



Excavation of later prehistoric remains and a Roman cemetery at East Hill, Dartford, 2006

**Wessex Archaeology, Portway House, Old Sarum Park,
Salisbury SP4 6EB
tel: 01722 326867 fax: 01722 337562
email: info@wessexarch.co.uk
www.wessexarch.co.uk**

EXCAVATION OF LATER PREHISTORIC REMAINS AND A ROMAN CEMETERY AT EAST HILL, DARTFORD, 2006

by Mike Trevarthen

With contributions by

Nicholas Cooke, Phil Harding, Grace Perpetua Jones, Matt Leivers, Jacqueline I.
McKinley and Chris J. Stevens
with illustrations by Rob Goller

Introduction

Wessex Archaeology was commissioned by CgMs Consulting, acting on behalf of Persimmon Homes (South East), to undertake a programme of archaeological excavation within the grounds of the former East Hill House, 73 East Hill Drive, Dartford prior to redevelopment for housing.

The site (centred on NGR 554733 173815; Fig. 1) lay immediately east of a partially excavated Roman inhumation cemetery (Leyland 1990a; 1990b; Herbert 2011), and two archaeological evaluations had demonstrated that additional Roman graves lay beneath the site's western end, as did other significant prehistoric remains (Canterbury Archaeological Trust 2002, Wessex Archaeology 2005). The site was excavated in two phases during February–March and May–June 2006.

Site location and topography

Lying at *c.*30m aOD, the site occupies level and gently north-easterly sloping ground on the crest of East Hill, overlooking the Darent valley immediately to the west. The upper parts of East Hill comprise Palaeocene Thanet Sand beds above Upper Chalk; the Thanet Sands outcropped in northern and eastern parts of the site as stiff and relatively stoneless red- to orange-brown clay-sand bearing superficial periglacial polygonal joints. These deposits were capped by a thin outlier of Quaternary alluvial gravel and sand, which formed the natural substrate in southern and western parts of the site. The gravel deposits on East Hill are mapped by the Ordnance Survey as part of the Boyn Hill Terrace (BGS 1998), although this attribution has been questioned (for example Bridgland 1994; Gibbard 1994; see Harding, below, for a fuller discussion).

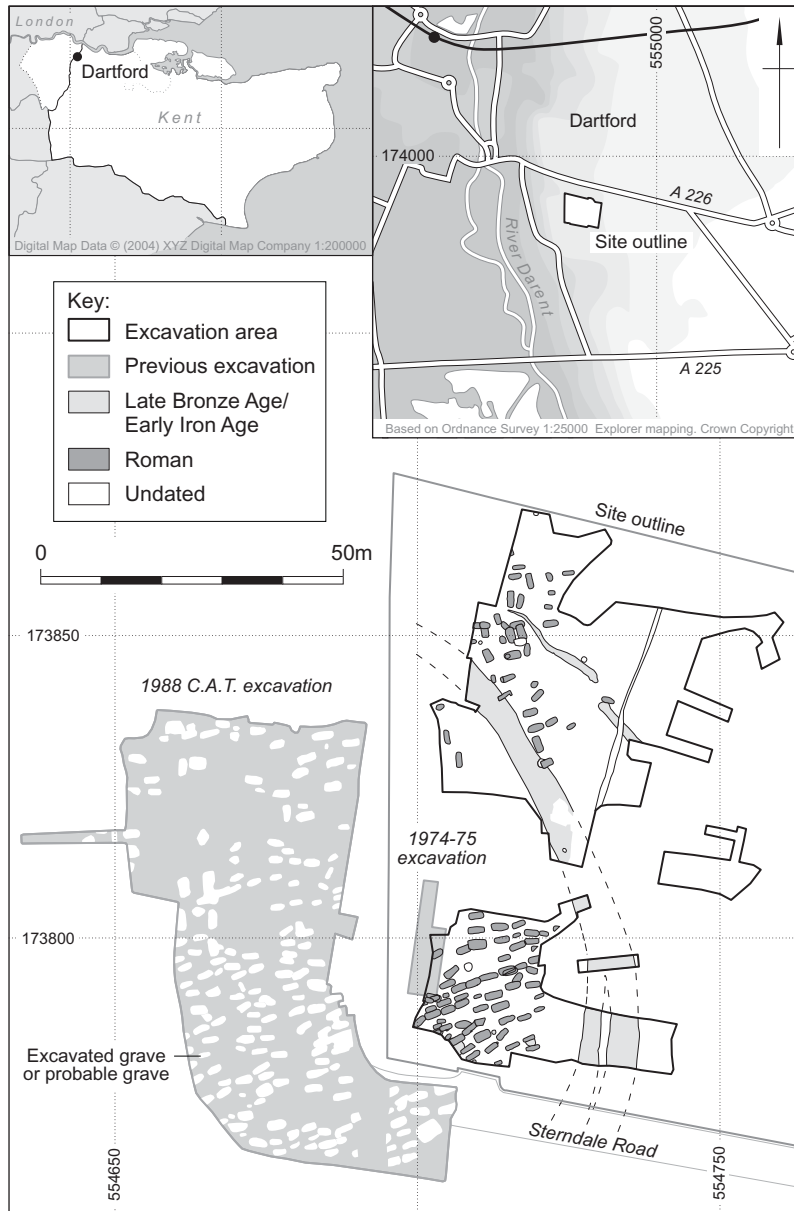


Figure 1 East Hill, Dartford. Site location showing all archaeological features and earlier investigations

Previous archaeological work

Roman stone coffins were discovered on East Hill in 1792 and 1882 (Keyes, cited in Leyland 1990a). More recently, J.V. Ritson carried out a small excavation in 1965 (just west of the site) revealing some 30 graves, amongst which were a number furnished with pottery vessels of 3rd–4th century date. A third stone coffin (possibly for a child, and almost certainly already removed from its original point of interment) was found in 1973 adjacent to East Hill House (Leyland 1990a; 1990b; Herbert 2011). The Dartford District Archaeological Group carried out small-scale training excavations at the site during the mid-1970s and again after the mid-1980s (C. Baker, pers. comm.). Backfilled graves excavated during one of these phases of work were identified at the western edge of the site.

In 1988 the impending development of what is now Chaucer Park (immediately west of the site) provided an opportunity for large-scale excavation of the East Hill cemetery. Work conducted by the Canterbury Archaeological Trust, in conjunction with Dartford Borough Council and English Heritage, revealed 186 graves, of which 83 were fully excavated (Leyland 1990a; 1990b; see Fig. 1).

Most recently, two archaeological evaluations were carried out as a prelude to the redevelopment scheme. These revealed additional Roman graves and other later prehistoric remains at the western end of the site (Canterbury Archaeological Trust 2002; Wessex Archaeology 2005).

Excavation results

Within the proposed redevelopment area, 0.218ha was mechanically stripped of vegetation cover (topsoil and subsoil), and subjected to detailed archaeological excavation (Fig. 2). Central and eastern parts of the site were known to possess low to negligible archaeological potential (see above), and were not investigated further.

The archaeological remains revealed in the western part of the site are discussed below in broad chronological sequence.

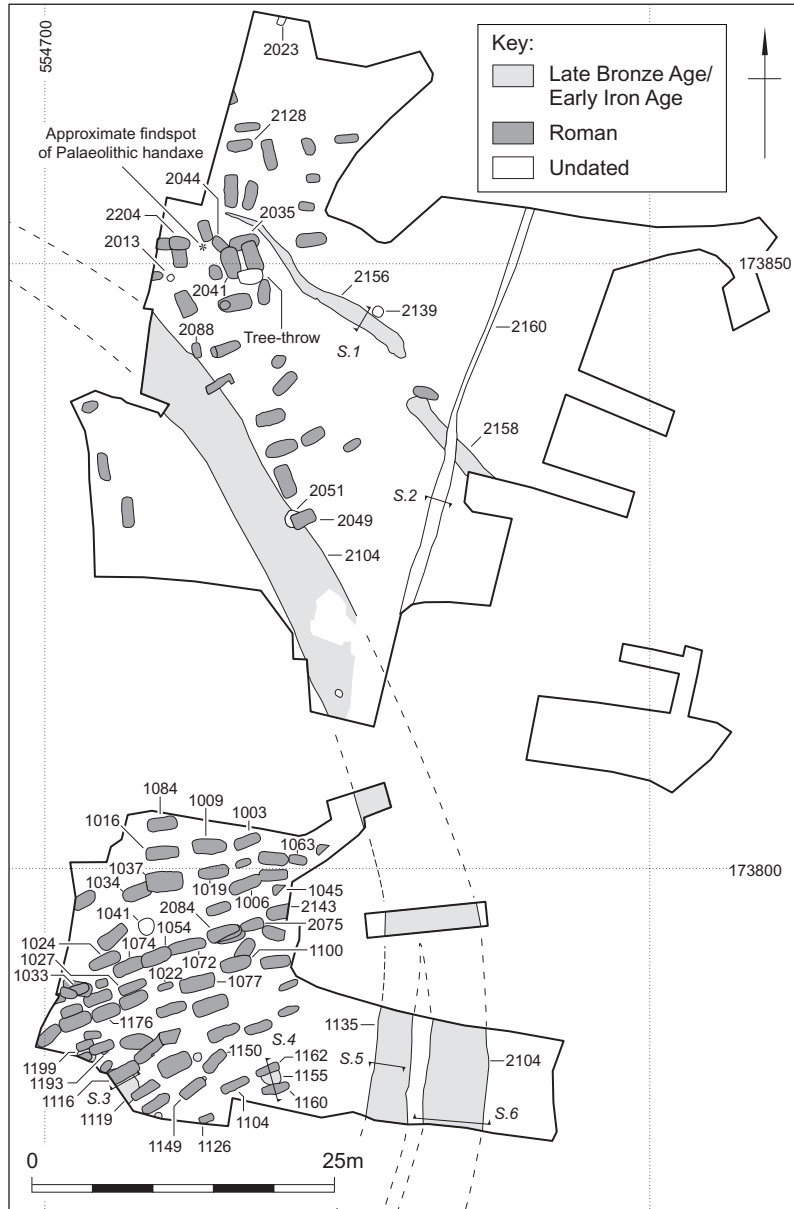


Figure 2 East Hill, Dartford. Graves and other features excavated in 2006

Phase 1: Lower Palaeolithic

Thirty-eight rolled and stained flint flakes and broken flakes were recovered directly from the upper exposure of the gravel substrate and as residual finds from later deposits. Two bifacially-flaked hand axes were also recovered (one each of Wymer's (1968) types E and J, see Plate 1), both from near the western edge of the excavation.

Phase 2a: later prehistoric

Two large later prehistoric ditches were discovered (Fig. 2). The later (and larger) ditch may form part of a sub-circular or oval defensive enclosure. The earlier ditch remains less completely understood, but may be part of an earlier phase of enclosure. Several pits lay within the enclosed area, and burnt flint, struck flint and fragments of pottery loosely attributable to the Late Bronze Age–Early Iron Age were relatively common finds from this part of the site. To the north, two smaller ditches defined a sinuous, approximately north-west to south-east aligned boundary, although their relationship with the enclosure(s) remains unknown.

Ditch 1135

North–south aligned ditch 1135 was seen only in the southern part of the site, and in an additional trial trench dug outside the proposed development impact area specifically to address its relationship with ditch 2104 (see below). It was *c.*3m wide and almost 1.6m deep, with edges sloping at approximately 45° from horizontal to a broad, flattish base (Fig. 2 and 3, S.5). Approximately 0.25m of primary sandy silt (1175) had accumulated on its base. Sampling of this material yielded degraded and possibly re-worked charred plant remains, among which were a grain and glume bases of probable emmer wheat, and single fragments of sloe and hazelnut shell. Above the primary fill, the remainder of ditch 1135 had been deliberately backfilled with dumps of mixed, but relatively clean, sand and gravel.

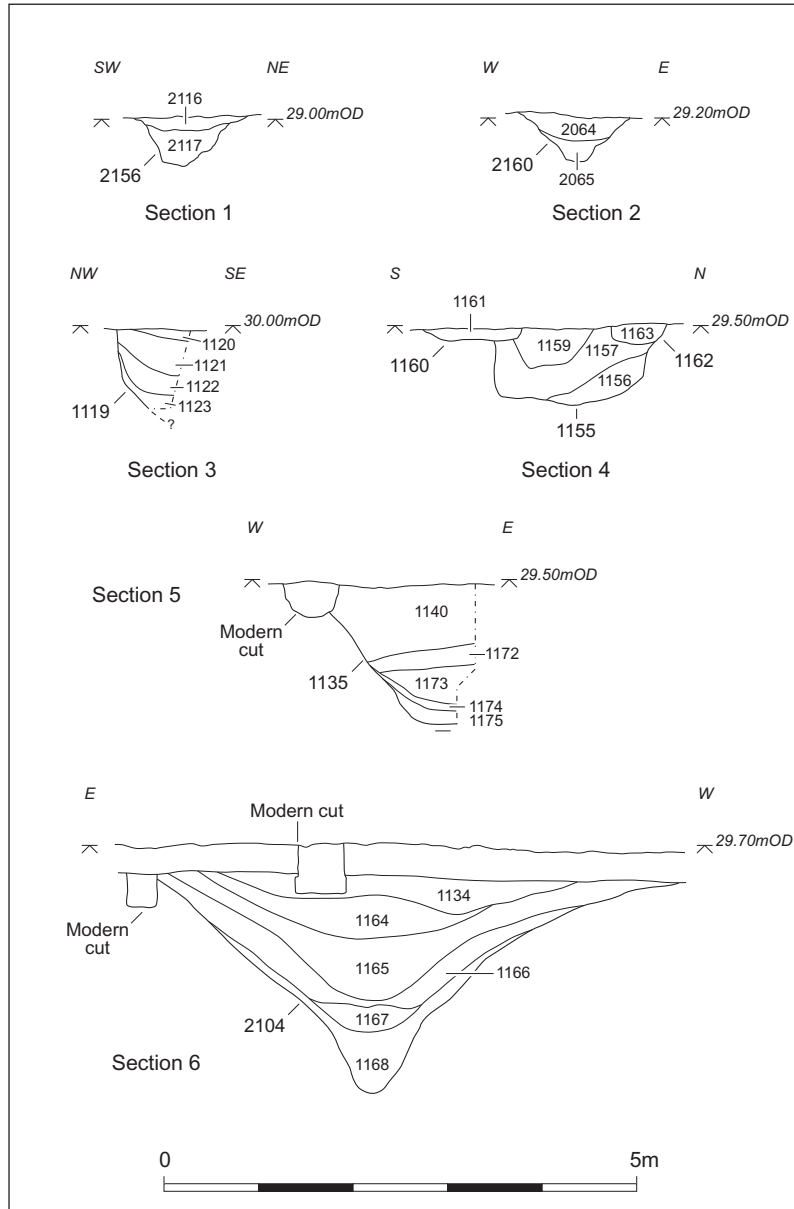


Figure 3 East Hill, Dartford. Sections through selected features

Ditch 2104

Post-dating ditch 1135, the larger ditch 2104 was gently curvilinear, and was exposed over a distance of *c.* 70m. It was up to 5m wide, its only fully-excavated segment (Fig. 3, S.6) was 2m deep. Although considerable edge erosion was noted in its upper profile, the sides of ditch 2104 may originally have been steeply sloping, with a narrow concave base. In contrast to earlier ditch 1135, 2104 seems to have become infilled slowly, primarily through natural and agricultural processes. No evidence for the position of any associated earthworks was found, although if a bank was placed internally (as might be expected for a defensive site), this may explain the need to backfill 1135.

Ditches 2156 and 2158

Two ditches lay on the same, broadly north-west–south-east aligned axis. The more sinuous western ditch (2156) had been truncated at its western end, where it rose onto slightly elevated gravel substrate (Fig. 2 and 3, S.1). Up to 1m wide and 0.5m deep, its profile was very irregular and contained fills that were pale and partly demineralised. Its eastern end appears originally to have been marked by a rounded terminal, although this had been made irregular by selective erosion of silt-filled polygonal joints in the weathered Thanet Sand.

The western end of ditch 2158, 3.4m to the south east, was also marked by a rounded terminal. Up to 1.53m wide and 0.57 deep with an irregular concave profile, it also contained partly demineralised fills.

Prehistoric pits

In the south-western area of the site (and inside ditch 2104) five circular- to sub-circular pits were noted. These ranged in diameter from 0.6m to over 3m, but all contained fills that were at least partially de-mineralised. The largest three pits (1119, 1199 and 1155; Fig. 2 and 3, S.3–4) were cut by Roman graves, and none produced datable finds.

Phase 2b: Late Iron Age/early Roman

Phase 2b was represented by two cremation burials (discussed in greater detail below) and a small assemblage of grog- and shell-tempered pottery found in the upper fills of

ditch 2104, suggesting that – although deeply infilled – this feature survived as a discernable earthwork. A potin coin belonging to the 2nd or early 1st century BC was residual in the fill of Roman grave 1009.

Urned cremation burial 2023

Truncated sub-rectangular grave 2023 near the north-western corner of the site, measured in excess of 0.6m by 0.5m, surviving to a depth of 0.1m (Fig. 4). Set centrally on its flat base, a late Iron Age-style grog-tempered jar (Fig. 5, 104) had been used as a cinerary urn. Burial deposits within the jar (see Table 5) included 376.3g of cremated human bone, from a single adult aged in excess of 40 years and likely to have been female. An additional 87.3g of cremated bone from the surrounding grave fill could have been incorporated at the time of burial or represent post-depositional intrusion of disturbed bone from the disturbed upper part of the urn.

Possible unurned cremation burial 2013

Sub-circular pit 2013, 23m to the south (Fig. 2), measured up to 0.6m in diameter, with a surviving depth of 0.18m. Its single dark fill deposit contained 71.9g of calcined human bone (subadult/adult, aged *c.*16–30 years, and also probably female). However, the low quantities of cremated bone and the inclusion of pyre debris make it uncertain whether the feature represents the remains of a cremation burial, or formal deposition of pyre debris (cf. McKinley 2000b, see discussion below) which included cremated human remains.

Phase 3: the later Roman cemetery

One hundred and nine inhumation graves (or features interpreted as graves on grounds of their morphology and/or position) were identified. Nine of these lay entirely or predominantly outside the agreed development footprint and were not excavated. Adult/adolescent- and child-sized graves were present, suggesting use of the cemetery for burial of a mixed and probably representative population.

Graves were predominantly oval or sub-rectangular, and ranged in size from 0.52m by 0.25m (grave 1193) up to *c.*3m by 1.80m (grave 1037). Depths ranged from only *c.*0.11m (grave 1160) to 1.68m (grave 1037). Some graves had vertical or steep sides with flat bases, whilst others displayed more concave profiles and bases.

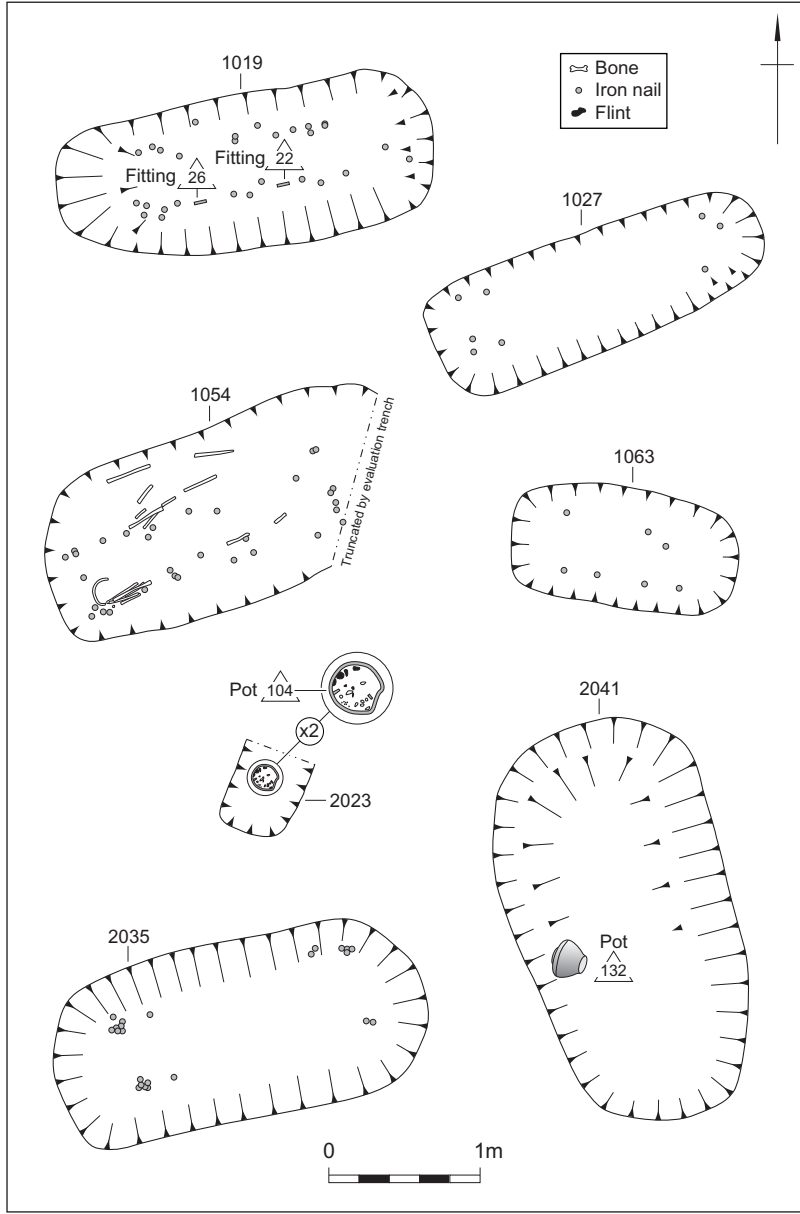


Figure 4 East Hill, Dartford. Selected grave plans

Grave alignment

The majority of the graves were aligned broadly WSW–ENE, but variation of grave axis ranging to east–west was recorded. Preservation of unburnt human bone was generally poor across the site, but in the 23 graves where human remains were recovered (all in the southern part of the site) these indicate a tradition of burial with head to the west.

In the northern part of the site, 15 ‘variant’ graves lay loosely clustered on an approximately perpendicular (NNW–SSE) axis (Fig. 2). These graves were not distinguished by any clear chronological patterning (variant graves were both cutting, and cut by, east–west aligned graves), and neither was there any discernible difference in grave furnishings, except that only one of the excavated examples (grave 2088) produced evidence for a nailed coffin, and grave 2041 contained a globular greyware jar, placed on-edge at the eastern side of the grave as an accessory vessel (Fig. 4 and Plate 2). A smaller number of approximately NNE–SSW aligned graves were also found in the northern half of the 1988 Chaucer Park excavations (Leyland 1990a; 1990b; see Fig. 1).

Evidence for coffins

Clear evidence for use of coffins (in the form of spatial arrangements of iron nails and other fittings) was recovered from 13 of the 100 excavated graves, although the extent to which coffins fixed by carpentry joints or other forms of organic bindings might have been used cannot be assessed. Selected grave plans illustrating coffin remains are presented in Figure 4. Of the 13 coffins indicated by iron nails, ten are from the southern part of the cemetery, where they seem to be randomly distributed. Three graves with coffins were found in the northern part of the site, including a single example set on a NNW–SSE alignment. Two iron hinges from grave 1019 (Fig. 4 and 5, 22 and 26) suggest use of a hinged coffin lid.

Unphased features

Unphased ditch 2160 lay on a NNE–SSW alignment near the eastern edge of the northern part of the site (Fig. 2). It cut prehistoric ditch 2158, but cannot be more closely dated, as it was cut only by the remains of East Hill House. No continuation of the ditch was seen in the southern part of the site.

Unphased sub-circular pits 1041 (diameter 1.4m, depth 0.23m), 2051 (diameter 1.4m, depth 0.4m), and 2139 (diameter 0.9m, depth 0.22m) fell on a NNE–SSW alignment some 8m west of ditch 2160, although whether this was by coincidence or design remains unclear. Pit 2051 cut fills on the outer (north-eastern) edge of ditch 2104, and was, in turn, cut by Roman grave 2049, suggesting it could be placed broadly in phase 2b. The date and purpose of the unphased features remains unclear, as does the validity of associating them with each other. They may have served as boundary markers during early use of the cemetery (no graves were found east of ditch 2160), but their variance from the dominant grave alignments might argue against any such interpretation.

SPECIALIST REPORTS

Palaeolithic flint

Phil Harding

Two Palaeolithic hand axes, 23 flakes and 15 broken flakes were found in 12 contexts, 11 of which were later prehistoric pits, ditch sections and graves. Twenty five pieces were recovered directly from the terrace gravel. The artefacts were all robust, in a rolled condition and frequently stained, consistent with material that has been sorted and reworked in a fluvial environment. Similarly the total includes a small number of pieces with crushed butts that are more likely to have resulted from natural collision of flints in the gravel. The hand axes include a pointed implement of Wymer's (1968) type E and a cordate hand axe of type J (Plate 1). The pointed implement is 76mm long, has a plano-convex cross-section and one heavily battered, 'backed' edge. The cordate is well made, 76mm long and finished with soft hammer flaking. The tip is offset in profile and appears to have been broken and reworked.

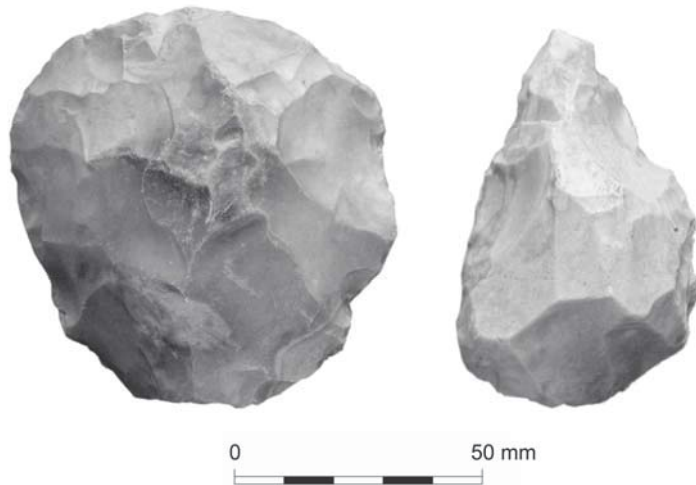


Plate 1 East Hill, Dartford. Palaeolithic hand axes found near the western edge of site

Discussion

The deposits containing the Palaeolithic artefacts form part of vast spreads of river terrace gravel that have been mapped as Boyn Hill/Orsett Heath Gravel (BGS 1998) and which lie along the south side of the River Thames Estuary. These deposits can be traced through Dartford to the internationally renowned site at Swanscombe; however, it is hotly debated whether they form part of the same deposit (Bridgland 1994), dated to 400,000–340,000 BP, and are contemporary with those at Swanscombe, or whether they are part of the earlier Black Park Gravel of 450,000–423,000 BP (Gibbard 1985; 1994). Clast lithology (Canterbury Archaeological Trust 2002) has in fact suggested that the gravel is derived from the Darent drainage, although components, including the implements, may have been reworked from the Thames gravel. The results of the excavation do nothing to resolve the issue.

Rich assemblages of Palaeolithic artefacts have been found in the gravel around Dartford. These implements were recovered principally from gravel pits on Dartford Heath to the west of the River Darent. Find spots from the equivalent deposits to the east of the Darent have produced relatively few implements. This probably reflects urban development and the absence of open spaces that might be exploited for gravel extraction. Nevertheless finds of individual hand axes and fauna have been made in the vicinity of Sterndale Road, including material recovered from earlier excavations at the Romano-British cemetery on East Hill (Wessex Archaeology 1993). Wymer

(1999) noted the frequency with which enhanced quantities of implements often coincided with river confluences, as here that of the Rivers Darent and Thames.

The quantity of Palaeolithic material from the excavation is relatively high considering the small area investigated and the fact that no substantial sampling of the gravels was undertaken. It indicates the potential for making further discoveries in the event of future development in the area.

Later prehistoric flint

Matt Leivers

The bulk of the assemblage consists of pieces which cannot be accurately dated beyond a general attribution to the Neolithic or Bronze Age. A core from grave 1037 is of Early Bronze Age date, while some pieces are likely to be Middle Bronze Age or later, including a crude chopper from the topsoil and a number of pieces which re-use earlier materials.

Coins and tokens

Nicholas Cooke

Twelve coins and one jeton were recovered (see Table 1). Most were found unstratified in the topsoil/subsoil. Many show signs of corrosion as well as wear, and their condition is generally poor.

A badly corroded Iron Age potin coin residual in the fill of Roman grave 1009 was probably cast in the 2nd or early in the 1st century BC. Six Roman copper alloy coins comprise three *antoniniani* of the later 3rd century AD (two of which are ‘barbarous’ copies of official coinage) and three 4th-century issues: namely a contemporary copy of a ‘Constantinopolis’ issue, and two coins of the House of Valentinian (AD 364–378).

The later coins from the site include a corroded jeton, almost certainly originating in Nuremberg and bearing the ‘rose and orb’ design common in the late 15th and the first half of the 16th century. The remaining coins (all unstratified) include a farthing of James I, two others of Charles II and a Half Penny of George III.

Metalwork

Grace Perpetua Jones

Introduction

An assemblage of 258 metal objects was recovered (Table 2). Only three are of copper alloy, the rest are iron. With the exception of two copper alloy objects and one nail, all were recovered from graves.

Copper alloy

The copper alloy objects comprise a rim fragment from a vessel with a diameter of approximately 400mm, and a possible small rivet with biconical head, both from the subsoil. A very small fragment, probably a corrosion by-product, came from grave 1009.

Iron

Nails

The iron assemblage is dominated by nails, with 132 recorded from 21 inhumation graves, eight from a cremation grave and one from the subsoil (Table 2). A further 26 shank fragments were recovered from the inhumation graves. The coffin nails are all flat-headed (Manning 1985, type 1B) and vary in length from 20mm to 155mm, with most within a range of 45mm to 80mm. Three graves (1034, 1072 and 1084) contained large nails. Those from grave 1034 were 110mm–130mm long (five nails), with one incomplete nail of 75mm. Grave 1072 contained six nails and two shank fragments, the nail lengths were: 45mm, 80mm (x2), 105mm, 110mm and 120mm. Nails with length of 115mm, 120mm (x2), 130mm, 150mm and 155mm were recovered from grave 1084, as well as two shank fragments. Analysis of nail length from coffined burials at the Eastern Cemetery in London suggests that use of the very largest nails (>140mm long) was not related to age at death, sex, the stature of the deceased or date, but was probably related to the thickness of the planks or the availability of nails in the workshop (Barber and Bowsher 2000, 91). Only four graves contained more than ten nails/shank fragments, with 24 nails and one shank from grave 2035; 23 nails and two shanks from grave 1054; 18 nails and ten shanks from grave 1019 and twelve nails from grave 1027. Inhumation graves with nails suggest

burial in a wooden coffin, although the absence of nails or timber staining cannot be taken as proof of burial without a coffin (*ibid.*, 94).

Eight nails were recorded from cremation burial 2013. These were 15mm to 60mm long; five were at the lower end of this range, and were quite small and thin in comparison to the coffin nails.

Hobnails

Grave 2128 contained 64 hobnails (in two groups of 44 and 20 hobnails respectively) from leather boot or shoe soles. The hobnails demonstrated moderate amounts of wear.

Fittings

Coffin fittings other than nails are rare, a pattern observed for most Roman urban cemeteries (Barber and Bowsher 2000, 94). Of particular interest are two hinge fragments from grave 1019 (Fig. 5). The first (Object Number (ON) 22) is a 135mm long and 30mm wide strip, with two nails of 30mm length, only one of which is still attached to the object. The second (ON 26) is a 136mm long and 30mm wide strip. Two nails perforate the strip, one 40mm in length, the other incomplete. Both came from the southern side of the grave and were located on the same alignment, 0.56m apart. They are similar to hinged brackets illustrated from Bath Gate cemetery at Cirencester (Viner and Leech 1982, fig. 36 a, b). The brackets were recovered from the left of the head and the feet, 'suggesting their function to have been hinges for the lid' (*ibid.*, 88). These were the only grave fittings, other than nails, recorded for the Bath Gate cemetery.

An L-shaped object from grave 1019 may have been part of a clamp or a nail; traces of mineralised wood adhere to the object. A joiner's dog was present in grave 2128.

Unidentified

The remaining 21 objects are unidentified. Many are almost completely corroded and do not, therefore, register on the X-ray plates.

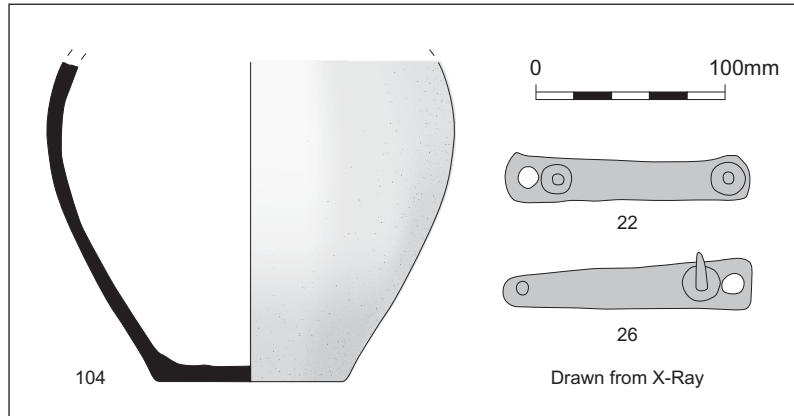


Figure 5 East Hill, Dartford. ON 22 and 26: iron hinge fragments, context 1021, grave 1019. ON 104: Base of cinerary vessel, grog-tempered fabric, context 2030, grave 2023

Prehistoric and Roman pottery

Grace Perpetua Jones

A total of 379 sherds (6,448g) of later prehistoric and Roman pottery was recovered from the site. The material was recorded in accordance with national guidelines for both prehistoric (PCRG 1997) and Roman pottery (Darling 1994). The assemblage was in poor condition, with abraded surfaces. The mean sherd weight is high (17g), although this figure is skewed by two semi-complete vessels – from cremation burial 2023 and inhumation grave 2041 (Fig. 5 and Plate 2). If these vessels are excluded, mean sherd weight falls to only 7.8g.

The assemblage derives from 65 contexts, only three of which contained more than 25 sherds, the minimum sample size considered to be reliable for dating (PCRG 1997, 21); this includes one of the semi-complete burial vessels (cremation grave 2023). The other contexts are grave 1185 (52 sherds) and ditch 2104 (55 sherds).

Later prehistoric pottery

The later prehistoric assemblage is dominated by flint-tempered fabrics, accounting for 52% of the assemblage by count and 42% by weight (Table 3). Shell-tempered fabrics represent 22% of the number of later prehistoric sherds and 14% of the weight; grog-tempered account for 18% by count but 38% by weight; sandy wares 7% by count and 6% by weight and organic-tempered fabrics are a minor component, with only 1% by count and weight. Such inclusions can be difficult to date as they were used for pottery production in Kent throughout the Bronze Age and Iron Age periods. Although grog- and shell-tempering tend to relate to the Late Iron Age, flint temper was used from the Neolithic until just after the Roman conquest, and sherds can appear very similar in the hand specimen.

Five rims are present amongst the later prehistoric sherds (R1–R5); however, all are broken at the neck and it was not possible to ascertain the form type. The R1 rim was flat-topped and externally expanded; R2 is a medium-length everted rim; R3 is flat-topped but only the rim tip was present; R4 is a short everted rim, and R5 has slight beading and is possibly from a lid. Rim forms R2, R3 and R4 all come from ditch 2104 (fill 2100) which produced a mix of flint-tempered, grog-tempered and sandy ware sherds. A body sherd from a shouldered jar with a band of fingertip

impressions below the neck zone is probably of Late Bronze Age/Early Iron Age date; the R2 rim is probably also of this date. However, an angled sherd from a sandy ware vessel, burnished on the interior, may be of Late Iron Age date, as might the R4 rim fragment, but this could not be confirmed. Grave 1185 produced a mixed, residual assemblage, mostly later prehistoric flint-tempered body sherds, but also grog-tempered (including one scored sherd), shell-tempered and sandy wares, many of which were burnt. Two Roman sherds were also present.

Of interest amongst the later prehistoric material is a Late Iron Age grog-tempered jar that had been used as a cinerary urn in grave 2023 (Fig. 5, 104). Much of one side of the vessel has survived, up to shoulder level, but the rim is missing and the overall form unknown. Burning is evident on one side of the vessel, towards the base, and traces of soot are present around the middle interior.

Roman pottery

The Roman assemblage consists of 43 sherds, weighing 3338g. Identifiable vessels comprise the rim from an Oxfordshire colour-coated flanged bowl (AD 240–400 or younger), imitating samian form 38 (Young 1977, C51), from grave 1116; and a triangular-rimmed jar in the Alice Holt Overwey-Tilford fabric variant, of 4th-century AD date, from grave 1024. Only four other rim fragments are present amongst the Roman assemblage; all appear to be from everted rim jars but are broken at the neck and otherwise undiagnostic. Two are in greyware fabrics and two in oxidised wares.

A globular-bodied jar in a coarse greyware fabric had been placed at the side of grave 2041 as an accessory vessel (Plate 2; Fig. 4, ON 132). The rim is missing and the date of the form is uncertain, but it is probably late Roman. There are two bands of slip, one above the widest point of the vessel and one below the neck. The base is well worn from use. The fabric is very coarse and not a typical north Kent product. Of interest are two post-firing holes in the side of the vessel, also made in antiquity, pierced from the outside of the vessel. One is at the widest point of the vessel and the other just above it. Re-cataloguing of the coarse pottery from the late 19th- and early 20th-century excavations at Silchester has revealed 67 vessels with at least one hole pierced around the point of maximum girth (Fulford and Timby 2001, 293). The vessels nearly all come from pits and wells, with the exception of one vessel from a cremation burial, and range in date from the late 1st century BC through to the end of

the Romano-British period. It is suggested that the presence of multiple holes ‘argues against piercing, as a kind of ritual killing, being part of the ritual of deposition’, and suggest that such vessels may have been used as timing devices or in the preparation of foods (*ibid.*, 296). However, the significance in the care taken to execute such holes without damage to the rest of the vessel is noted. Evidence of this practice also comes from cremation cemeteries in East London and Ospringe, Kent (*ibid.*, 296).

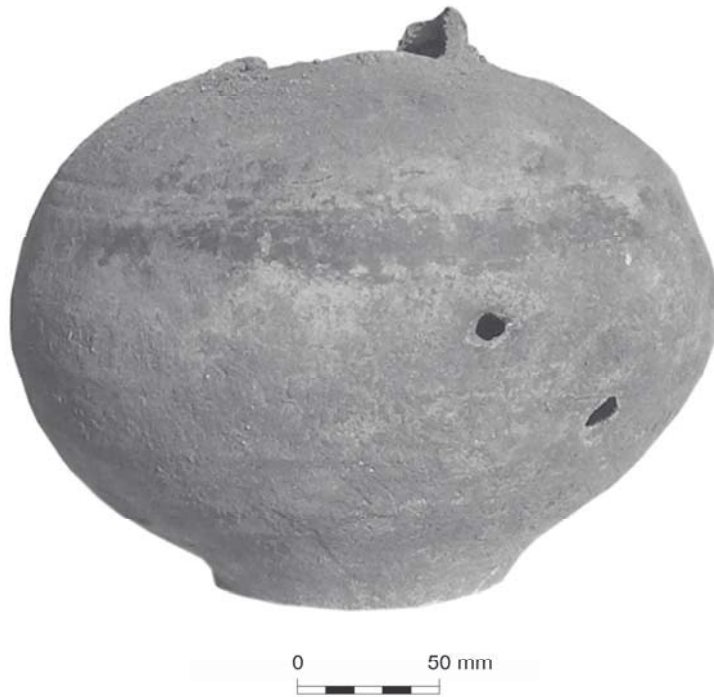


Plate 2 East Hill, Dartford. Globular jar, coarse greyware fabric. ON 132, context 2042, grave 2041

Human Bone

Jacqueline I. McKinley

(Report written November 2007)

In situ human remains were recovered from 24 of the 100 later Romano-British inhumation graves subject to excavation; nine of these burials had been made coffined. Cremated bone was recovered from three contexts including the disturbed remains of a Late Iron Age urned burial and the remains of a probable Late Iron Age/early Romano-British unurned burial with pyre debris.

Methods

Analysis of the cremated bone followed the writer's standard procedure (McKinley 1994a, 5–21; 2000a; 2004a). The degree of erosion to the unburnt bone was recorded following McKinley (2004b, fig. 6). Age (cremated and unburnt bone) was assessed from the stage of skeletal and tooth development (Beek 1983; Scheuer and Black 2000), and the patterns and degree of age-related changes to the bone (Buikstra and Ubelaker 1994). Sex was ascertained from the sexually dimorphic traits of the skeleton (Buikstra and Ubelaker 1994). Too little bone survived to enable any measurements to be taken. A record of morphological variations was made following Berry and Berry (1967) and Finnegan (1978). Full details are held in the archive.

Results

A summary of the results from the analysis is presented in Tables 4 (inhumation burials) and 5 (cremated bone).

Disturbance and condition

The surviving depths of the inhumation graves from which human remains were recovered ranged from 0.11m (grave 1160) to 1.68m (grave 1037); the majority (*c.*83%) being over 0.30m deep. Intercutting between these graves was limited (Fig. 2) and it is unlikely that much, if any bone will have been lost from the deposits by this mechanism. All the graves from which human remains were recovered lay in the southern portion of the cemetery (*c.*35% of the graves in this area); this probably reflects the slight change in the underlying geology from a clayey sand in the northern part of the site to free-draining coarse gravels with sand in the south. A minority of the inhumation burials (*c.*39%) had been coffined and the remainder were, apparently, uncontained.

The quantity and quality of the surviving bone was very poor. In 11 graves only the enamel tooth crowns survived (almost pure mineral as compared with the organic/mineral mix of bone); in six others only fragments of teeth and skull elements. Only seven graves contained bone fragments from other skeletal areas, commonly, though not exclusively, fragments of cervical vertebrae (particularly C1–2). The most complete remains recovered were the *c.*10% including skull, axial

skeleton and lower limb elements from grave 2084 (1.10m deep; adult male). The surviving bone is generally heavily degraded/eroded (Table 4).

Grave depth and the presence/absence of a coffin were not consistent factors in the level of bone preservation, nor was the age/sex of the buried individual. The predominant factor was the burial microenvironment, which was both acidic and free-draining across the site, particularly in the north. With the exception of a ceramic accessory vessel in one of the graves from which no human bone was recovered (2041), none of the graves contained any surviving artefactual goods. The – albeit slight – preferential survival of skull bone and upper cervical vertebrae, however, suggests the presence of some additional material within this area of the graves aiding preservation of these elements; organic materials used as pillows or headgear perhaps.

The two cremation graves, both situated in the north-western part of the site, had survived to a much shallower depth (0.10–0.18m) than had the majority of the inhumation graves. Bone had clearly been lost from grave 2023, both in antiquity and during machine stripping of the site. The fill of grave 2013 had suffered from tree root disturbance and the location of the bone within the fill was not recorded. It is possibly that some bone may have been lost from this deposit but the quantity is unlikely to have been substantial. The bone is generally in good condition, with a fairly fresh appearance, and fragments of trabecular bone (generally the first to be lost in adverse burial conditions) are well represented within the remains of the urned burial and moderately so in the unurned deposit.

Demographic data

Two individuals, both probable females, were identified from the Late Iron Age/early Romano-British cremated bone assemblage (Table 5). Human remains of this date have been recovered from *c.*44 sites in Kent, most, as here, comprising cremation burials made as singletons or parts of small groups (Parfitt 2004, 16–17; McKinley 2006). The two cremation graves at East Hill were situated on the northern and north-western margins of the excavated area *c.*23m apart (Fig. 2). It is plausible that further burials of this date may have existed to the west of the site, in an area believed to have been subject to previous quarrying for gravel (Leyland 1990a, 342).

The remains of 24 individuals are represented within the late Romano-British unburnt bone assemblage, though of course, this represents only a small proportion of the individuals who would have been buried within the cemetery. A further 77

excavated graves did not contain any surviving human bone, and a minimum of nine more were excavated (see above). Although the eastern margin of the cemetery was established, further graves undoubtedly extend to the south and west, and potentially to the north. Excavations in the 1960s (see *Previous archaeological work*) revealed *c.*30 graves, and there are reports of the recovery of three stone coffins from the site since the 18th century (Leyland 1990a, 1990b); there is no osteological analysis data associated with these early finds.

The individuals identified within the current project include six immature individuals (26%) and one subadult/adult (16–25 yr.). The highest number of adults (>18 yr.; four) lay in the 18–25 yr. age range, but the median fell within the 25–45 yr. range; at least two individuals were over 40 years old (NB. see discussion included in dental *pathology* on potential bias within observable ages). The poor skeletal recovery severely limited the number of individuals for whom it was possible to suggest a sex; only six adults were sexed, three as probable female (all in the 18–25 yr. range) and three as male (one in the >40 year group). Although the data are limited, the impression is one of a normal domestic population similar to that seen in broadly contemporaneous cemeteries. There was no apparent spatial distribution of graves dependant on the age and/or sex of the deceased.

Most Romano-British Kentish burials for which there are osteological records comprise singletons or small groups distributed in dispersed clusters across the northern half of the county (McKinley 2006). Four sites represent more substantial dual rite cemeteries; Clubb's Pit, Isle of Grain (42 inhumation and one cremation burial; Cameron 1985); Cranmer House, Canterbury (53 cremation and one inhumation burial; Frere *et al.* 1987); Pepper Hill, Springhead (332 cremation and 79 inhumation burials; Biddulph 2006), and St. Dunstan's, Canterbury (95 cremation and 23 inhumation burials; Diack in prep.; McKinley 2008a). The majority of the *c.*745 minimum number of individuals overall for the county derive from cremation burials and few are of the later Roman date suggested for the East Hill inhumation burials, indicating the importance of the site despite the poor skeletal recovery (McKinley 2006).

Pathology

The very poor skeletal survival severely limited the type and extent of pathological lesions which could be observed in the unburnt bone assemblage, most being limited

to those conditions affecting the teeth. Parts of 19 dentitions were recovered including six tooth positions (all probable male) and 158 permanent teeth (95 probable male and 35 probable female).

Slight-mild dental calculus (calcified plaque/tartar; Brothwell 1972, fig. 58b) was observed in ten dentitions, with a slightly higher proportion of mandibular (14%) compared with maxillary (11%) teeth affected. Deposits were predominantly observed on the distal teeth, and all the sexed individuals were affected.

Very small carious lesions were observed in two dentitions, with an overall rate of 1.9%. The rate is very low compared with the average rate of 7.5% for the Romano-British period (Roberts and Cox 2003, table 3.10) but the figures may be skewed by bias survival of the more healthy teeth. Where tooth enamel is the only or main surviving osteological component, those teeth already structurally weakened by a gross carious lesion would be more prone to destruction/loss than an intact crown. Very few of the teeth recovered showed heavy occlusal wear or extensive pathological lesions; this may also have led to a bias against the survival of identifiable older adults. In both cases the carious lesions were observed in the teeth of young individuals (15–22 yr.), in the occlusal or buccal fissures of the mandibular M2.

Dental hypoplasia is a developmental defect in the tooth enamel formed in response to growth arrest in the immature individual, the predominant causes of which are believed to include periods of illness or nutritional stress (Hillson 1979). Faint linear or, in one case, pitting defects were seen in four dentitions (22%), affecting 4.4% of permanent teeth. The overall rate is lower than the 9.1% for the period and the condition less likely to be biased by stresses affecting survival (Roberts and Cox 2003, table 3.16).

Concave, uneven wear to the distal occlusal surface of the left canine from 1163 (grave 1162, adult probably male) probably reflects use of the teeth in some occupational activity.

Slight osteophytes (irregular growths of new bone along joint margins) were observed in one spinal and one extra spinal joint, both adult males. The lesions may develop in response to a number of conditions and it is not always possible to ascertain the specific cause, though in these cases they probable reflect age-related wear-and-tear (Rogers and Waldron 1995, 20–31). Similarly, it is not always possible to be conclusive with respect to the aetiology of enthesophytes, bony growths which

may develop at tendon and ligament insertions on the bone. Causative factors include advancing age, traumatic stress, or various diseases.

Taken at face value, the evidence of the dental pathology suggests a population with a self-cleaning diet, relatively high in meat protein and not over dependent on carbohydrates, producing reasonably well-nourished children not overly prone to chronic childhood diseases. The data could, however, as noted above, be presenting a biased view of the population and should, therefore, be treated with caution.

Pyre technology and cremation ritual

All the cremated bone was white in colour, indicating a high level of oxidation (Holden *et al* 1995a and b).

An unknown quantity of bone is likely to have been lost from both graves, particularly 2023, as a result of disturbance/truncation, thereby limiting the significance of observations which may be made regarding the quantity of bone included in the burial. Both weights are relatively low, that of 463.6g from grave 2023 representing *c.*29% of the average weight expected from an adult cremation (McKinley 1993).

Numerous intrinsic factors may affect the size of cremated bone fragments, including the nature of the deposit, the burial conditions, levels of disturbance and excavation/post-excavation processing of the bone (McKinley 1994b; 2000a; 2004c, 298). The majority of the bone from the urned burial was recovered from the 10mm sieve fraction (*c.*57%) with a maximum fragment size of 77mm. By comparison, the majority of the bone from the unurned deposit was recovered from the 5mm sieve fraction (*c.*60%) with a maximum fragment size of 33mm. Such a difference between burial types is commonly observed and, as here, at least in part reflects the increased protection afforded by the urn against the acidic burial environment.

The knock-on effects of low bone weights and increased fragmentation is reflected in the proportion of bone fragments identifiable to skeletal element, *c.*52% in the case of the urned burial from grave 2023 and *c.*31% from the unurned deposit. The identifiable elements from grave 2023 indicate a close to 'normal' proportional distribution of the four skeletal areas present in the burial. The remains from the unurned deposit show the common bias in favour of easily identifiable skull elements and against the largely trabecular (and less robust) fragments of axial skeleton. There

is no evidence to suggest that specific skeletal areas were being preferentially included or excluded from the burials.

Tooth roots and the small bones of the hands and feet are commonly recovered from cremation burials of all periods. Three of these small skeletal elements (as distinct from small bone fragments) were recovered from grave 2013 and five from grave 2023. The figures are similar to those from similarly dated burials at Stanstead, Essex, and some early Romano-British cemeteries (McKinley 2008b; 2004c). The writer has suggested that the low frequency of these bones may be linked with the mode of recovery employed to collect bone from the pyre site for burial; the hand recovery of individual fragments leading to a bias against the recovery of such small bones (McKinley 2004c, 300–1).

Small quantities of cremated animal bone were recovered from at least the unurned burial, possibly also the urned burial (Table 5). Some of the bone could not be identified to species but various elements of domestic fowl were recorded. The inclusion of cremated animal remains in late Iron Age and Romano-British burials is relatively common, and there are close similarities between the periods in terms of frequency of occurrence and the species recovered. There is limited British data for the Iron Age, but pig and domestic fowl tend to feature strongly both here and elsewhere in Europe (Harman 1985; Méniel 1993; Anderson 1995, 145; McKinley *et al.* 1997; Rielly 2000, table 26, 76).

Several fragments of bone (cervical vertebrae and femur shaft) from grave 2023 have blue/green spot staining of a type which suggests the presence of copper-alloy in the vicinity of the bone during cremation. No copper-alloy artefacts were recovered from this burial but it appears likely that some were present at the time of cremation and were either incidentally or deliberately not collected for inclusion in the secondary rite of burial.

The fill of grave 2013 was described as being ‘charcoal-rich/black’; no note of the distribution of the bone within this pit was given and the fill of the cut was collected as a single sample so the distribution could not be ascertained during analysis. The inclusion of pyre debris in grave fills was a common characteristic of the rite throughout its use and reflects the proximity of the pyre site to the place of burial (McKinley 1997; 2000b). Deposits of pyre debris (commonly inclusive of variable but generally relatively low quantities of cremated bone and pyre goods) are also found in other feature types, however, and may be found as deliberate formal deposits of debris

(McKinley 2000b). In the absence of details of the distribution of the archaeological components from grave 2013 it cannot be stated with confidence that this deposit does not represent redeposited pyre debris rather than the remains of a burial with redeposited pyre debris (made as separate deposits).

Palaeoenvironmental remains

Chris J. Stevens

One hundred and eleven soil samples were taken during the excavation, although most were taken with the primary aim of recovering degraded human remains from graves. Samples of the underlying natural deposits were also retrieved for sediment analysis, but these are not commented on here (the results form part of the project archive).

Methods

Bulk samples were processed by standard flotation methods; the flot retained on a 0.5mm mesh, residues fractionated into 5.6mm, 2mm and 1mm fractions and dried. The coarse fractions (>5.6mm) were sorted, weighed and discarded. Flots were scanned under a x10–x40 stereo-binocular microscope and the presence of charred remains quantified (Table 6) in order to present data to record the preservation and nature of the charred plant and charcoal remains and assess their potential to address the project aims. Identifications of dominant or important taxa are noted below, following the nomenclature of Stace (1997).

Results

The flots from the northern part of the site and samples from cremation graves 2013 and 2023 all contained high numbers of roots and modern seeds indicative of stratigraphic movement, reworking or contamination by later intrusive elements.

Charred plant remains

Cremation grave 2013 produced reasonably high numbers of very well preserved charred plant macrofossils. These were predominately of grains of spelt wheat (*Triticum spelta*) or free threshing wheat (*Triticum aestivum/turgidum*): at least two

more closely resembled free-threshing wheat. No glume chaff was noted. Seeds of clover (*Trifolium* sp.) were common, as were grass roots, stems and two well preserved tubers of false-oat grass (*Arrhenatherum elatius* var. *bulbosum*). The tubers may have been associated with the clearance of long grassland for the creation of a fire-break that was subsequently used as tinder in the pyre (Stevens 2008). The grains may have been associated with the incorporation of settlement waste into the pyre, intrusive material or settlement material that became incorporated with the deposit, or perhaps even deliberate offerings. It is notable that deposits from the Roman East London cemetery also contained such remains (Davis 2000).

Plant macrofossils were also recovered from the naturally-deposited primary fill (1175) of ditch 1135. These were quite degraded, raising the possibility that at least some may have been redeposited. They included a grain and three glume bases of probable emmer (*Triticum dicoccum*), some cleavers (*Galium aparine*), a fragment of hazelnut (*Corylus avellana*) and a fragment of sloe (*Prunus spinosa*). These remains are generally indicative of low levels of domestic or settlement activity, and would be consistent with a Middle Bronze Age to Iron Age date – a period when emmer appears to have been more common in Kent (cf. Stevens 2006; Giorgi 2006).

Charcoal

Only one flot (a sample from an upper fill of ditch 2104, and therefore probably unrelated to the primary use of the ditch) contained high amounts of charred material, predominantly wood charcoal. Of this, much was ring-porous and thus most probably oak.

Discussion

Excavations at East Hill House have revealed evidence for three (if not four) chronologically distinct and probably unrelated periods of pre-modern activity and landuse.

Lower Palaeolithic

The Lower Palaeolithic flint assemblage from the site derives in its entirety from a larger body of fluvially reworked artefacts present within the gravel substrate. Whilst there is ongoing debate over the stratigraphic associations and date of the East Hill

gravel beds, it is reasonable to suppose that they were laid down in the period *c.*450,000–340,000 BP. The relative abundance of tools and flintworking waste may indicate a concentration of hominin (*Homo erectus/heidelbergensis*) activity near the confluence of the Rivers Thames and Darent.

Wymer notes three other Palaeolithic findspots on Orsett Heath gravels east of the Darent (1999, Volume 2, map 11), and other examples are known locally: the Dartford District Archaeology Group discovered a hand axe in a Roman grave fill immediately west of trench 1, and two others came from the 1988 Chaucer Park excavation (C. Baker, pers. comm.).

Later Prehistoric

The discovery of major prehistoric earthworks on the crest of East Hill represents a significant discovery, albeit that the dating evidence available from their excavation is limited. The fills of these features were often pale and at least partially demineralised, contrasting with the soils backfilling the later Roman graves, which were usually rather darker and more humic.

The limited exposure in plan of ditch 1135 makes its interpretation difficult. It may have been a boundary ditch, but its size, taken together with its absence from the northern part of the site may instead indicate it was a relatively short-lived original phase of enclosure – perhaps destroyed by, or expanded to form the larger ditch 2104 elsewhere. Ditch 1135 produced no secure dating evidence, but the limited suite of charred plant remains from its primary fills would not be inconsistent with a Middle Bronze Age to Iron Age date.

Whatever the origins of ditch 1135, creation of the larger curvilinear ditch 2104 represents significant re-modelling of the site, if not actually a change of use. Again, there is only limited material evidence from which to draw an interpretation of its purpose, but the scale, layout and setting of ditch 2104 allow for it to be placed most easily into the tradition of circular or oval enclosed/defended settlements, a type of site that became widespread in south-eastern Britain toward the end of the Bronze Age (Champion 2007, 105; Yates 2007). Further exposures of the ditch will be required if its form is to be charted with any certainty. If extrapolated as a circular enclosure, then a diameter in the range of *c.*140–160m is obtained which, although larger than many Late Bronze Age enclosures, need only be a little larger than the

Late Bronze Age ringwork at Kingsborough Manor, Sheppey (c.130m) (Ellis and Allen 2008, 283–5 fig. 18; Schuster 2010, 90–3 fig. 3). Other large circular enclosures or ringworks in south-east Britain include Carshalton, Surrey; Mucking South Ring and Springfield Lyons in Essex; and Mill Hill, Deal; Highstead, near Chislet (Bennett *et al.* 2007, figs. 21 and 23); Castle St, Canterbury (Yates 2001, 77 table 7.7, no. 4), and Chalk Hill, Ramsgate (Shand 2001) in Kent (for an overview cf. Allen *et al.* 2008, 307 fig. 24; 314 fig. 25).

However, at East Hill there is clearly insufficient room between the site and the scarp of the valley-side to accommodate a monument of this diameter (even taking a degree of erosion into account), and it seems more likely that any enclosure was sub-circular or oval in shape. Another possibility is that ditch 2104 simply cut off the crest of East Hill hill, taking advantage of the valley-side to the west and possibly a dry tributary coombe to the south, beneath what is now Brent Lane.

Late Iron Age and Romano-British period

The site lies almost immediately south of Roman Watling Street, at the point where it crests East Hill ascending out of the Darent Valley towards Canterbury. A growing corpus of evidence is documenting the development of a substantial Romano-British settlement, probably around the crossing of the Darent by Watling Street (Finch Smith 1987, 138–39), and it is perhaps most likely that the East Hill cemetery served at least part of this community.

Although a substantial portion of the cemetery has previously been charted (Leyland 1990a; 1990b; Herbert 2011), the latest phase of excavation has clearly defined its easterly extent, while its northern and southern limits remain untested. Although preservation of human remains within the cemetery as a whole was relatively poor, the site offers a significant new body of later Romano-British human osteoarchaeological data for the county (see McKinley 2006, and above).

Secure dating evidence from the East Hill cemetery as a whole is scarce, and that from the 2006 excavations is particularly scant, but some inferences can be drawn from the available evidence. Inhumation burial gradually replaced cremation as the favoured burial rite for southern Britain in the 2nd century AD (Philpott 1991, 53), and early Romano-British cremation burials are known from within or near to the

Roman settlement area at Dartford: two cremation burials with pots dating to later 1st–early 2nd century AD lay near a possible pyre-site and other deposits of pyre waste, and may indicate the existence of a larger early Romano-British burial ground beneath the modern Priory Centre (Hutchings 2001, 105–107). The absence of such provisioned cremation burials from the East Hill cemetery might, therefore, suggest it was a phenomenon of the later Romano-British period – perhaps of the late 2nd century continuing into the 3rd and 4th centuries AD. This corresponds with the date of the grave goods recorded by Ritson (Leyland 1990a, 1990b), and with the limited suite of Roman pottery from the 2006 excavation. The presence of 3rd- and 4th-century coinage at the site attests use at this time and Dunkin (1844, 90, cited in Finch Smith 1987, 139) records the discovery of a coin of Constantine I (AD 308–337) in one of the East Hill stone coffins.

The question of burial rite also remains problematic. Whilst unaccompanied east-west aligned supine inhumation with head to the west is widely recognised as characteristic of Christian burial practice, it is not necessarily the case that burials exhibiting these traits are Christian (Thomas 1985, 228–239). Factors such as local topography (in this case alignment perpendicular to the scarp of the Darent Valley?) or adherence to pagan/cult customs (for example *Sol Invictus*; cf. Henig 1984, 120) may have defined the structure of later Roman graveyards. Romano-Christian burials may be present at East Hill, but in the absence of objects bearing overt Christian symbols, they cannot now be distinguished with any confidence.

The north-south variation in distribution-density and regimentation of the graves from the site corresponds closely with the results of the 1988 Chaucer Park excavations by Canterbury Archaeological Trust (see Fig. 1). There too, greater numbers of WSW–ENE aligned graves were seen to the south, with a lesser spread of graves, including a few perpendicular ‘variant’ examples in the northern area of the northern half of the site. The 1988 excavations led to a suspicion that a focal structure such as a mortuary temple or early church lay to the east within the East Hill House grounds (Leyland 1990a, 1990b). No evidence for this has been revealed by the latest work (although obviously the possibility of an ephemeral structure cannot be disproved), but additionally the possibility must now be considered that the cemetery could instead have been structured in relation to the vestigial remains of a large prehistoric hilltop earthwork.

A number of graves contained evidence for use of nailed wooden coffins (see Fig. 4 for examples). These all lay in the southern part of the excavation area where it was notable, firstly, that the spatial arrangement of graves was more regimented, and secondly, that there was a tendency for graves to be more deeply cut with vertical or steep sides and flat bases. This grave form may indicate that confined burial was predominant in this part of the cemetery – the use of carpentry jointing instead of nails in coffin construction might account for some such graves without nails. Equally, graves to the north appeared less structured, and generally shallower with a tendency to exhibit sloping sides and concave bases. It may be the case that this grave form was better-suited to uncontained or shrouded burials.

After the end of the Romano-British period, the site seems to have fallen into disuse. The Kentish portion of Watling Street was probably unused in the early Anglo-Saxon period, regaining some of its importance as a link between London and Canterbury only in the later Anglo-Saxon period. By this time, however, Dartford and Strood were linked by a newer route to the north, through Gravesend and Northfleet (Tatton-Brown 2001, 121–22).

Archive

The archive is currently held at Wessex Archaeology, Salisbury (project numbers 58830 and 62240) until accepted by a suitable Museum in Kent.

Acknowledgements

The excavation was commissioned by CgMs Consulting, and funded by Persimmon Homes (South East). The input and assistance of Duncan Hawkins (CgMs) is gratefully acknowledged in respect of this. The fieldwork was monitored for Kent County Council by David Britchfield.

Excavations were directed by Mike Trevarthen, assisted by Gareth Chaffey and Steve George. The excavation team comprised Darren Baker, Dave Brown, Naomi Hall, Dave Parry, Simon Reames, Jane Roberts and Gemma White. Roger Richards' help with metal detecting is gratefully acknowledged. The project was managed for Wessex Archaeology by Richard Greatorex.

Initial assessment of the finds was undertaken by Lorraine Mepham. Soil samples were processed and sorted by Hayley Clarke, assisted by Rachel Billson and Naomi Hall. Geoarchaeology, soils and sediments (including requirement and sampling for micro-fossils) were initially assessed by Michael J. Allen with Catherine Barnett. Thanks are due to Chris Baker (Dartford Borough Museum) for discussions and additional information on the archaeological setting of the site, and on previous excavations.

The illustrations were drawn by Rob Goller. The report was edited and prepared for publication by Jörn Schuster.

Bibliography

- Anderson, T., 1995, 'The human skeletons', in Parfitt, K., *Iron Age Burials from Mill Hill, Deal*. London: British Museum Press, 114–145.
- Allen, M. J., Leivers, M. and Ellis, C., 2008, 'Neolithic causewayed enclosures and later prehistoric farming: duality, imposition and predecessors at Kingsborough, Isle of Sheppey, Kent, UK', *Proc. Prehist. Soc.* 74, 235–322.
- Barber, B. and Bowsher, D., 2000, *The Eastern Cemetery of Roman London 1983–1990*, MoLAS Monogr. 4. London: Museum of London.
- Barrett, J., 1980, 'The evolution of Later Bronze Age settlement', in Barrett, J. and Bradley, R. (eds.), *Settlement and Society in the British Later Bronze Age*, British Archaeological Reports Brit Ser 83 (i). Oxford.
- Bass, W. M., 1987, *Human Osteology*, Missouri Archaeol. Soc.
- Beek, G. C. van, 1983, *Dental Morphology: an illustrated guide*. Bristol: Wright PSG.
- Bennett, P., Couldrey, P. and Macpherson-Grant, N., 2007, *Highstead near Chislet, Kent: Excavations 1975–1977*, The Archaeology of Canterbury New Ser. 4. Canterbury: Canterbury Archaeological Trust.
- Berry, A. C. and Berry, R. J. 1967, 'Epigenetic variation in the human cranium', *Journ. Anatomy* 101(2), 261–379.
- Biddulph, E., 2006, *The Roman cemetery at Pepper Hill, Southfleet, Kent*, CTRL integrated site report series, in ADS 2006, Channel Tunnel Rail Link Section 1 (DOI: 10.5284/1000230)

- BGS 1998, 1:50 000 series, *Dartford*, sheet 271 (solid and drift geology). Keyworth, Nottingham: British Geological Survey.
- Bridgland, D. R., 1994, *Quaternary of the Thames*, Joint Nature Conservation Committee. London: Chapman and Hall.
- Brothwell, D. R., 1972, *Digging Up Bones*, British Museum (Nat. Hist.) London.
- Buikstra, J. E. and Ubelaker, D. H., 1994, *Standards for data collection from human skeletal remains*, Arkansas Archaeological Survey Research Series 44. Fayetteville: Arkansas Archeological Survey.
- Cameron, A., 1985, Human Bone from Clubb's Pit, Isle of Grain (unpub. AML report).
- Canterbury Archaeological Trust, 1998, An archaeological Evaluation of Land to the South-east of the Junction of Princes Road and Lowfield Road, Dartford, Kent (unpubl. report).
- Canterbury Archaeological Trust, 2002, An Archaeological Excavation at East Hill House, East Hill, Dartford, Kent (unpubl. report).
- Carson, R. A. G. and Kent, J. P. C., 1989, *Late Roman Bronze Coinage, AD 324–498: Part 2: Bronze Roman Imperial Coinage of the Later Empire, AD 346–498*. New York: Sanford J. Durst.
- CgMs, 2005, Written Scheme of Investigation for an Archaeological Strip, Map and Sample Exercise: Land at East Hill House, 73 East Hill, Dartford, Kent. (unpubl. report reference DH/KB/5601).
- Champion, T., 2007, 'Prehistoric Kent', in Williams, J. H. (ed.), *The Archaeology of Kent to AD 800*. Woodbridge: The Boydell Press and Kent County Council, 67–134.
- Darling, M. (ed.), 1994, *Guidelines for the Archiving of Roman Pottery*. London: Study Group for Roman Pottery, Guidelines Advisory Document 1.
- Davis, A., 2000, 'The plant remains', in Barber and Bowsher, 368–78.
- Diack, M in preparation *A Roman Cemetery at St Dunstan's Terrace, Canterbury*, Canterbury Archaeological Trust Occasional Paper
- Ellis, C. and Allen, M. J., 2008, 'The excavated evidence', in Allen *et al.*, 282–8.
- English Heritage, 2002, *Environmental Archaeology; a guide to theory and practice of methods, from sampling and recovery to post-excavation*. Swindon, Centre for Archaeology Guidelines.

- Finch Smith, R., 1987, *Roadside Settlements in Lowland Roman Britain: A gazetteer and Study of their Origins, Growth and decline, Property Boundaries and Cemeteries*. British Archaeological Reports Brit. Ser. 157.
- Finnegan, M., 1978, 'Non-metric variations of the infracranial skeleton', *Journ. Anatomy*, 125(1), 23–37.
- Frere, S., Bennett, P., Rady, J., and Stow, S., 1987, *Canterbury excavations: intra- and extra-mural sites, 1949–55 and 1980–84*, The Archaeology of Canterbury 8. Maidstone: Kent Archaeological Society for the Canterbury Archaeological Trust.
- Fulford, M. G., and Timby, J., 2001, 'Ritual Piercings? A consideration of deliberately 'holed' pots from Silchester and elsewhere', *Britannia*, 32, 293–7.
- Gibbard, P. L., 1985, *The Pleistocene History of the Middle Thames Valley*. Cambridge: Cambridge University Press.
- Gibbard, P. L., 1994, *Pleistocene History of the Lower Thames Valley*. Cambridge: Cambridge University Press.
- Giorgi, J., 2006, *The plant remains from White Horse Stone, Aylesford, Kent* CTRL specialist report series, ADS 2006, Channel Tunnel Rail Link Section 1 (DOI: 10.5284/1000230).
- Harman, M., 1985, 'The Mammalian Bones', 274–280, in Wheeler, H., 'The Racecourse cemetery', in Dool, J., Wheeler, H. *et al*, 'Roman Derby: Excavations 1968–1983', *Derbyshire Archaeological J.*, 105, 222–80.
- Henig, M., 1984, *Religion in Roman Britain*. London: Batsford.
- Herbert, A. N., 2011, 'Excavations and discoveries at the Romano-British cemetery, east Hill, Dartford', *Archaeologia Cantiana*, 131.
- Hill, P. V. and Kent, J. P. C., 1989, *Late Roman Bronze Coinage, AD 324–498: Part 1: The Bronze Coinage of the House of Constantine, AD 324–346*. New York: Sanford J. Durst.
- Hillson, S.W., 1979, 'Diet and dental disease', *World Archaeology*, 2 (2), 147–162.
- Holden, J. L., Phakley, P. P. and Clement, J. G., 1995a, 'Scanning electron microscope observations of incinerated human femoral bone: a case study', *Forensic Science International*, 74, 17–28.
- Holden, J.L., Phakley, P.P. and Clement, J.G., 1995b, 'Scanning electron microscope observations of heat-treated human bone', *Forensic Science International*, 74, 29–45.

- Hutchings, P., 2001, 'Early Roman burial in Dartford', *Archaeologia Cantiana*, 121, 103–120.
- Hutchings, P., 2003, 'Ritual and riverside settlement: a multi-period site at Princes Road, Dartford', *Archaeologia Cantiana*, 123, 41–79.
- Leyland, M., 1990a, 'East Hill, Dartford' in Interim report on work carried out by Canterbury Archaeological Trust, *Archaeologia Cantiana*, 107, 342–345.
- Leyland, M., 1990b, 'East Hill, Dartford', *Canterbury's Archaeology 1988–1989*, 33–35.
- Manning, W. H., 1985, *Catalogue of the Romano-British iron tools, fittings and weapons in the British Museum*. London: British Museum.
- McKinley, J. I., 1993, 'Bone fragment size and weights of bone from modern British cremations and its implications for the interpretation of archaeological cremations', *International J. Osteoarchaeology*, 3, 283–287.
- McKinley, J. I., 1994a, *The Anglo-Saxon cemetery at Spong Hill, North Elmham Part VIII: The Cremations*, East Anglian Archaeology 69. Dereham.
- McKinley, J. I., 1994b, 'Bone fragment size in British cremation burials and its implications for pyre technology and ritual', *Journal Archaeological Science*, 21, 339–342.
- McKinley, J. I., 1997, 'The cremated human bone from [Iron Age] burial and cremation-related contexts', in Fitzpatrick, A. P., *Archaeological Excavations on the Route of the A27 Westhampnett Bypass, West Sussex, 1992, Vol. 2*. Salisbury: Wessex Archaeology Report 12, 55–72.
- McKinley, J. I., 2000a, 'The Analysis of Cremated Bone', in Cox, M. and Mays, S. (eds.) *Human Osteology*. London: Greenwich Medical Media, 403–421.
- McKinley, J. I., 2000b, 'Phoenix rising; aspects of cremation in Roman Britain', in Millett, M., Pearce, J. and Struck, M. (eds.), *Burial, Society and Context in the Roman World*. Oxford: Oxbow Books, 38–44.
- McKinley, J. I., 2004a, 'Compiling a skeletal inventory: cremated human bone', in Brickley, M. and McKinley, J. I. (eds.), *Guidelines to the Standards for Recording Human Remains*, British Association for Biological Anthropology and Osteoarchaeology and Institute for Field Archaeology, 9–12.
- McKinley, J. I., 2004b 'Compiling a skeletal inventory: disarticulated and co-mingled remains', in Brickley, M. and McKinley, J. I. (eds.), *Guidelines to the Standards*

- for Recording Human Remains*. British Association for Biological Anthropology and Osteoarchaeology and Institute for Field Archaeology, 13–16.
- McKinley, J. I., 2004c, 'Human remains, pyre technology and cremation rituals', Cool, H.E.M., *The Roman Cemetery at Brougham Cumbria: Excavations 1966–67*, Britannia Monograph 21. London, 283–310.
- McKinley, J. I., 2006, *Human bone scheme-wide overview*, CTRL specialist report series, ADS 2006, Channel Tunnel Rail Link Section 1 (DOI: 10.5284/1000230).
- McKinley, J.I. 2008a The cremated remains from the Romano-British cemetery of St. Dunstan's, Canterbury. Unpublished report for Canterbury Archaeological Trust
- McKinley, J. I., 2008b, 'Cremated bone', in Cooke, N., Brown, F. and Phillpotts, C., *From hunter gatherers to huntsmen. A history of the Stansted landscape*, Framework Archaeology Monogr. 2, CD-Rom Chapter 27. Salisbury.
- McKinley, J. I., Smith, P. and Fitzpatrick, A.P., 1997, 'Animal bone from burials and other cremation-related contexts', in Fitzpatrick, A.P., *Archaeological Excavations on the Route of the A27 Westhampnett Bypass, West Sussex, 1992, Volume 2*. Salisbury: Wessex Archaeology Report No. 12, 73–77.
- Méniel, P., 1993, 'Les animaux dans les pratiques funéraires des Gaulois', in Cliquet, D., Remy-Watte, M., Guichard, V. and Vaginay, M. (eds.), *Les Celtes en Normandie. Les rites funéraires en Gaule (II^{ème} au I^{er} siècle av. J.–C.). Actes du 14^{ème} colloque de l'Association Française pour l'Etude de l'Age du Fer, Evreux – mai 1990*. Revue Archéologique de l'Ouest, Supplément 6. Rennes, 285–290.
- Parfitt, K., 1995, *Iron Age Burials from Mill Hill, Deal*. London: British Museum Press.
- PCRG 1997, *The Study of Later Prehistoric Pottery: general policies and guidelines for analysis and publication*, Prehistoric Ceramics Research Group Occas. Papers 1/2 (revised edition).
- Philpott, R., 1991, *Burial practices in Roman Britain: A survey of grave treatment and furnishing AD43–410*, British Archaeological Reports Brit. Ser. 219. Oxford: Tempus Reparatum.
- Pollard, R.J., 1988, *The Roman pottery of Kent*. Maidstone: Kent Archaeol. Soc. Monogr. 5.
- Rielly, K., 2000, 'Pyre goods: animal bone and cremation burial', in Barber and Bowsher, 71–76.

- Roberts, C. and Cox, M., 2003, *Health and disease in Britain from prehistory to the present day*. Stroud: Sutton.
- Rogers, J. and Waldron, T., 1995, *A field guide to joint disease in archaeology*. Chichester: Wiley.
- Scheuer, L. and Black, S., 2000, *Developmental juvenile osteology*. London: Academic Press.
- Schuster, J., 2010, 'The Neolithic to post-medieval archaeology of Kingsborough, Eastchurch, Isle of Sheppey: from monuments to fields', *Archaeologia Cantiana* 130, 83–103.
- Seaby, H. A., 1989, *Coins of England and the United Kingdom. Standard Catalogue of British coins 24th edition*. (edited by Stephen Mitchell and Brian Reeds). London: Seaby.
- Shand, G., 2001, Archaeological excavations at Chalk Hill, Ramsgate Harbour Approach Road 1997/8: The stratigraphic report. Canterbury Archaeological Trust, unpubl. report.
- Sidell, J., Wilkinson, K., Scaife, R. and Cameron, N., 2000, *The Holocene evolution of the London Thames*. MoLAS Monograph 5. London: Museum of London Archaeology Service.
- Archaeologists.
- Stace, C., 1997, *New flora of the British Isles, 2nd edition*. Cambridge: Cambridge University Press.
- Stevens, C., 2006, *The charred plant remains from North of Saltwood Tunnel, Saltwood, Kent*, CTRL specialist report series, ADS 2006, Channel Tunnel Rail Link Section 1 (DOI: 10.5284/1000230).
- Stevens, C., 2008, Cereal agriculture and cremation, In Allen, M. J. *et al.* 296-299,
- Tatton-Brown, T., 2001, 'The evolution of 'Watling Street' in Kent', *Archaeologia Cantiana* 121, 121–133.
- Thomas, C., 1985, *Christianity in Roman Britain to AD 500*. London: B T Batsford Ltd.
- Viner, L. and Leech, R., 1982, 'Bath Gate Cemetery', in McWhirr, A., Viner L. and Wells, C., *Cirencester Excavations II, Romano-British cemeteries at Cirencester*. Cirencester: Cirencester Excav. Comm., 69–111.
- Walker, K., 1990, *Guidelines for the Preparation of Excavation Archives for Long-Term Storage*, UKIC Archaeology Section.

- Wessex Archaeology 1993, *Region 4 (South of the Thames) and Region 1 (South West England)*, Southern Rivers Palaeolithic Project Rep. 2. Salisbury.
- Wessex Archaeology, 2005, 'Land at East Hill House, East Hill and Sterndale Road, Dartford, Kent: Archaeological Evaluation Report' (unpubl. report 58830).
- Wessex Archaeology, 2006, 'Excavations at the Former East Hill House, Sterndale Road, Dartford, Kent: assessment of results' (unpubl. report 62240.01).
- Wymer, J., 1968, *Lower Palaeolithic Archaeology in Britain, as represented by the Thames Valley*. London: John Barker.
- Wymer, J., 1999, *The Lower Palaeolithic Occupation of Britain*. Salisbury: Wessex Archaeology and English Heritage.
- Yates, D. T., 2001, 'Bronze Age agricultural intensification in the Thames Valley and Estuary', in Brück, J. (ed.), *Bronze Age Landscapes. Tradition and transformation*. Oxford: Oxbow Books, 65–82.
- Yates, D. T., 2007, *Land, Power and Prestige: Bronze Age Field Systems in Southern England*. Oxford: Oxbow Books.
- Young, C. J., 1977, *The Roman pottery industry of the Oxford region*, British Archaeological Reports Brit. Ser. 43. Oxford.