of c. 0.5-1.5mm in a very silty background matrix

FLIN2 Moderate, moderately-sorted flint, mostly of 0.2-2mm with some examples up to 3mm, in a non-sandy background matrix

FLIN3 Sparse to moderate flint of 0.5-2mm in a slightly silty background matrix

FLIN4 Moderate ill-sorted flint, mostly of 0.2-4mm with some examples up to 5mm, in a non-sandy background matrix

FLIN5 Moderate to common very ill-sorted flint, ranging from 0.2-7mm in a dense fairly inclusionless matrix

FLIN6 Common well-sorted flint 1-2mm (rarely a little larger) with a blocky appearance in a dense silty matrix

FLIN7 Sparse flint, ranging from 1mm but mostly of 3-4mm with some examples of up to 6mm in a fairly dense inclusionless matrix

FLIN8 Moderate to common flint of 1-3mm with occasional examples up to 4mm a non-sandy background matrix

FLQU1 Rare/sparse flint, mostly fine (0.5-1mm) with a few coarser examples (up to 2.5mm); moderate to common coarse quartz (c.0.3-0.5mm).

FLQU2 Moderate flint of 0.2-2.5mm in a silty to fine sandy matrix (most quartz is 0.1mm or less though a few larger grains of 0.2-0.4mm are visible)

FLQU3 Rare/sparse flint of 0.2-2.5mm in a silty to fine sandy matrix (most quartz is 0.1mm or less though a few larger grains of 0.2-0.4mm are visible)

GLFL1 Common glauconite c. 0.2-0.4mm, rare fine flint mostly of <0.5mm and rare large quartz grains up to 0.8mm

GRFL1 Moderate grog of 1-2mm and rare/sparse flint (most <1mm although very rare large examples up to 8mm are occasionally observed)

GROG1 Moderate grog of 1-2mm often blending into an otherwise quite inclusionless matrix

GRQU1 Moderate grog of 1-2mm in a very silty background matric containing sparse/moderate coarser quartz grains up to 0.2mm

QUAR1 v. silty to fine sand matrix; rare larger grains 0.2-0.3mm. in one example some rare leached white calcareous material <1mm in size

SHEL1 Common, moderately to ill-sorted shell of 0.5-4mm in a non-sandy background matrix

Period 1 Grooved Ware

The Late Neolithic Grooved Ware assemblage derives mostly from two small/moderate-sized pit groups, with a few sherds distributed in other features and deposits. Individually, many of the sherds are undiagnostic and could have been attributed either to the Late Neolithic Grooved Ware (c.2900-2000BC) or Late Neolithic/Early Bronze Age Beaker (c.2500-1700BC) traditions. However, radiocarbon evidence from one of the features, pit [811], suggests that it was filled long before the currency of Beaker pottery. In addition, sherds from both [811] and another pit, [258], feature decorative styles which are fairly specific to Grooved Ware; meanwhile no positively identifiable Beaker traits were present. It therefore seems reasonable to assume that the assemblage is entirely made up by Grooved Ware.

Overview of fabric, form and decoration

As shown in Table 11, contemporary fabrics are almost entirely grog-tempered. Most examples are in fabric GROG1 which does not contain any other coarse inclusions, though a number of examples with sandier matrixes (GRQU1) or grog-with-flint (GRFL1) also occur. Twelve sherds assigned to features of this period are flint-tempered (fabrics pre-fixed FLIN, FLQU). These are all small undiagnostic fragments, which are difficult to date with certainty but their fabrics are very atypical of Grooved Ware. It is possible that some could represent residual earlier Neolithic pottery but it is perhaps more likely that they are intrusive later prehistoric sherds.

Fabric	Sherds	Weight (g)	ENV	%ENV
FLIN	1	1	1	2%
FLIN2	2	4	2	5%
FLIN4	4	31	4	9%
FLIN5	2	5	2	5%
FLQU2	3	31	3	7%
GRFL1	14	194	7	14%
GROG1	78	353	24	56%
GRQU1	1	3	1	2%
Total	105	622	44	100%

Table 11. Quantification of pottery fabrics stratified in Period 1 deposits.

The upper fill [813], of pit [811] (G1), produced a small collection of highly abraded Grooved Ware (35 sherds, weighing 228g from an estimated 12 vessels). Diagnostic material includes a large plain profile vessel with pinched vertical cordons infilled by finger impressions (Figure 24, P1). Several other highly abraded sherds feature indistinct impressed or incised decoration. One small but less abraded sherd is decorated with an incised chevron ((Figure 24, P2). In addition, a plain bodysherd from this group features a carbonised residue radiocarbon dated to 2881-2635 cal BC (SUERC-63860 4167±29); a directly associated charcoal fragment was also dated to 2887-2678 cal BC (SUERC-63859, 4187±24).

Pit group G12 produced 39 sherds weighing 334g (29 ENV), the majority from pit [258]. Although most of these are probably Grooved Ware, all of the flint-tempered sherds (considered atypical of the Late Neolithic) were from group G12 and they were found in all four of the associated pits, with feature [283] producing only flint-tempered sherds. The group from pit [258] includes some fairly substantial, though still moderately abraded Grooved Ware sherds. Interestingly, despite the depth of this feature there was one definite cross-fit between the primary and mid fills [259] and [260]. Several other sherds from all three fills were similar enough to suggest that they may derive from common vessels, perhaps suggesting a fairly rapid sequence of filling.

The most diagnostic sherds from this group comprise thick-walled bodysherds with closely spaced vertical cordons and an adjacent zone of fingernail/fingertip rustication (Figure 24, P3). Several other sherds feature a slightly varying motif of more widely spaced cordons interspersed with fingernail/fingertip impressions (Figure 24, P4). The fabric and firing colour of these two groups of sherds are similar enough to suggest that they may represent different parts of the same vessel. Another bodysherd, with a thinner-walled profile has paired columns of fingernail impressions interspersed with vertical lines of fingernail impressions (Figure 24, P5).

The remainder of the stratified Late Neolithic pottery comprised one undiagnostic bodysherd from pit [1396] (G14) and 30 small plain bodysherds from a single vessel apparently quite directly ploughed out into subsoil deposit [460] (G15). In addition, 20 undiagnostic bodysherds sherds in typical Grooved Ware fabrics were noted as residual elements in later deposits.

Discussion

Grooved ware assemblages from the South-East have tended to be assigned to the Durrington Walls or Clacton sub-styles (Barclay 2008, 6) and both have been identified in the small assemblages known from the West Sussex coastal plain (Raymond 2014, 78). Most of the sherds from Oldlands Farm are difficult to attribute to either with much certainty, although the use of vertical applied cordons (e.g. on Figure 24, P3 and P4, which may represent different parts of one vessel) are quite specific to the Durrington Walls style. Another vessel (Figure 24, P1) features vertical cordons and this trait, together with its large diameter, might also suggest a Durrington Walls vessel, although here the cordons seem pinched out from the wall and rather wavy and irregular in form, attributes which have noted in Clacton style assemblages (e.g. Varndell 2006, 41). The incised chevron on Figure 24, P2 is similar to an example from North Bersted, which was suggested to belong to the Clacton sub-style (Raymond 2014, 78), though similar decoration is certainly not unknown on Durrington Walls vessels.

The radiocarbon dates from pit [811], suggest a fairly early date within the currency of Grooved Ware – between the 29th and later 27th centuries BC. This is in keeping with current evidence from the South-East, where it has been suggested that Grooved Ware may have been replaced quite rapidly by Beaker after *c*. 2500BC (Garwood 2011, 377).

Although the presence of the deer antler in feature [342] raises the possibility of structured deposition in at least one of the Grooved Ware pits, this feature only contained four sherds of highly fragmented pottery and most of the rest of the assemblage also appears to have undergone episodes of redeposition. Purposeful placing of Grooved Ware vessels has certainly been suggested at other pit sites from the wider region, for example at Heathrow (Framework Archaeology 2010, 114-124) and there is clearly very intensive use of Grooved Ware vessels at ceremonial sites like Ringlemere (Varndell 2006, 41-42) but there is little evidence for structured deposition of pottery at Oldlands Farm.

On the other hand, although Grooved Ware undoubtedly had a strong connection with domestic activity, it has been argued that its purpose was not entirely utilitarian. It might for example, have had a key role in expressing culturally binding symbols also seen on passage tombs and other high status objects (Thomas 2010). In the South-East such inferences are harder to draw since Grooved Ware is typically found in small quantities in pits rather than in association with well-preserved domestic structures or henges (Barclay 2008, 6). In Sussex for example, only two finds spots of Grooved Ware were noted in Longworth and Cleals' (1999) gazetteer, since supplemented by new but small assemblages from two sites in Westhampnett, North Bersted and further afield at Peacehaven (Every and Mepham 2006, Mepham 2008; Raymond 2014; Doherty 2015). However, there is still some evidence that Grooved Ware may have been used in highly selective contexts. For example, its distribution within the South-East is quite clearly coastal and riverine (Longworth and Cleal 1999, 189-90; Cotton *et al.* in prep) so it is interesting to note that some of the pits from which the Grooved Ware was recovered may have functioned as waterholes. This new find-spot also seems to reinforce the impression of small concentration of Grooved Ware using populations at the western fringe of the coastal plain, whilst similar evidence is more or less absent from the rest of Sussex.

Period 2 Middle to Late Bronze Age

The Period 2 ceramics represent a continuous period of activity spanning the Middle Bronze Age and earlier part of the Late Bronze Age. Stylistically it contains elements of Deverel-Rimbury (DR) and Post Deverel-Rimbury (PDR) pottery, with the latter being largely of early 'undeveloped plain ware' type, probably pre-dating *c*.950BC. The stratigraphic sequence has been divided into two phases, 2.1 and 2.2, and although these respectively contain some diagnostic groups or vessels which belong wholly in the Middle Bronze Age or Late Bronze Age, in reality, most individual spot-dates were more ambiguous.

The non-funerary assemblage

Excluding a small number of obviously residual Late Neolithic grog-tempered and intrusive Roman sherds, the pottery from Period 2 is almost entirely flint-tempered (Table 12): a pattern which is typical of both DR and earlier plain ware PDR assemblages from West Sussex (Seager Thomas 2008, 41). It is notable that the coarsest grades of flint-tempering, represented by fabrics FLIN5 and FLIN7 (usually associated with thick-walled heavy duty wares and therefore probably wholly Middle Bronze Age) make up a reasonable proportion (15% of ENV) in Phase 2.1 but are less common (5%) by Phase 2.2. There is also a decrease in the next coarsest ware FLIN4 and a corresponding increase in the marginally finer coarse ware, FLIN8 over this period. Medium coarse wares, FLIN2 and FLIN3, increase noticeably (from 24 to 42%)

between Phases 2.1 to 2.2 but fine wares (FLIN1; FLIN6) are fairly uncommon in both phases. Overall, it can be said that the Phase 2.1 fabrics are more typically Middle Bronze Age and the Phase 2.2 more characteristically Late Bronze Age but it would also probably be accurate to characterise Period 2 as a whole as a transitional Middle/Late Bronze Age assemblage, reflecting activity ongoing before and after *c*.1150BC. Having said this, a single bodysherd in a DR fine ware fabric (FLIN6) from ditch [1430] (G39; FS1) features a carbonised residue radiocarbon dated to 1608-1436 cal BC (SUERC-63869; 3234 ± 29). This suggests that there was at least some activity on site from the early part of the Middle Bronze Age. It should be noted however, that the rest of the assemblage from the ditches of field system FS1, is dominated by moderately coarse and finer grades of flint-tempering which may be more suggestive of a Middle/Late Bronze Age date of deposition, suggesting that the dated residue may belong to a redeposited sherd.

Fabric	Sherds	Weight (g)	ENV	% ENV
FLIN	64	63	54	8%
FLIN1	49	151	20	3%
FLIN2	375	2553	213	33%
FLIN3	79	310	52	8%
FLIN4	441	4213	88	14%
FLIN5	285	3281	26	4%
FLIN6	10	56	7	1%
FLIN7	89	1145	16	2%
FLIN8	283	2393	157	24%
GLFL1	1	8	1	<1%
FLQU1	76	247	11	2%
FLQU2	5	48	5	1%
SHEL1	1	3	1	<1%
Total	1758	14471	651	100%

Table 12. Quantification of pottery fabrics in Period 2 (excluding residual Grooved Ware and intrusive Roman sherds).

A few examples of flint-tempered wares with sandier matrixes (FLQU1, FLQU2) appear in features assigned to this period as well as one shell-tempered sherd (SHEL1) and one in a glauconitic flint-tempered ware (GLFL1). These fabrics are fairly atypical of DR and early PDR assemblages but they were all found singly or with other Middle/Late Bronze Age sherds and perhaps represent isolated instances of early/mid 1st millennium activity or intrusive material from Iron Age activity at the site. It is worth noting that a previous evaluation (Cotswold Archaeology 2008) recovered one diagnostic pit group, containing typical Early Iron Age elements such as tri-partite bowls, finger-tipped decoration and an omphalos base, in a trench, T33, which fell partly within the bounds of the current development area (although outside the bounds of the excavation).

Apart from the funerary vessels, discussed below, the Phase 2.1 material is entirely lacking in diagnostic feature sherds. However, one diagnostic Deverel-Rimbury piece, featuring comb-stabbed decoration (Figure 24, P6) was found as a residual element in a Phase 2.2 ditch, [378] (G72; part of enclosure ENC2). This decorative technique was relatively prominent in the assemblage from Medmerry, on the Manhood peninsula, and has also been noted at Durrington, Findon, Park Brow, Westhampnett and North Bersted, suggesting that it is a stylistic trait which is specific to the area west of the Adur, and particularly concentrated at the western extent of the Coastal Plain (Doherty in prep b; Seager Thomas 2008, 31; Raymond 2014. Fig. 51, 18).

Aside from the probable funerary/placed vessels, the remainder of the Period 2 pottery is mostly assigned to Phase 2.2. A few moderately-large groups of pottery were noted including in pits from open area OA8 ([750] G103; [507] and [837] G105) as well as reasonably large portions of individual vessels from pit [1038] (also in G103). Most of these groups comprise undiagnostic bodysherds; however, layer [192] (G108) produced a number of sherds from a fairly thick-walled vessel with a poorly defined neck (Figure 24, P7). The remaining feature sherds are all from similar neutral or hook-rim jar types (e.g. Figure 24, P8-P10). This lack of form diversity is very typical of undeveloped plain ware PDR assemblages, reinforcing the impression that there was continuity between the Middle and Late Bronze Age phases, with the bulk of activity probably occurring in the later 2nd millennium BC.

A single – probably intrusive – rimsherd, found in the backfill associated with the Phase 2.2 funerary-related feature [998], is the only PDR piece which is possibly diagnostically later than *c*.950BC. Like the other hook-rim jars, this vessel (Figure 24, P11) has a simple in-turning rim profile but features fingernail impressions along the top of rim. Decoration on PDR vessels is almost universally absent in early undeveloped assemblages; though it may occasionally occur in 'developed plain ware' groups (dated *c*.950-800BC) and becomes increasingly common in 'decorated' assemblages (*c*.800-600BC). This sherd therefore appears to be of later date than the associated placed vessel, which contained charcoal fragments dated to 1188-935 cal BC and 1124-931 cal BC (SUERC-63870, 2873±29: SUERC-63871, 2867±29) and which is in keeping with an early undeveloped plain ware attribution (see below). Originally, some consideration was given to the possibility that this could be a residual Middle Bronze Age sherd. Decoration on rim tops is sometimes a part of the wider DR tradition in southern Britain; however, this feature has not been commonly noted in synthetic studies of Middle Bronze Age pottery from Sussex (Ellison 1978; Seager

Thomas 2008), and where it does occur, it seems to consist exclusively of rounded fingertip decoration, often just below rather than on the top of the rim. In addition the thin-walled profile and moderately coarse fabric (FLIN2) strongly suggest a PDR vessel.

Funerary and other placed vessels

Six vessels appear to have been deliberately placed in Middle/Late Bronze Age features. Only three of these appear to be cremation urns, containing human bone, although it is possible that the others relate to funerary activity.

Based on radiocarbon evidence the earliest funerary-related deposit is probably pit [1342]. This appears slightly atypical as a cremation feature in that it was lined with fired clay. The vessel which it contained is partially-complete but highly fragmented and not obviously placed either in an upright or inverted position since elements of both the base and rim are present but neither is complete. It contained human bone which produced one of the few determinations from the site (SUERC-65219, 3062 ± 30, 1411-1232 cal BC) which is unambiguously Middle Bronze Age as opposed to spanning the Middle/Late Bronze Age period. The vessel, from fill [1344], is associated with a very coarse flint-tempered ware (FLIN5) and the form is very comparable to DR bucket urn shapes, although it is a much smaller vessel than typical, with a diameter of *c.* 120mm (Figure 24, P12).

Two closely spaced pits, [805] and [808], which contained placed vessels were noted a short distance to the south of funerary feature [1342], both apparently deposited upright and intact but heavily truncated; no bone was recovered from either feature. One example (not illustrated), from [805], which retained a fairly complete body profile on initial block-lifting, appears to be of neutral straight-side profile – a typically DR trait – but also features flint-gritting on the underside of the base, a feature more readily associated with PDR vessels. The other, from [808], is too fragmentary for the profile to be adequately reconstructed but it is clearly very thick-walled and associated with a very coarse fabric (FLIN5), suggesting a wholly Middle Bronze Age date.

Also assigned to Phase 2.1 is the complete upper portion of Barrel Urn (Figure 24, P13) placed in an inverted position, in association with cremated bone and truncated away in the lower body, in cremation pit [1152]. Although the relatively thin-walled profile and moderately coarse fabric type (FLIN8) could suggest a transitional DR/PDR form, the presence of an applied boss on the upper body is a trait which is fairly specific to Middle Bronze Age assemblages from the region (e.g. Ellison 1978, types 2 and 3; Seager Thomas 2008, Fig 5, 5-7).

Adjacent to the Phase 2.1 cremation [1342], another cremation pit, [1333] had a vessel which was more conventionally placed, in an upright positon with the upper part truncated away (not illustrated). Photos of the vessel *in situ* show that the body has a neutral straight-sided profile, typical of the DR tradition (Figure 25) although the fabric type (FLIN4) is only moderately coarse, possibly allowing for a Middle to Late Bronze Age attribution. The radiocarbon determinations on the associated human bone also appears to suggest a transitional Middle/Late Bronze Age date (SUERC-63861, 2966 ± 29, 1271-1057 cal BC; SUERC-63862, 2971 ± 26 1279-1111BC) and this burial has therefore been assigned to Phase 2.2. However, given the close spatial association between cremation features [1342] and [1333], it seems feasible that both were deposited within living memory of each other, suggesting that the vessel from [1333] is more likely to date to nearer the start of the above calibrated date-ranges.

The final possible funerary-related vessel comes from pit [998]. Like two of the vessels assigned to Phase 2.1, it was placed upright and intact but was heavily truncated and again, no human bone was recovered. However, the vessel did contain a charcoal rich deposit, from which separate fragments were radiocarbon dated to 1188-935 cal BC and 1124-931 cal BC (SUERC-63870, 2873 ± 29: SUERC-63871, 2867 ± 29). The vessel itself (not illustrated) is associated with moderately coarse fabric which could be of DR or PDR type, although the presence of pinching around the base is more typically seen on PDR vessels and, as the radiocarbon determinations suggest, is likely to represent a date of deposition close to beginning of the Late Bronze Age. It is also worth noting that, somewhat unusually for a possible cremation related feature, the backfill around the main vessel contained quite a large assemblage of mixed fragmented sherds (94, weighing 364g) including the single possible later PDR rim discussed above.

Discussion

In most respects the Period 2 assemblage is quite typical for the coastal plain and the wider Sussex region. For example, it fits entirely with known patterns of continuity between the Deverel-Rimbury (DR) and post-Deverel Rimbury (PDR) pottery traditions, often deriving from settlements which were maintained fairly unchanged over the course of the later 2nd millennium during the transition from Middle to Late Bronze Age. Similar assemblages with transitional elements are known from a number of local sites, including Yapton Road and Waterford Gardens, Climping and Centenary House, Worthing (Seager Thomas in prep). It is interesting to note that the funerary assemblage from Oldlands Farm is perhaps of marginally earlier character, being more typically DR in style with some transitional DR/PDR features, whereas most of the pottery from settlement features appears more characteristic of the early PDR tradition. However, this difference does not necessarily indicate that the cremations and other structured deposits pre-date the settlement, since it is possible that many of the pits and ditches were only filled towards the end of the site's lifespan.

The assemblage also reinforces the impression that vessels used in funerary and domestic contexts were often physically deposited almost side-by-side within the same spaces (Hamilton 2003, 76). At present there is limited evidence that that special vessels were commissioned for funerary or other ritual purposes and many of the deliberately-placed pottery appears entirely similar to that from other contemporary non-funerary assemblages. However, two urns, both directly associated with cremated human remains, are worth highlighting. In contrast to the typically large-sized vessels of the DR tradition, one example from cremation [1333] (Figure 24, P12), is of *c*.120mm in diameter and probably of similar height. Although occasional small vessels are not unknown in the Sussex DR tradition, it seems possible that the size relates to a specific function within the funerary rite or instead represents some aspect of the identity of the deceased (unfortunately it was not possible to determine sex or age at death in any of the cremated remains from the site – though all were probably older juveniles or adults; Sibun this volume).

It may also be significant that the funerary vessel from cremation [1152] (Figure 24, P13) features an applied boss. Whilst this style of decoration is quite common in Sussex assemblages (Ellison 1978, 34), there are indications that bossed vessels may have been selectively chosen in burials and structured deposits. For example at Waterford Gardens, Climping, two separate partially-complete vessels of this type were noted in separate pits, whilst other examples from the region seem to be somewhat disproportionately represented in funerary assemblages (Seager Thomas in prep). At Claypit Lane, Westhampnett four of the five illustrated vessels from burials feature lugs or bosses (Every and Mepham 2006, Figs 15-16, 31). Interestingly, although cremation vessels are probably more commonly found in an upright position on the Coastal Plain, all of the bossed vessels at Westhampnett had been inverted, as had Oldlands vessel P13, raising the possibility that the orientation of the urn may have had a relationship with vessel type (although at Claypit Lane, the association with barrow-like ring-ditches, an unusual feature type for the Middle Bronze Age in Sussex, may also have been a determining factor). Beyond the immediate vicinity of the site itself, it is worth mentioning the tradition of 'knobbed cups' from the Surrey and Thames Valley. These much smaller vessels featuring similar styles of decoration are again found almost exclusively in funerary deposits (Needham 1987, 111).

Finally three upright truncated vessels, from features [805], [808] and [998], did not contain any preserved human remains but were nevertheless filled by charcoal-rich material with some similarities to pyre deposits. It is possible that these may represent 'cenotaphs' or token burials, which have often been noted at the periphery of cremation cemeteries (McKinley 2006b, 34-35; Egging Dinwiddy and McKinley 2009). This interpretation may also be suggested by the spatial pairing of cremation burials [1333] and [1342], which seems to mirror that of placed vessels [805] and [808]. On the other hand, two of the truncated vessels which lack cremated bone did contain small to moderate quantities of fire-cracked flint. Vessels filled by burnt flint and other burnt stone have also noted at Claypit Lane and at a number of other sites from the region (Chadwick 2006, 18-19; Seager Thomas 2008, 37). Whilst the spatial proximity to burials at both Westhampnett and the current site may indicate that these are a funerary-related phenomenon, they may equally represent a distinct class of structured deposit. At Westhampnett, for example one alternative suggestion was that similar vessel deposits may have served to reinforce boundaries (Every and Mepham 2006, 30).

Catalogue

Period 1

P1 Plain neutral Grooved Ware vessel of large diameter (>240mm) with vertical cordons, which are possibly finger-pinched rather than applied. The space between the cordons infilled with areas of rough finger-tipping (Fabric GROG1). Fill [813], pit [811] (G1)

P2 Bodysherd with incised chevron (Fabric GRFL1). Fill [813], pit [811] (G1)

P3 Thick-walled bodysherds with closely spaced vertical cordons with an adjacent zone of fingernail/fingertip rustication. Cross-fitting sherds from fills [259] and [260], pit [258] (G12)

P4 Thick-walled bodysherds with poorly-defined vertical cordons interspersed with fingernail/fingertip rustication (may be from a different part of vessel P3). Fill [260], pit [258] (G12)

P5 Bodysherd with paired columns of fingernail impressions interspersed with vertical lines of fingernail impressions. Fill [261], pit [258] (G12)

Period 2, Non-funerary pottery

P6 Bodysherds with comb-stabbed decoration (Fabric FLIN5). Fill [379], ditch [378] (G72, ENC2)

P7 Thick-walled jar with poorly defined neck (Fabric FLIN5). Layer [192] (G108, OA5)

P8 Neutral to slightly closed jar with slight vertical wiping on external surface (Fabric FLIN2). Fill [1026], pit [1025] (G103, OA8)

P9 Hook rim jar with vertical finger smears (Fabric FLIN2). Fill [637], pit [636] (G105, OA8)

P10 Hook rim jar with slight internal bead (Fabric FLIN4). Fill [838], pit [837] (G105, OA8)

P11 Plain incurving jar with fingernail impressions along the rim top (Fabric FLIN2). Fill [1000], cremation cut [998] (G111, OA8)

Period 2 Funerary pottery

P12 Cremation vessel of comparable profile to Deverel-Rimbury Bucket Urns but on a much smaller scale, with a diameter of c.120mm (Fabric FLIN5). Vessel [1334], cremation pit [1333]

P13 Barrel Urn with at least one applied boss. Vessel [1154], cremation pit [1152]

The Fired Clay by Trista Clifford

A small assemblage of 273 fired clay fragments weighing a total of 4050g was recovered from 20 separate contexts. A further 6.4kg of material was recovered from bulk environmental samples. Fabrics were identified with the aid of a x20 binocular microscope (Table 13).

Fabric	*Description*
F1	Sparse -moderate fine quartz, moderate iron rich inclusions
F1a	As F1 with sparse to moderate coarse rose quartz
F1b	As F1 without iron rich inclusions
F2	Fine fabric with coarse calcareous inclusions/voids
F3	Similar to F1 with sparse grassy voids
F3a	Calcareous version of F3
F4	Fine silty fabric with laminar appearance due to organic voids, sparse iron rich veining

Table 13. Fired clay fabric descriptions.

Samples of each fabric were retained, as were pieces of interest. The hand collected assemblage has been recorded in detail on pro forma sheets for archive and data has been entered onto digital spreadsheet; material from the environmental samples was rapidly scanned by eye for diagnostic fragments but not recorded. An overview of the assemblage by site phase shows that the peak of fired clay utilisation occurred during period 2 (Table 14). Periods 3 and 4 do not form part of the published articles.

Period	% by weight	% by fragment count
1 LNEO	0.5	4
2 M-LBA	92	87
3 MIA-ER	2	4
4 Rom	0.5	1
5 Medieval	3	2
0 Undated	2	2
Total	100	100

Table 14. Overview of the fired clay assemblage by phase.

The majority of the assemblage (3041g) consists of natural brickearth utilised as pit lining material, present in phase 2 pit fills [1343], [1344] and [834], which has fired as a result of exposure to heat. These pits may have been employed as cooking pits or hearths but no evidence of structural fired clay is present to confirm this. Period 2, Phase 2 pit fill [833] (SG397) contained conjoining fragments of a possible casting mould. A single fragment of possible briquetage was recovered from Period 5 medieval ditch fill [409] (G117; FS3).

A single fragment of fired clay with impressed decoration was recovered from Period 5 medieval ditch fill [517], RF<23> (G117; FS3).

Two triangular loomweights were also recovered. RF<22> is broken across all three apices, with two piercings of 10mm and 12mm diameter apparent. RF<24> is more fragmentary therefore the identification is less certain. Both are made in fabric F4.

The form is typical of the late Iron Age/ early Roman period and is widespread across the south of Britain.

Rapid assessment of the sampled assemblage confirms that this almost exclusively made up of amorphous, abraded lumps with no diagnostic characteristics; the remaining hand collected assemblage is also undiagnostic although a small number of fragments do exhibit features such as flat surfaces.

The Registered Finds by Trista Clifford (Figure 26)

Dress accessories

Brooch fragment RF<1> was a large copper alloy spring from an early 1st century bow brooch. The spring is fragmentary but consists of at least four turns and has a diameter of c.10mm. A small fragment of straight wire with the spring could be part of an external chord or pin.

An undecorated copper alloy dandy button, RF<18>, was also recovered from a Period 5 medieval ditch (G117). The loop is missing. Buttons of large diameter such as this were fashionable during the 18th century.

Tools

A fragmentary iron sickle, RF<12>, was recovered from Period 5 ditch fill [554] (G117). The object is complete but appears to have been deliberately damaged so that the blade is bent out of shape. The form of such tools changes little over time, however, Roman examples can have a serrated blade (Manning 1985, 51).

RF<25> comprised a Roe's intermediate form of battle axe (Roe 1979, 25) in a dark grey fine-grained non-calcareous stone (sandstone/quartzite). Too little is present to completely rule out an axe-hammer and the hour-glass perforation appears to have been set badly off-centre which may have contributed to its breakage. Such items are typical of the earlier part of the Bronze Age.

Horse equipment

A copper alloy figure of eight spur terminal, RF<15> of late medieval to post medieval date was recovered from a Period 5 medieval ditch (G117). An iron strap loop (RF<21>) was recovered from part of the same field-system, ditch fill [1089] (G124). This is of late post medieval date.

The decorated loom weight

A small fragment from a probable cylindrical loom weight (wt 114g) was recovered from Period 5 (G117) ditch fill [517]. Cylindrical weights are generally assigned Middle – Late Bronze Age date due to their frequent association with Deverel-Rimbury and post Deverel-Rimbury pottery, and are increasingly recognised as components of placed deposits, often recovered in pit groups. The current example is residual within a Period 5 ditch fill which must account for its poor condition. The fragment is extremely abraded, consisting of part of the oxidised outer surface and reduced core of the object. No evidence of a central perforation remains. On the oxidised surface three rows of round toothed comb impressions are set at angles to form a zig zag. The marks are very faint due to the severity of the abrasion of the objects surface, however, they are similar, if rather more regular, to the decorative motifs found on three fragments from nearby Selsey peninsular (Clifford in prep).

Comb impressed decorated cylindrical weights have a sparse distribution across the southern half of Britain, from Devon in the south west to Dagenham at their eastern limit. An example from Oxford (Barclay 2003) is also decorated with comb impressions, although these are arranged in a regular grid pattern rather than the somewhat ad hoc patterning on other recorded examples. The complete examples from Honiton (Laidlaw 1999, fig.59) are decorated with fingertip impressions around the margins rather than the surface of the objects. Fingertip impressions also feature on one fragment from Selsey (Clifford in prep). Barford and Major (1992, 117) suggest an association between weaving combs and weights with stabbed decoration.

The clay mould fragments

Phase 2.2 pit [832], fill [833] (G105) produced 12 fragments from a bivalve casting mould. The fragments consist of the interior layer with its' characteristic black/grey reduced colouration, made in a fine silty fabric with sparse calcined flint inclusions. The outer wrap is present on some pieces of the mould, tempered with sparse organic inclusions and oxidised to a mid-beige to mid red colour. Complete thickness is c.12.5mm, the outer wrap measuring 5mm at its thickest extent.

All fragments are heavily abraded, particularly on the inner surfaces, and as such no features remain with which to identify the exact form of the cast object. Four conjoining fragments form the most diagnostic group, in which the cross section shows a possible matrix base of c.18mm wide although the inner surface is so abraded in places that a determination of object type is not possible. The characteristics of this group appear to have been exaggerated during washing. One small piece appears to have a narrow V shaped section, possibly a channel for the tip of a pointed implement such as a spear. Again cleaning has probably contributed to this characteristic.

A bronze mould was included in the Late Bronze Age Wilmington hoard (Curwen 1954, xx) but no clay moulds have been recovered in Sussex thus far and other evidence for

Bronze Age metalworking is equally scarce within the county, despite a plethora of hoard and site finds. A number of moulds are known from neighbouring counties, including an increasing number from Kent (e.g. Yalding (Reamen in prep), Snodland (Boden 2006, 42) and Highstead (Needham 2007, 261-263). Dunkin (2001, 261) highlights the correlation between Bronze Age metalwork and ‘burnt mound’ sites on the coastal plain and this find would certainly not contradict this assertion.

The Worked Wood by Dawn Elise Mooney (Fig. 27)

Introduction and Methodology

During excavations at the site, a log ladder [T.1419] was discovered within the fills of waterhole [1391]. As the feature was not fully excavated, only the upper portion of the ladder could be recovered. The artefact was gently washed to remove as much adhering sediment as possible, and then recorded. A scale drawing (1:5) of the timber was conducted, and any visible working, tool marks or tool shadows were recorded. A sample of the timber was also taken for taxonomic identification. The sample was sectioned along three planes (transverse, radial and tangential) according to standardised procedures (Gale and Cutler 2000), and examined under a transmitted light microscope at 50x to 300x magnification in order to determine the type of wood used for the construction of the ladder. The taxonomic identification was assigned by comparing suites of anatomical characteristics visible with those documented in reference atlases (Hather 2000; Schoch *et al.* 2004; Schweingruber 1990), and by comparison with modern reference material held at the Institute of Archaeology, University College London. Nomenclature used follows Stace (1997).

Results

The ladder was constructed from a single large bough or small trunk of oak (*Quercus* sp.) wood. No bark was present, but the timber was substantially abraded and the bark is likely to have been lost post-depositionally rather than stripped. The timber was originally whole, but was broken into two sections during excavation. Although the two broken pieces do refit, point of refit is unclear as the timber is much degraded. The poor condition of the timber is likely to relate to fluctuations in groundwater level.

The timber tapers from a maximum diameter of 180 mm at the lower end, to 95 mm in the upper portion. This tapering is the natural form of the wood, rather than related to any working of the timber. The recovered portion of the ladder is 1825 mm in length (the upper portion 1150 mm, and the lower 675 mm). The ladder has three hewn notches, with evidence of a fourth at the broken basal end, each creating a step of up to 50 mm in depth. Possible tool shadows are visible in the lower two hewn notches, however these are too abraded to contribute to any discussion of the woodworking tools employed in the construction of the ladder. The uppermost step is significantly damaged – this may have occurred post-deposition, however, it is more likely that this damage occurred during the use of the ladder, through the pressure of people standing on the narrow notch. The notch below this is cut into the wood above a side branch which has been broken or trimmed to leave a prominent stump.

Discussion

The log ladder, comprising a notched small trunk or large bough of oak which would have been used to access the waterhole, is an unusual find in the region, and no other published examples from Sussex were identified during literature consultation. However, numerous examples have been found in other areas of southern England and East Anglia, dating to the Bronze Age and Iron Age periods. Excavations at Heathrow Terminal 5 produced four examples, one of which utilised stumps as steps as in the present timber (Allen 2010). Other Bronze Age log ladders are known from Longstanton, Cambridgeshire (Taylor 2007), Langtoft, Lincolnshire (Hutton 2008) and Yarnton, Oxfordshire (Archaeology Data Service 2014), while later Iron Age examples have been found at Trumpington (Armour 2007) and Milton (Bamforth 2013) in Cambridgeshire, and at Calverton in Milton Keynes (Wardell Armstrong Archaeology

2012). In the east Midlands and East Anglia, a significant corpus of prehistoric log ladders is beginning to build up (Bamforth 2013), and it seems likely that this simple piece of technology was a fairly ubiquitous component of prehistoric life. The clustering of such finds in this area, and their relative absence in the South-East of England, may be due to a number of factors, including preservation bias and excavation methodology.

The Animal Bone by Hayley Forsyth

A small assemblage of animal bone was retrieved from the excavations at Oldlands Farm, West Sussex. 1076 fragments of faunal remains consisting only of mammal bone were retrieved from 21 contexts. The majority of the assemblage derives from medieval deposits including pit and ditch fills. Small quantities of faunal remains were also retrieved from the late Neolithic – early Bronze Age and the middle – late Bronze Age. Iron Age and Roman phases not discussed further also produced a small quantity of animal bone.

Methodology

The assemblage has been recorded onto an Excel spreadsheet in accordance with the zoning system outlined by Serjeantson (1996). Where ever possible bone fragments have been identified to species and the skeletal element, part and proportion, represented. Specimens that could not be confidently identified to taxa, such as long-bone and vertebrae fragments, have been recorded according to their size and categorised as large, medium or small mammal.

In order to distinguish between the bones and teeth of sheep and goats a number of identification criteria were used including those outlined by Boessneck (1969), Boessneck *et al* (1964), Halstead et al (2002), Hillson (1995), Kratochvil (1969), Payne (1969; 1985), Prummel and Frisch (1986) and Schmid (1972). The identification of red deer remains has been undertaken with reference to Lister (1996).

Age at death data has been collected for each specimen where observable. Tooth eruption and wear has been recorded from mandibular dentition with two or more teeth in-situ, according to Grant (1982) for cattle. The state of epiphyseal fusion has been recorded as fused, unfused and fusing. Mammalian metrical data has been taken in accordance with Von den Driesch (1976) and withers heights were calculated following Fock (1966). Specimens have then been studied for signs of butchery, burning, gnawing and pathology. The location and direction of butchery marks on the bones has been recorded. Burnt bone has been recorded as charred or calcined.

The Assemblage

The assemblage contains 1076 fragments of which 525 fragments have been identified to taxa (Table 15). The majority of the assemblage has been hand-collected as well as retrieving a small quantity from bulk samples. 59 fragments of animal bone, of which 28 are identifiable, were collected from the bulk samples. The majority of the specimens are fragmented and in poor condition, with surface erosion evident. Evidence of butchery and burning has been recorded and where observable metrical and age at death data has also been recorded.

Period	No. Fragments	NISP	Preservation		
			Good	Moderate	Poor
1- Late Neolithic – Early Bronze Age	46	1	-	-	100%
2- Middle – Late Bronze Age	188	133	2%	26%	72%
5- Medieval	842	391	2%	22%	76%
Total	1076	525			

Table 15. Quantification of animal bone (NISP = Number of Identified Specimens).

A range of faunal taxa have been identified (Table 16). Cattle dominate the assemblage, followed by sheep/goat. Horse and red deer are also represented. Large and medium mammal bones are present in high quantities, representing the majority of the assemblage, due in part to the high levels of fragmentation.

Taxa	Period 1	Period 2		Period 5
	Phase 1	Phase 2.1	Phase 2.2	Phase 5
Cattle			18	33
Sheep/goat			1	17
Horse				3
Red Deer	1			
Large Mammal		7	71	141
Medium Mammal		3	14	197
Small Mammal			19	
Total	1	10	123	391

Table 16. Animal bone NISP (Number of Identified Specimens) by period.

Late Neolithic – Early Bronze Age (Period 1)

The late Neolithic – early Bronze Age assemblage contained 46 fragments from a single beam of red deer antler, recovered from pit fill context [343]. Both the pedicle and burr are absent suggesting this antler may have been naturally shed. Due to severe fragmentation and weathering it is unclear whether any tines are present amongst the fragmented remains. There is no evidence of burning or working that has survived that could suggest the antler was modified and utilised as a tool, such as a pick or rake (Serjeantson and Gardiner 1995; Worley and Serjeantson 2014). Samples were submitted for C14 dating but did not contain enough carbon to produce successful dating results.

It is highly likely that the antler was deposited or discarded deliberately as antler was such an important resource in this period (Serjeantson 2011). Antlers were collected after being naturally shed in March-May as well as being removed during the butchery processes of slain red deer (Serjeantson 2011). Antlers from Stonehenge, Durrington Walls and Grimes Graves include both naturally shed as well as slaughtered specimens, although the slaughtered remains were present in fewer numbers (Serjeantson and Gardiner 1995). In some cases deer were deliberately selected for the size and robusticity of the antlers from older, well developed male red deer as seen in the specimens recovered from Stonehenge (Serjeantson and Gardiner 1995).

The majority of antler implements discovered at sites across Britain are often recovered from the base of pits and ditches, utilised for digging features in chalk and limestone geology (Serjeantson 2011). Numerous deposits have been recovered at Marden Henge (Worley and Serjeantson 2014), Grimes Graves (Legge 1992; Clutton-Brock 1984) and Durrington Walls (Serjeantson 2011; Worley and Serjeantson 2014).

The antler from Oldlands Farm may have been utilised and modified as a pick or rake, however, poor preservation and high levels of fragmentation have obscured any visible signs of usage. The Oldlands Farm antler is a symbolic object and may have been deposited as an unused offering instead of a worn modified and utilised tool. At South Street Long Barrow in Wiltshire seven antlers had been deposited in a ditch, one antler showed no signs of wear, whilst the remainder had worn tines (Serjeantson 2011). Several antlers deposited in a ring ditch at Barrow Hills in Radley exhibited signs of modification and use, apart from one specimen (Serjeantson 2011).

Middle – Late Bronze Age (Period 2)

The Middle – Late Bronze Age period contains two phases; Phase 2.1 and Phase 2.2. Phase 2.1 contained 10 identifiable fragments recovered from two cremation fill contexts [1343] and [1344]. This small assemblage contains large and medium mammal long bone fragments that show signs of burning; calcination.

Phase 2.2 produced an assemblage of 123 identifiable fragments including large mammals, small mammals, cattle, medium mammal and sheep/goat. The remains were retrieved from twelve contexts including fills of a waterhole ([1391]; G56; WH1); [1393], [1394], [1395], [1399] pits; [615] (G103), [907], [908] (G91; B4); ditches; [420] ([419]; ENC2), [922] (G90; B4), [1204] (G60; FS2), a storage/sump pit; [1445] ([1444]; OA8) and a posthole; [711] ([710]; FS2). From this assemblage four bulk samples [329] <105>, [420] <11>, [1393] <49> and [1394] <50> produced a collection of 55 fragments of bone, 26 of which were identifiable. Both meat and non-meat bearing bones were present within this assemblage, with the majority originating from post-cranial elements. Evidence of butchery was observed in a large mammal mandible fragment from context [1399] from waterhole [1391] (G56; WH1). Small repetitive cut marks were recorded across the surface of the bone possibly to remove the skin and to portion the bone cutting through soft connective tissues. No ageable mandibles or measureable bones were recorded. Bone fusion data was limited and no evidence of gnawing or pathology was recorded.

Medieval (Period 5)

The medieval assemblage contained 391 identifiable fragments, recovered from four pit and ditch fill contexts; [170] (G115), [1076] (G124), [1144] (G122), [1199] (G123).

This period is dominated by fragments of medium and large mammal bone due in part to poor levels of preservation. Cattle, sheep/goat and horse are also present within this assemblage.

Two Associated Bone Groups (ABG's) (Hill 1995; Morris 2008; 2010; 2011), were retrieved from contexts [1144] and [1199]. This type of deposit is not uncommon in the period (Hill 1995; Morris 2008; 2010; 2011). A juvenile partially articulated sheep/goat axial skeleton ABG was recovered from pit fill [1144] (G122). Fusion data suggests that this individual was approximately 10 months old at death (Silver 1969). No butchery marks, gnawing or pathological lesions were observed.

A partially articulated cattle skeleton ABG was retrieved from pit fill [1199] (G123). Fusion data suggests that this was an adult individual (Silver 1969). Butchery marks were recorded in four bones from this ABG burial including two long bone fragments as well as a humerus and radius fragment, with evidence of chop marks consistent with dismemberment. Two measurable cattle bones were recorded from context [1199] and included a metacarpal and metatarsal producing estimated withers heights of 1.28m and 1.33m respectively. Two ageable left and right cattle mandibles from the ABG burial were recorded with a tooth wear stage of 47. No gnawing or pathological lesions were observed.

Three loose horse incisors and a cattle mandible fragment were recovered from ditch fill [170] (G115) as well as a medium mammal rib fragment from ditch fill [1076] (G124). The majority of the bones present within this period consist of meat bearing bones, with a small quantity of non-meat bearing bones also present. This assemblage likely represents domestic refuse and general waste from the site.

The Cremated Bone by Lucy Sibun

Introduction

Burnt human bone was recovered from eight contexts dating to Phase 2.1 (early MBA) and Phase 2.2 (MBA-LBA). Phase 2.1 included urned cremation burial [1153], [1154] (G84) and deposit [1344] (G47). Phase 2.2 produced urned cremation burial [1334], [1335] (G111), un-urned cremation deposits [329] (G107) and [894] (G112) and possible pyre deposit [1264] (G83). Ten further contexts produced small assemblages of cremated bone that were either unidentifiable or animal in origin.

Methods

Although some of the cremated bone was hand collected, the majority of deposits were removed from site and processed as environmental samples; sieve fractions of <4mm, 4-8mm and >8mm presented for analysis. Recording and analysis of the bone followed the procedures outlined by McKinley (2004) Age and sex estimations were carried out with reference to Bass (1987), Buikstra and Ubelaker (1994). All bone fragments were examined for pathological lesions.

Results

Phase 2.1

The results of analysis are summarised below (Table 17).

Group number	Context Number	Fragment size (mm)	Weight per skeletal element (grams)					*Percentage of whole assemblage*	Total
			Skull	Axial	Upper limb	Lower limb	Unident		
47	1344	0-4	5.2				31.5	*13.8*	265.1
		5-8		9.5	4.9	5.2	121.6	*53.2*	
		9-20		2.4	35.5	25.5	8	*27.0*	
		21-30				8.5		*3.3*	
		30+				7.3		*2.8*	
	Percentage of identifiable material		*5.0*	*11.4*	*38.8*	*44.7*			
84	1153	0-4					0.8		3.3
		5-8		0.1			2.4		
	1154	0-4	<1				72.0	*50*	144.0
		5-8	4.4	0.5	4.8		53.7	*44.0*	
		9-20	5.6	0.7	2.3			*6.0*	
	Percentage of identifiable material		*54.6*	*6.6*	*38.8*				

Table 17. Period 2, phase 1: quantification of cremated human bone.

Cremation deposit [1344] is one of several possible cremation deposits within G47, located in FS1, but the only one to produce identifiable human bone. It had been deposited within a clay-lined pit [1342] interpreted as a possible fire pit. The assemblage appears to represent a single individual of probable adult age but undetermined sex. The 265.1 grams of bone recovered comprise approximately 16% of the expected weight for an adult burial (McKinley 1993, 285) but unfortunately, due to the degree of fragmentation (53% recovered from the 5-8mm fraction) less than half was identifiable to skeletal area or element. Fragments from the upper and lower limbs dominated the assemblage (83.5%) and unusually, fragments from the axial skeleton were more prevalent (11.4%) than skull fragments (5%). The largest fragment was from a femoral shaft and measured a maximum of 47mm. None of the smaller elements of the skeleton such as teeth or small bones of the hands and feet were recovered, suggesting that the cremation ritual may have involved hand selection of bone, rather than collection en masse (McKinley 2006a, 29). Approximately 95-98% of the assemblage was white in colour, indicative of an effective and fairly uniform cremation process reaching temperatures in excess of 600°C (Holden et al 1995a and b).

G84 represents the vessel [1154] and surrounding backfill [1153] from an isolated cremation burial located in OA6. The vessel appears to have been inverted and had suffered from truncation, with no fragments from the base of the vessel recovered. Considering the small quantities of bone recovered from the backfill it is likely that both contexts represent the same individual and there was nothing noted in the assemblage to contradict this. Fragment size would suggest that this individual was an adult but no elements were recovered that could aid with sex determination. As with [1344] the assemblage was highly fragmented with 50% recovered from the smallest 0-4mm fraction, contributing to a total of 94% that measured less than 8mm. The 144.0 grams of bone recovered comprise less than 10% of the expected weight for an adult burial (McKinley 1993, 285). Unlike [1344], skull fragments formed the majority of the identified assemblage, comprising 54.6% but in this burial the presence of tooth roots may indicate a different bone collection ritual. The cremation process itself was efficient, with approximately 95% of the bone white or off-white in colour. As the vessel was micro-excavated in spits it was possible to look for patterns of bone within the vessel but none were apparent. The bone was scattered throughout and interspersed with occasional prices of charcoal and fire-cracked-flint. The density of bone increased towards the base of the vessel (uppermost in the ground), which suggests that there may have been some bone loss as a result of the truncation.

Phase 2.2

Urned cremation [1334]

The results of analysis are summarised below (Table 18).

Group number	Context Number	Fragment size (mm)	Weight per skeletal element (grams)					*Percentage of whole assemblage*	Total
			Skull	Axial	Upper limb	Lower limb	Unident		
111	1334	0-4				37.4	69.5	*13.5*	791.5
		5-8	18.7	10.9	30.3	8.6	186.5	*32.2*	
		9-20	72.5	9.8	40.5	36.6	69.4	*28.9*	
		21-30	91.2		70.8	15.1		*22.4*	
		30+	14.7		0.6	8.4		*3.0*	
	Percentage of identifiable material		*42.3*	*4.4*	*30.5*	*22.8*			
	1335	0-4					68.9	*41.2*	167.1
		5-8	8.4		4	2.7	61.2	*45.7*	
		9-20	12.9		3.9	3.3	1.8	*13.1*	
	Percentage of identifiable material		*60.5*		*22.5*	*17.0*	35.2		

Table 18. Period 2, phase 2: quantification of cremated human bone.

G111, located in OA8 contained cremation vessel [1334] and backfill [1335] as well as possible cremation [998], from which only unidentifiable bone was recovered. Vessel [1334] had been truncated and was highly fragmentary. Although a more significant quantity of bone was recovered around the vessel than in the phase 2.1 cremation [1154], there were no duplicated elements suggesting that the vessel fill [1334] and surrounding backfill [1335] represent the same individual; a probable adult of unknown sex. The assemblage recovered from inside the vessel was spread across all fraction sizes, although the 5-8mm fraction produced slightly more bone (32.2%); the apparent post-depositional deposition to the vessel, is likely to be a causal factor in the fragmentation of the bone. The backfill assemblage was more highly fragmented, with 41.1% recovered from the smallest fraction (0-4mm) and 45.7% from the 5-8mm fraction. This might suggest that that backfill assemblage has become more fragmented since its deposition, without the protection of the vessel. The largest fragment recovered was from a humeral shaft, measuring 53mm in length.

Taking both assemblages together, the total of 958.6 grams represents approximately 58% of the expected weight for an adult and is more than commonly recovered from the average cremation, which produces between 500 and 800 grams (McKinley 2006a, 26). Fragments from the skull dominate both assemblages followed by upper limb, lower limb and axial fragments. Tooth root fragments were recovered, possibly indicating en-masse bone collection rather than hand-selection (McKinley 2006a, 29). As with the phase 2.1 assemblages, the off-white colour indicates an effective and uniform cremation process.

An examination of the micro-excavation plans confirms that the majority of the bone was recovered from the base of the vessel, suggesting that although the top of the vessel had been truncated, this is unlikely to have affected the quantity of bone recovered. There are no other spatial patterns visible within the vessel.

Un-urned cremations deposits

Phase 2.2 also contained two un-urned cremation deposits [329] (G107) and [894] (G112), both of which were found alongside other possible cremation deposits that unfortunately didn't contain identifiable human bone. Cremation deposit [329], located in area R2 only produced a total of 68.6 grams of bone. The only identifiable fragments were from the skull (12.1 grams) and were recovered from the 0-4 and 5-8mm fractions. Cremation [894] was located in OA8 and produced 13.9 grams of bone, only 0.5 grams of which was identifiable; 0.1 grams as skull and 0.4 grams as upper limb.

Pyre Deposit

Possible pyre deposit [1264] (G83) was located in area FS2. This has been summarised in the table below.

Group number	Context Number	Fragment size (mm)	Weight per skeletal element (grams)						Total
			Skull	Axial	Upper limb	Lower limb	Unident	*Percentage of whole assemblage*	
83	1264	0-4					7.2	*5.7*	125.4
		5-8	7.1	3.4	1.6	3.3	45.5	*48.6*	
		9-20			17.0	6.7		*18.9*	
		21-30	11.3		8.3	6.8		*21.1*	
		30+	7.2					*5.7*	
	Percentage of identifiable material		*35.2*	*4.7*	*37.0*	*23.1*	72.7		

Table 19. Quantification of cremated human bone from pyre deposit [1264].

The deposit produced a total of 125.4 grams of bone, the majority of which was recovered from the 5-8mm fraction. Upper limb fragments comprised approximately 37% of the identified assemblage and skull fragments approximately 35%. Unlike the cremation deposits from the site only 75% of the bone was fully calcined and off-white in colour. The remaining 25% comprised mostly limb fragments and was charred black or grey. McKinley has stated that the presence of a pyre deposit implies that the pyre site is probably close by, as possibly is the burial of the individual to which the deposit relates (McKinley 2013, 154). Although at the edge of the excavation and therefore possibly associated with something unseen, a number of cremation or possible cremation burials are located in the vicinity.

Discussion

These assemblages appear to be typical of Bronze Age cremation burials in many aspects and both urned and un-urned deposits have been recovered from many contemporary sites, for example Clay Pit Lane (McKinley 2006b) and Gravesend (Sibun forthcoming). The assemblages from these sites also exemplified effective cremations. None of the burials appear to have involved the selection of particular parts of the skeleton for burial, but a general approach, with all areas of the skeleton represented in most cases. However, the recovery of the smallest elements, such as tooth roots, from some but not all deposits suggests a variation in collection ritual, both at this site and between sites. It has been suggested that small bone recovery may have been aided by raking-off the top layers of the pyre (McKinley 2006b, 35).

From two of the three deposits, the quantity of bone recovered is significantly less than average; larger quantities are more consistently found in the Bronze Age and it has been suggested that time taken for the collection of bone for burial may reflect the status of the individual (McKinley 2006a, 26). At this site, post-deposition disturbance would have undoubtedly had an adverse effect on the quantities recovered. This may also have had a detrimental effect on the fragmentation of bone, although this degree of fragmentation is not uncommon for cremation burials of this date (McKinley 2006a, 27-8).

Radiocarbon dating

A programme of radiocarbon dating was undertaken in order to address specific questions regarding site phasing and the date of particular artefacts. The results of the radiocarbon dating programme are given in Table 20.

Four samples of bulk organic sediment and wood were processed by Beta Analytic Inc., Florida, USA (lab code Beta) for AMS dating during the assessment phase. In the subsequent analysis phase, 17 samples of wood, (both waterlogged and charcoal), charred residues on pottery, burnt and unburnt human bone and antler were submitted to the Scottish Universities Environmental Research Centre (lab code SUERC (GU)) in East Kilbride, Scotland for AMS dating. Five of these samples (2 x antler, 2 x residue on pottery, 1 x human bone) failed due to insufficient carbon.

The radiocarbon results are quoted in accordance with the international standard known as the Trondheim convention (Stuiver & Kra 1986). They are conventional radiocarbon ages (Stuiver & Polach 1977). The dates have been calibrated using the IntCal 13 calibration curve of Reimer *et al.* (2013) and the calibration programme OxCal v4.2.4 (Bronk Ramsey 1995; 1998; 2001). The dates in the table and text are for 95% (2σ) confidence. The dates are quoted in the form recommended by Mook (1986) with the end points rounded outwards to ten years.

Lab number	ASE dating sample number	Context	Sample Type	$\delta^{13}C$ (‰)	Conventional Radiocarbon Age BP	Calibrated Date 95% confidence
Beta-392053	ASE_DS_275	BH1_1.96-1.98m	sediment	-25.3	10580±40	10705–10480 cal BC
Beta-392054	ASE_DS_276	BH1_4.76-4.78m	sediment	-29.7	3040±30	1395–1215 cal BC
Beta-392055	ASE_DS_277	BH7_2.88-2.90m	sediment	-24.2	6400±30	5470–5315 Cal BC

Beta-409063	ASE_DS_294	[1419]	Waterlogged Wood *(Quercus sp.)*	-25.0	2870±20	1110–1000 cal BC
SUERC-63859 (GU-39212)	ASE_DS_351	813	Charcoal *Maloideae*	-27.0	4187±24	2887–2678 cal BC
SUERC-63860 (GU-39213)	ASE_DS_352	813	Residue on Pottery	-27.4	4167±29	2881–2635 cal BC
SUERC-63861 (GU-39215)	ASE_DS_354	1335	Burnt Bone	-18.3	2966±29	1271–1057 BC
SUERC-63862 (GU-39216)	ASE_DS_355	1333	Burnt Bone	-20.9	2971±26	1279–1111 cal BC
SUERC-63863 (GU-39217)	ASE_DS_356	1395	Waterlogged wood *Maloideae* roundwood	-30.1	2938±29	1230–1031 cal BC
SUERC-63867 (GU-39219)	ASE_DS_358	508	Residue on Pottery	-25.0 (assumed)	2912±29	1208–1015 cal BC
SUERC-63869 (GU-39222)	ASE_DS_361	1431	Residue on Pottery	-26.6	3234±29	1608–1436 cal BC
SUERC-63870 (GU-39223)	ASE_DS_362	999	Charcoal *Maloideae*	-25.3	2873±29	1188–935 cal BC
SUERC-63871 (GU-39224)	ASE_DS_363	999	Charcoal *Corylus/Alnus sp.*	-26.7	2867±29	1124–931 BC
SUERC-65219 (GU-39678)	ASE_DS_373	1344	Burnt Bone Human Bone	-19.8	3062±30	1411–1232 cal BC
SUERC-65220 (GU-39679)	ASE_DS_374	204	Charcoal *Maloideae*	-27.1	4135±30	2872–2620 cal BC

SUERC-65221 (GU-39680)	ASE_DS_375	204	Charcoal *Corylus avellana*	-26.2	4094±30	2861–2500 cal BC

Large tables

Table 2. Description of sediment attributes for microstratigraphic units, Oldlands Farm, Bognor, West Sussex.

Sample	Field context	Microstrat unit number	Basal boundary	Particle size	Sorting	Fine material	Groundmass	Colour	Related distibution	Microstructure	Inclusions: Orientation and Distribution
63	353	**1**	Irregular, gradual, sedimentological	Silt loam	Bimodal: well sorted silt; moderately sorted sand.	Mineral	Dotted b-fabric/ mosaic-speckled b-fabric/ poro and granostriated b-fabric	PPL:mid brown and dark orange; XPL: orange and grey.	Embedded and coated	Channels 15% Chambers 10% Spongey 5% Vesicles 2%	Locally oriented and clustered quartz silt. Other components are unoriented, unrelated, random and unreferred.
63	353	**2**	N/A	Silt loam	Bimodal: well sorted silt; moderately sorted sand.	Mineral	Dotted b-fabric/Stippled-speckled b-fabric/ poro and granostriated b-fabric	PPL:mid brown and dark orange; XPL: orange and grey.	Embedded and coated	Chambers 10% Spongey 5% Vesicles 2% Cracks 2%	Locally oriented and clustered quartz silt. Other components are unoriented, unrelated, random and unreferred.

Table 3. Percentage of inclusions within microstratigraphic units, Oldlands Farm, Bognor, West Sussex.

Key: very dominant >70% ****** dominant 50-70% ***** common 30-50% **** frequent 15-30% *** few 5-15 % ** very few <5% *

				Minerals					**Micro-artefacts**	**Organic/Plant remains**		
Slide number	**Microstrat unit number**	**Thickness on slide (cm)**	**Bedding**	**Quartz**	**Muscovite**	**Glauconite**	**Manganese**	**Iron**	**Flint**	**Charred wood**	**Plant tissue ferruginous**	**Plant tissue (with cellulose)**
63	**1**	5.7-6.2	Massive	*****	*		*	***	*	*	*	
63	**2**	3.5-4.7	Massive	*****	*		**	**	*			

Table 4. Type and percentage of post-depositional within microstratigraphic units, Oldlands Farm, Bognor, West Sussex.

Key: ● <2% ●● 2-5% ●●● 5-10% ●●●● 10-20% ●●●●● >25%

Slide number	**Microstrat unit number**	**Weathering**				**Trampling, shrink-swell etc.**	**Bioturbation**
		Translocation		**Chemical alteration**		**Microstructure effects**	
		Silty Clay Coatings: moderately/ strongly orientated	**Iron**	**Mica weathering**	**Manganese neomineral**	**Cracks**	**Mesofaunal / root bioturbation**
63	**1**	●●●●	●●●●	●●	●●		●●●●●
63	**2**	●●	●●●	●●	●●●	●	●●●

Table 5. Charcoal analysis data.
(V = vitrified, PDS = post depositional sediments, RC = radial cracks, rw = round wood, nb = no bark present, gr = growth rings, cf. = compares with, indet. = indeterminate/unidentifiable). Values in brackets are quantities from the assessment phase of works (Allott and Vitolo 2015)

Sample Number	**Context**	**Feature Type**	**Parent Context**	**Phase**	***Quercus* sp.**	**cf. *Quercus***	***Fraxinus excelsior***	**cf. Maloideae group**	**Prunoideae *Prunus* sp.**	***Corylus avellana***	***Corylus/Alnus***	**cf. *Corylus alnus***	**cf. *Populus/Salix***	**indet. Distorted**	**Total number of analysed fragments**
					oak		**ash**	**hawthorn, whitebeam, rowan, apple, pear**	**cherry/blackthorn**	**hazel**	**hazel/alder**		**Willow/poplar**		
16	576	Cooking/ furnace pit fill	575	2.2	93 (10)		1							6	100 (10)
					V, PDS, RC, SG + FG		PDS							High V, RC, PDS. 1* knotwood	
20	637	Cooking/ furnace pit fill	636	2.2	44 (7)			34 (3)		1	12			9	100 (10)

Sample Number	Context	Feature Type	Parent Context	Phase	*Quercus* sp.	cf. *Quercus*	*Fraxinus excelsior*	cf. Maloideae group	Prunoideae *Prunus* sp.	*Corylus avellana*	*Corylus/Alnus*	cf. *Corylus alnus*	cf. *Populus/Salix*	indet. Distorted	Total number of analysed fragments
					PDS, RC, SG + FG. Poor preservation			V, PDM		PDS	PDS, V			PDS, 1 * knotwood	
23	722	Pit fill	720	2.2	17 (6)		55 (6)	12		2	10			4	100 (10)
					PDS		PDS, some V	PDS		PDS , FH?	PDS			PDS, brittle	
29	892	Cremation pit fill	891	2.2	3	1	2	38 (2)			30 (1)			26 (5)	100 (8)
					PDS			PDS			PDS, 1* knotwood			V, PDS, RC, very bad preservati on	
36	813	Cooking pit fill	811	1	16 (4)			3 (1)	2 (2)	3 (2)		(1)	1		25 (10)
					V, RC			PDS							
41	126 4	Cremation deposit	1264	2.2	4		72 (6)	14 (4)			1				91 (10)

Sample Number	Context	Feature Type	Parent Context	Phase	*Quercus* sp.	cf. *Quercus*	*Fraxinus excelsior*	cf. Maloideae group	Prunoideae *Prunus* sp.	*Corylus avellana*	*Corylus/Alnus*	cf. *Corylus alnus*	cf. *Populus/Salix*	indet. Distorted	Total number of analysed fragments
					3 * <4mm		SG/pith visible *5; V, RC *5	Vessels squashed, 5* not RW but inner 8 rings wider than outer rings							
43	134 4	Cremation /cooking pit/ furnace	1342	2.1	3			5		9 (4)	64 (4)			19 (2)	100 (10)
					V, RC, PDS			2 * <4mm		RC	PDS, RC, V*8; several knotwood and squashed cells			PDS, V, RC, 1* knotwood	
67	999	Cremation	998	2.2	6 (5)	10		25 (3)			4	5		15 (2)	65 (10)
					PDS	V, RC, PDS		PDS, low V			V, RC, PDS	V, RC, PDS		PDS, V, RC	
Totals					186	11	130	131	2	15	121	5	1	79	681

Table 6. Presence/absence data for charcoal taxa.

Taxonomic Identification	*Quercus* sp.	*Fraxinus excelsior*	*Corylus /Alnus* sp.	*Corylus avellana*	Maloideae group	Prunoideae *Prunus* sp.	*Salix* sp./*Populus* sp.
English Name	oak	ash	hazel/alder	hazel	hawthorn, whitebeam, rowan, apple,	plum/cherry/blackthorn	willow/poplar
Phase 1 - Late Neolithic - Early Bronze Age	X			X	X	X	X
Phase 2.1 - Middle - Late Bronze age	X		X	X	X		
Phase 2.2 - Middle - Late Bronze Age	X	X	X	X	X	X	

Table 7. Charcoal species list.

KEY

Estimated, not quantified: +=occasional, ++=several, +++=abundant, ++++=very abundant

Habitat characteristics

A - Weeds of arable land**, C -** Cultivated plants, **D –** Ruderals, weeds of waste and disturbed places, **E –** Heath, **G –** Grassland, **H** – Hedgerows, **M –** Marsh/bog, **R –** Rivers/ditches/ponds**, S –** Scrub, **W –** Woods, **Y –**Waysides/hedgerows**, * -** plants of economic value

Soils/ground conditions

a – acidic**, c –** calcareous**, d –** dry**, b –** base rich**, n –** nutrient rich**, o –** open ground**, s –** shaded**, w –** wet/damp soils**, h –** heavy soils

		Depth	1.30-1.40	1.40-1.50	1.50-1.60	1.78-1.97
		Sample Number	60	61	62	47
		Context Fill Number	1399	1391	1391	1466
Taxonomic Identification	**English Name**	**Habitat Codes**				
Charred						
Triticum dicoccum/spelta	emmer/spelt glume base	C*	1			
Triticum dicoccum/spelta	emmer/spelt caryopsis	C*			1	
Hordeum vulgare L.	hulled barley caryopsis	C*	1			
Rubus idaeus/fructicosus agg.	raspberry/bramble	HSW*		1		
Waterlogged						
Triticum dicoccum/spelta	emmer/spelt spikelet fork	C*		1		
Ranunculus acris/repens/bulbosus	meadow/creeping/bulbous buttercups	ADHSWow		22	2	
Ranunculus cf *sceleratus* L.	celery leaved buttercup	MP				1

		Depth	1.30-1.40	1.40-1.50	1.50-1.60	1.78-1.97
		Sample Number	60	61	62	47
		Context Fill Number	1399	1391	1391	1466
Urtica dioica L.	stinging nettle	AND	143	108	428	20
Chenopodium cf *album* L.	fathen	CDn	4		14	
Chenopodium sp.	goosefoots	CDY	1	34	16	5
Chenopodium/Atriplex sp	goosefoots/oraches	AD	13			
Stellaria media (L.) Vill	common chickweed	AD	60	110	760	33
Stellaria sp.	chickweed/stitchwort	ADHSWo	2	10		
Polygonum/Rumex sp.	knotgrasses/docks	ADHSWow	7	64	32	2
Rumex sp.	sorrel/dock	ADHSWow	4		4	3
Polygonum sp.	knotgrasses	ADHSWow			2	
Polygonum cf. *aviculare* L.	knotgrass	AD			4	2
Persicaria lapathifolia(L.) Gray	pale persicaria	CDd	2	10	4	
Fallopia convolvulus (L.) Á Löve	black bindweed	AD				2
Viola sp	violets	ADGHSWo		28		
cf Brassicaceae	cabbage family		2			
Crataegus monogyna Jacq.	hawthorn	HSW	3 (5cf)	15	1 (cf)	
Prunus spinosa L.	sloe/blackthorn stone	HSW	1 (1cf)	1		
Rubus idaeus/fructicosus agg.	raspberry/bramble	HSW*	179	284	140	239
Cornus sanguinea L.	dogwood	WSb	3 (1cf)	6	3	
cf *Linum catharticum* L.	fairy flax	Gcs		2		
Apiaceae	Umbellifera/carrot famly		23	42	4	
Conium maculatum L.	hemlock	DRYw	49	3		
Aethusa cynapium L.	fool's parsley	CD		4		
cf Daucus carota L.	wild carrot	AHSWoC		2		

		Depth	1.30-1.40	1.40-1.50	1.50-1.60	1.78-1.97
		Sample Number	60	61	62	47
		Context Fill Number	1399	1391	1391	1466
cf. *Solanum* sp.	nightshades	Do			2	1
Solanum dulcamara	bittersweet	DHWMR	77	83		
Mentha sp.	mints	GRM			22	3
Galeopsis tetrahit	hemp-nettles	ADWow	1	1		
Prunella vulgaris L.	self-heal	DGW		4	4	
Sambucus nigra L.	elder	DHSW	52	66	110	50
Asteraceae	Compositae/daisy family				2	
Carduus/Cirsium sp.	thistles	ADGY	17	52	2	2
Sonchus oleraceus (L.)	smooth sow-thistle	ADY		4		
cf *Senecio vulgaris*	groundsel	AD	2			
cf *Potamogeton* sp**.**	pondweeds	Rab		2		
Cyperaceae	sedges (small nutlet)				16	
Carex sp.	sedges triangular/round	EGMRw	2	6		
Pteriidum aquilinum (L.)Kuhn	bracken (small pinnule fragments)	WEda	2	16	18	
Inteterminate or Unidentified Plant part				6		
Unidentified weed seed			7	7	24	4
Thorns (Rosaceae)			+	++	++++	+++
Indeterminate nutshell/fruit stone frags			8			
Unidentified fruit				7		
Buds			+	+	++++	+++

Table 8. Summary of the pieces of struck flint by period.

(*: from unstratified, unphased and natural deposits)

Period	LNEO EBA								MBA LBA	MIA and later	Remaining assemblage*	**Total**
Landuse	OA1							OA1, BM1 and S4	B1-4, D1, ENC1-3, FS1-2, OA5, R1-2, S10 and WH1	incl. FS3 and FS4	incl. WC1	
Feature	GW Pit / Sump [258]			Pit / Sump [283]	Pit / Sump [342]		GW Cooking pit / Fire [811]	various	various	various	various	
Stratigraphy	Primary fill	Secondary fill	Tertiary fill	Single fill	Primar y fill	Secondary fill	Secondary fill					
Context	[259]	[260]	[261]	[284]	[344]	[343]	[813]					
Flake	2	3	6	3	4	19	73	22	201	58	10	**401**
Blade-like flake	-	-	1	-	1	3	6	1	12	2	1	**27**
Blade	-	-	-	-	-	2	-	2	15	2	1	**22**
Bladelet	-	-	-	2	-	1	-	-	1	-	-	**4**
Core face edge rejuvenation flake	-	-	-	-	-	-	-	-	1	-	-	**1**
Chip	14	27	33	-	8	12	30	28	162	5	6	**325**
Irregular waste	-	-	-	-	-	2	5	-	5	2	1	**15**
Single platform blade core	-	-	-	-	-	-	-	-	1	-	-	**1**
Multiplatform flake core	1	-	-	-	-	-	4	-	7	2	2	**16**

Period	LNEO EBA								MBA LBA	MIA and later	Remaining assemblage*	**Total**
Landuse	OA1							OA1, BM1 and S4	B1-4, D1, ENC1-3, FS1-2, OA5, R1-2, S10 and WH1	incl. FS3 and FS4	incl. WC1	
Feature	GW Pit / Sump [258]			Pit / Sump [283]	Pit / Sump [342]		GW Cooking pit / Fire [811]	various	various	various	various	
Stratigraphy	Primary fill	Secondary fill	Tertiary fill	Single fill	Primary fill	Secondary fill	Secondary fill					
Context	[259]	[260]	[261]	[284]	[344]	[343]	[813]					
Single platform flake core	-	-	-	-	-	-	-	-	1	1	-	**2**
Unclassifiable/fragmentary core	-	-	-	1	-	1	1	-	4	2	-	**9**
Core on a flake	-	-	-	-	-	-	1	-	1	-	-	**2**
Tested nodule	-	-	-	-	-	-	-	-	1	-	-	**1**
End scraper	-	-	-	-	1	1	-	-	2	-	-	**4**
Side scraper	-	-	-	-	-	-	-	-	-	2	-	**2**
End-and -side scraper	-	-	-	-	-	1	-	-	1	1	2	**5**
Denticulated scraper	-	-	-	-	-	-	-	1	-	1	-	**2**
Piercer	-	-	-	-	-	-	-	-	1	-	-	**1**
Notched piece	-	-	-	-	-	-	-	-	2	1	-	**3**
Scale-flaked knife	-	-	-	-	-	-	-	1	-	-	-	**1**
Other knife	-	-	-	-	-	-	-	-	-	-	1	**1**
Retouched flake	-	-	-	1	-	-	1	2	5	4	-	**13**
Retouched bladelet	-	-	-	-	-	-	-	-	1	-	-	**1**
Misc. Retouch	-	-	-	1	-	-	-	-	1	-	-	**2**
Composite tool	-	-	-	-	-	-	-	-	-	1	-	**1**

Period	LNEO EBA								MBA LBA	MIA and later	Remaining assemblage*	**Total**
Landuse	OA1							OA1, BM1 and S4	B1-4, D1, ENC1-3, FS1-2, OA5, R1-2, S10 and WH1	incl. FS3 and FS4	incl. WC1	
Feature	GW Pit / Sump [258]			Pit / Sump [283]	Pit / Sump [342]		GW Cooking pit / Fire [811]	various	various	various	various	
Stratigraphy	Primary fill	Secondary fill	Tertiary fill	Single fill	Primar y fill	Secondary fill	Secondary fill					
Context	[259]	[260]	[261]	[284]	[344]	[343]	[813]					
Hammerstone	-	-	-	-	-	-	-	-	4	-	-	**4**
Total	**17**	**30**	**40**	**8**	**14**	**42**	**121**	**57**	**429**	**84**	**24**	**866**

Table 9. Summary of burnt unworked flint rich features and deposits.

Period	Phase	Context	Origin	Parent context	Landuse	Subgroup	Group	Feature type	Burnt unworked flint - Weight (g)	Burnt unworked flint - Description
1	1.1	813	sample <36>	811	OA1	388	1	Pit (secondary fill)	6151	sample produced both worked unburnt flint (1383g) as well as unworked burnt flint
1	1.1	204	sample <102>	203	BM1	58	8	Burnt mound (secondary layer)	4976	Calcined light grey, small fragments up to 36mm
1	1.1	282	sample <104> + hand collection	281	BM1	100	11	Pit base of burnt mound	4968	Calcined light to mid grey, small fragments up to 32mm
2	2.2	486	sample <12>	485	OA8	209	105	Cooking pit or fire pit	7996	Calcined light to mid grey to white with occasional fragments with reddish tinge; fragments up to 54mm
2	2.2	508	sample <13>	507	OA8	220	105	Cooking pit or fire pit	12159	Calcined mid to dark grey; small fragments up to 44mm; pebble fragments present
2	2.2	637	sample <20>	636	OA8	289	105	Cooking pit or fire pit	20940	Calcined mid to dark grey; fragments up to 55mm; pebble fragments present
2	2.2	751	sample <24> + hand collection	750	OA8	356	103	Cooking pit or fire pit	1588	Calcined light to dark grey, occasional fragments with reddish tinge; pebble fragments; fragments up to 62mm
2	2.2	839	sample <38>	837	OA8	401	105	Cooking pit or fire pit (secondary fill)	18843	Calcined light grey with occasional red fragments; fragments up to 64mm
2	2.2	846	sample <39>	844	OA8	405	109	Refuse pit (secondary fill)	11486	Calcined light to dark grey, occasional fragments with reddish tinge; fragments up to 55mm
2	2.2	848	sample <40>	844	OA8	407	109	Refuse pit (quaternary)	12556	Calcined light to dark grey, occasional red fragments; fragments up to 62mm

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