Channel Tunnel Rail Link

London and Continental Railways

Oxford Wessex Archaeology Joint Venture

The Human remains from White Horse Stone, Aylesford, Kent

by Annesofie Witkin

CTRL Specialist Report Series

2006

TABLE OF CONTENTS

1 INTRODUCTION

The human bone assemblage from White Horse Stone comprised 19 deposits of cremated bone, three inhumation burials and 17 deposits containing unburnt disarticulated bone. The deposits dated from the late Neolithic to the Anglo-Saxon period. These remains underwent full osteological analysis.

A particularly interesting find was the evidence for interpersonal violence in the early to middle Iron Age found on the partial, disarticulated adult male skull 8015. Two chop marks and a number of smaller nicks had been made to the cranial vault by a sharp bladed instrument. Evidence of healing indicated that the wounds had not been fatal.

A rare example of an early to middle Iron Age cremation burial was also discovered on the site. The cremated human remains accompanied by a number of metal objects, a whetstone and a pot containing a rich deposit of grain. Less rare but by no means common were two late Bronze Age cremation burials.

Small quantities of cremated human bone were recovered from the fills (872, 912/914 and 955) of three late Neolithic pits, situated in close proximity to one another. The bone may represent the deliberate deposition of burnt human bone, as part of a wider ritual. Alternatively, the bone may originally have derived from a cremation nearby, and was accidentally included in the pit fills as redeposited pyre debris. Similar small deposits of cremated human bone placed within late Neolithic pits are known from Yarnton, Oxon. (Boyle pers.comm.).

Cremated human bone dating to the late Bronze Age was recovered from two contexts (854 and 949), the former being an urned burial, and the latter an unurned burial or redeposited pyre debris. These deposits represent a growing corpus of cremations dating to this period known from Essex, Hertfordshire, Middlesex, Suffolk and the south of England (www.huntingshire.info/history 2005). These cremations are broadly contemporary with features located in the eastern end of the site, which may mark the beginning of occupation.

One older adult male (2295) and one child inhumation (2291) dated to the Iron Age, the former being radio-carbon dated to 400-200 cal BC. Skeleton 2295 was interred within grave 2296, and was unaccompanied. Child skeleton 2291 had been placed within the second fill of pit 2184, and was associated with early to middle Iron Age pottery, a loomweight and a rich assemblage of animal bones. Disarticulated and unburnt human remains dating to this period were also recovered from pit contexts, with 15 bones were found within the fill of six early and middle Iron Age pits (2214, 2119, 2130, 2339, 6110 and 8012). The practice of deposition of complete or partial skeletons, and disarticulated bone within pits is a common feature in Iron Age settlements (Whimster 1981). More unusual was a cremation deposit, dating to the early Iron Age, found within the fill of a pit (6132). This shallow pit also

contained a metal awl, a curved blade, a ring-headed pin, a tanged knife, a whetstone and a pot containing a rich grain deposit.

A cremation burial dating to the late Iron Age to early Roman period was also found. The remains had been placed within a 0.8 m deep pit (199). Burnt bone pin fragments were found mixed with the cremated remains. These were presumably pyre goods, and usually are most commonly found in female burials (McKinley 2000a). The osteological sex of this individual could not be determined.

A single unaccompanied female inhumation (9052), dating to the Anglo-Saxon period, was also discovered on the site. The body had been laid out in a supine, extended position within the grave, with the arms crossed over the chest. There was no evidence to suggest a coffin or grave goods. The west-east alignment of this burial, the supine body position and the absence of grave goods all suggest a Christian burial, as was the norm in the 10th century. What is unusual about this burial is its isolated location.

Cremation deposits of two unurned burials (543 and 870), redeposited bone in posthole 452 and pit 952, and a cremation-related deposit (925) could not be dated. Cremation in Kent is known from a wide range of time periods including the early, middle and late Bronze Age, the late Iron Age, early to middle Roman periods and the pagan Anglo-Saxon period (Taylor 2000). In the absence of artefactual and/or scientific dating, it is impossible to ascribe a likely date to the above deposits.

2 METHODS

The general methodology followed that set-out in 'Specialist Study Package 6' of the *CTRL Section 1 Project Design* (RLE 2003). Where possible age was assessed using dental attrition patterns (Miles 1962; Brothwell 1981), degenerative changes of the pubic symphysis (Brooks and Suchey 1990), dental development and eruption pattern (Moorees *et al* 1963; Ubelaker 1989) and long bone length (Hoppa 1992). Sex was ascertained from the sexually diagnostic features of the skeleton (Standards Workshop 1980; Buikstra and Ubelaker 1994) and the measurements of joint diameters (Bass 1987).

The cremated bone was analysed according with the standard procedures used for the examination of cremated bone set out in McKinley (1994a, 5-6).

3 RESULTS

Results of the osteological analysis are reported below according to archaeological period.

3.1 The late Neolithic

Three small deposits (873, 913 and 952), each weighing only 1 g or less, were recovered from three pits fills. A summary of the results is presented in Table 1. Details are held in the archive.

Table 1: Summary of results from analysis of the late Neolithic human bone (n = 3)

Context	cut	quantification	age/sex	deposit type
Burnt bone				
873	872	1 g	unknown, unsexed	Redeposited in pit fill
912/914	913	1 g	unknown, unsexed	Redeposited in pit fill
955	952	< 1 g	unknown, unsexed	Redeposited in pit fill

Disturbance and condition

All three deposits were very small (< 1g 1g), and clearly none represented a complete individual. Bone preservation was poor due to adverse soil conditions, the bones being demineralised and chalky in appearance.

Demographic data

The very small quantity of bone renders demographic comment inappropriate. None of the deposits could be aged or sexed. It was unclear how many individuals they represented.

Pyre technology and cremation ritual

The cremated bone from all deposits was blue-white in colour, indicating full oxidation of the bone (Holden *et al* 1995a and b; McKinley 2000a, 40). Cremated bone may range in colour from brownish-black (slightly charred), through hues of blue and grey, to white or calcined bone (McKinley 2000b, 405). These colour changes depend on the temperature of the firing and the duration of exposure of the body to the flames (*ibid*). In modern crematoria where temperature, fuel availability and air circulation are optimised, full cremation of an adult corpse generally takes between 1 - 1.5 hours to complete when the temperature within the cremator is maintained between 700-1000° C (*ibid*, 404). The speed of full combustion is dependant on the size and body mass of each individual as well as the proportion of fatty tissue present in the body. In pyre cremations, maintenance of an optimal temperature and sufficient fuel and oxygen throughout the pyre is more problematic than a modern cremator,

often leading to less uniformity in combustion of the corpse (conspicuous in colour variation of different skeletal elements). Both the length of time that the pyre will burn and the temperature attained are largely dependent on the quantity of fuel used in construction (McKinley 2000a, 269). Efficacy of cremation is also influenced by pyre technology (such as pyre construction or the use of flues to facilitate oxygen circulation throughout the pyre). The blue-white colour of the above bone indicates that there had been high efficiency of cremation of these individuals.

Maximum fragment size was small (24 mm), and is probably due to the redeposited nature of the material.

3.2 The late Bronze Age

One fairly large unurned cremation deposit (852) and two smaller deposits of cremated human bone (949 and 950) were analysed. A summary of the results is presented in Table 2 below. The details are held in the archive.

Table 2: Summary of results from analysis of the late Bronze Age human bon (n = 3)

context	cut	quantification	age/sex	deposit type
Burnt bone				
854	852	1235 g	> 18 yr. male	Unurned cremation burial
949	948	126 g	> 18 yr. female??	Unurned cremation burial or redeposited pyre debris
950	948	4 g	> 18 yr. unsexed	Unurned cremation burial or redeposited pyre debris

Disturbance and condition

Cremation deposit (854) found within pit 852 was sealed by backfill 853. No bone was present on the surface of the feature. Clearly no truncation of the deposit had occurred, and thus, it may be regarded as complete. Burnt bone deposit 949 and 950 are likely to have been truncated by later activity. Bone from all three contexts was slightly chalky in appearance with poor preservation of trabecular bone. This was probably due to chemical leaching of the bone in the acidic soil conditions.

Demographic data

Cremated bone from 949 and 950 appeared to constitute the cremated remains of a single individual - an adult female. Cremation deposit 854 represented the remains of an adult male.

Pyre technology and cremation ritual

The colour of the cremated bone in all three deposits was generally white, indicative of full oxidation involving high pyre temperatures and sustained burning (see discussion above).

However, deposit 854 was less uniform, with some bone fragments being coloured black, grey, and white with black cores.

Investigations in modern crematoria have found that the average bone weight of cremated adult individuals is approximately 1000-2400 g, with an average of 1650 g (McKinley 2000a, 269). Predictably, individuals of smaller and more gracile build (such as females and children) will have a lower bone weight, and poorer bone survival of the articular surfaces and spongy bone has been observed in modern older individuals with osteoporosis (McKinley 2000b, 404). Deposit 1235 (an adult male) weighed 1235 g. This weight does fall within the weight range found by McKinley (*ibid*) albeit towards the lower end. This may be due to incomplete recovery of the bone from the funeral pyre. However, the loss of trabecular bone in the acidic soil conditions may also account for this lower weight. The weights of deposits 949 and 950 were 126 g and 4 g, respectively. Due to truncation of these deposits, no conclusions regarding funerary practice may be reached on the basis of the total weight of this cremation deposit.

In deposit 854 just under half (42%) of the bone was recovered from the 5 mm sieve fraction and the maximum surviving bone fragment was very small (11 mm). Factors affecting fragmentation of cremated bone (McKinley 1994b) include the extent of oxidation; deliberate fragmentation of the bone as part of the funerary ritual following cremation and preceding burial; taphonomic processes, such as mechanical disturbance and chemical destruction of the bone (commonly through acidic soil conditions); and breakage during archaeological excavation and processing. In this case, the soil acidity and the archaeological process are likely to have been predominant factors.

Elements from all parts of the body were represented in the deposits. Identifiable elements in deposit 854 included fragments of rib, femoral shaft, tibia and thoracic vertebrae. The small quantity of fragments from the axial skeleton is most likely the result of mineral leaching than deliberate exclusion. The relatively high proportion of cranial fragments is largely due to the ease of identification of those elements. There was no apparent preference in the skeletal elements included in the burial.

A total of 15 g of burnt animal bone and an unburnt animal tooth fragment were recovered within the above deposit, the former probably the remains of pyre goods, and the latter of grave goods. No pyre or grave goods were recovered from deposits 949 and 950.

3.3 The early-middle Iron Age

Two articulated skeletons (2291 and 2295) dated to the middle Iron Age. Eleven deposits (2113, 2114, 2120, 2187, 2341, 6126, 6127, 8015, 8016, 8020 and 8029) containing the unburnt, disarticulated human bones of seven individuals, and two cremated deposits (143 and

6131) dated to the early to middle Iron Age. The osteological analysis of this assemblage is summarised in Table 3 below. Further details are held in the archive.

Disturbance and condition

Skeleton 2291 was near complete and in an excellent condition. By contrast, bone preservation of skeleton 2295 was poor, the skeleton having suffered post - Roman plough damage. Preservation of the disarticulated remains was fair with a moderate amount of root impressions present on the cortical surfaces. The bones did not appear weathered or abraded, suggesting that they had not been subject to extensive exposure prior to their deposition within the pits, nor repeated disturbance and re-deposition.

Burnt bone deposits 143 and 6131 were *in situ* cremation burials. The burial pit of 6131 survived to the depth of 0.18 m. All bone was heaped together as a small deposit at the base of the pit, with no bone showing on the surface of the feature. This suggests that the deposit was recovered in its entirety. Bone fragments were moderately chalky (eroded) with little survival of spongy bone. Cremated bone deposit 143 was located within the middle fill of a pit. No bone was present on the surface of the pit, again suggesting that the deposit had not been truncated. Very little spongy bone was present, probably the result of demineralisation of the bony matrix.

Demographic data

The above assemblage represented the remains of a minimum of eleven individuals –seven adults, two sub-adults, one juvenile and one immature individual. At least four adult males were present. The inhumations comprised one 9-11 year old subadult (2291), and one mature to older adult male, aged 40-52 years (2295). The two unurned cremation burials comprised one adult of unknown sex (143), and one adolescent, aged less than 18 years (6131).

Table 3: Summary of results from analysis of the early-middle Iron Age human bone (n = 19).

Context	cut	quantification	age/sex	deposit type	pathology summary
Unburnt articulated skeletons					
2291	2184	90%	9-11 y unsexed	Inhumation burial	Bilateral osteochondritis dissecans, osteochondroma, slight dental calculus
2295	2296	75%	40-52 y male	Inhumation burial	Osteoarthritis on the cervicals, slight to moderate degenerative changes on the thoracic and lumbar vertebrae, slight to moderate degenerative joint disease on the right shoulder, both wrists, both heads of the 1st metacarpals, head of 1st metatarsal and distal end of the proximal phalanx, fractured right 4th metacarpal, dental caries, considerable periodontal disease.
Unburnt disaticulated bone					

Context	cut	quantification	age/sex	deposit type	pathology summary
2113	2214	Cranial vault	13-18 yr. unsexed	Disarticulated bone fragment	
2114	2119	Left distal fibula	>18 yr. unsexed.	Disarticulated bone fragment	
2120	2130	Right fibula shaft	> 18 yr. unsexed	Disarticulated bone fragment	
2187	2184	Cranial vault	5-18 yr. unsexed	Disarticulated bone fragment	
2341	2339	Lumbar vertebra	>18 yr. unsexed	Disarticulated bone fragment	Moderate spinal degenerative changes.
6126	6110	Right medial end of clavicle	>40 yr, male??	Disarticulated bone fragment	
6126	6110	Right tibia, proximal end and shaft	> 18 yr. unsexed	Disarticulated bone fragment	
6127	6110	Cranial vault	> 18 yr. unsexed	Disarticulated bone fragment	
8015	8012	4 fragments: cranium, mandible, fibula shaft and rib.	> 18 yr. male.	Disarticulated bone fragment	Healed porotic hyperostosis, 1 button osteoma on left parietal, 2 healed chop marks on the parietals, 4 smaller nicks on the left parietal.
8015	8012	Mandible	25-36 yr. male	Disarticulated bone fragment	Dental calculus, abscess, enamel hypoplasia.
8015	8012	Fibula shaft	> 18 yr. male	Disarticulated bone fragment	
8015	8012	Rib	> 18 yr. male	Disarticulated bone fragment	
8016	8012	Left tibia	>18 yr. male (based on size).	Disarticulated bone fragment	
8020	8012	Left femur	>18yr. male.	Disarticulated bone fragment	
8029	8012	Right tibia	>18 yr. male (based on size).	Disarticulated bone fragment	
cremated bone					
143	199	292 g	> 18yr. unsexed	Unurned cremation burial	
6131	6132	11 g	<18 yr. unsexed	Cenotaph	

The disarticulated bone found within seven pits (2214, 2119, 2130, 2184, 2339, 6110 and 8012) consisted largely of long bone and cranial vault fragments, suggesting deliberate selection of these elements for inclusion within the pits. Skull fragments of two subadults (2113 and 2187) and two adults (6127 and 8015) were recovered from four separate pits. A

disarticulated mandible of a 25-36 year old male, an adult fibula and rib fragment were also recovered from context 8015. Other fills of pit 8012 contained further human remains: a fragment of left tibia (8016), left femur (8020) and right tibia (8029). The dimensions of the long bones, and the morphology of the mandible and skull all suggested an adult male. It is likely that the cranium and these bones were elements of a single individual, and may even have been unrecognised as an articulated inhumation.

Pit 6110 contained human remains in two fills. The right medial clavicle of a possible male (aged 40+ years) and the proximal epiphysis and shaft of an adult right tibia was recovered from 6126, whilst an adult fragment of cranial vault was found in fill 6127 within the pit.

Isolated long bone fragments of adult individuals were found within pits 2119 and 2130, and an isolated adult lumbar vertebra was recovered from pit 2339. These probably derive from three separate individuals.

Dental pathology

Dental decay

Dentition was present in human remains 2291, 2295 and 8015. The total number of surviving permanent teeth was 53 and the number of dental sockets, 88. Three deciduous teeth and four sockets were present in subadult 2291. Two individuals (2291 and 8015) had small deposits of dental calculus or mineralised plaque (Hillson 1996, 225), affecting a total of 12 permanent (22.6 %) and 3 deciduous teeth (100 %). Slight periodontal disease was present on the alveolar bone of 8015, whilst the mandible of skeleton 2295 showed considerable disease. Peridontal disease involves the horizontal reduction of the alveolar of the jawbone, causing the teeth to loosen in their dental pockets, and sometimes to be shed altogether (Levin 2003, 245). Skeleton 8015 also had one peri-apical abscess (1/88; 1.12 %). The edges of the lesions were sharp, indicating that the lesion was active at the time of death. Skeleton 2295 had two small carious lesions (2/53; 3.77 %).

The aetiology of most dental pathology, such as periodontal disease, caries, calculus and ante-mortem tooth loss (AMTL), is strongly associated with the consumption of carbohydrates and poor oral hygiene practices (Roberts and Manchester 1995). Gum and dental disease are inter-linked. For example, excess calculus deposits may lead to gingivitis, which (if untreated) leads to periodontal disease. Retraction of the gums and alveolar bone expose vulnerable parts of the tooth facilitating the formation of carious lesions, which in turn may be the underlying cause of a dental abscess.

Dental enamel hypoplasia

Dental enamel hypoplasia (DEH) was observed on the crowns of the surviving three canines and the maxillary first premolars of 8015, showing as multiple horizontal lines. These lines are bands of thinned dental enamel, which form when there is disruption of the mineralisation process during tooth formation in the first seven years of life (Goodman and Rose 1990). The aetiology of the condition is multi-factorial, but is commonly associated with prolonged episodes of nutritional deficiency (such as seasonal food shortages) or diseases during childhood (Roberts and Manchester 1995, 58). Because tooth enamel does not remodel during life, dental enamel hypoplasia acts as an indelible marker of childhood ill health throughout life. The number of lines seen on the teeth of skeleton 8015 indicates multiple stress episodes in infancy or early childhood.

Skeletal pathology

Trauma

Bilateral osteochondritis dissecans was present on the medial femoral condyles of skeleton 2291. The lesions consisted of oval depressions with a porous base and smooth edges. This type of lesion most commonly affects males between the age of 10 –25 years (Aufderheide and Rodriguez-Martin 1998), and is generally related to strenuous physical activity. The knee is affected in 80% of the cases. The condition is caused by the sheering of blood vessels supplying the joint tissue, resulting in localised necrosis of the bone. The dead bone fragment separates from the joint surface, and may remain loose within the joint, causing pain on movement and sometimes secondary osteoarthritis, or may be reabsorb or heal back into the defect with no further clinical effect (Roberts and Manchester 1995, 87).

Skeleton 2294 had a healed and longstanding fracture of the proximal end of the right fourth metacarpal. The distal end of the bone had been slightly displaced anterio-laterally.

Two chop marks, just superior to the parietal foramina were present on skull 8015 (Plate 1). The two linear depressions were approximately 25 mm long, 5 mm wide and 2.3 mm deep. The lesions penetrated to the diplöe but did not extend into the inner table. There were no radiating fractures present, possibly as the right lesion extended to the sagittal suture, which may have acted to disperse the force of the blow. The orientation of the chop marks indicated that the right cut had been inflicted from a superio-lateral direction, whilst the left lesion had been inflicted from an inferio-medial aspect. Both lesions were healing and clearly did not kill the individual. The left parietal bone also exhibited four linear depressions, all were shallow and fairly short, the longest measured 11.62 mm. All showed evidence of healing. The nicks were probably inflicted in the same event as the two larger chop marks. All lesions are consistent with a sharp force injury, produced with an edged weapon, such as a sword (Boylston 2000; 361). Skeletal examples of weapon-related trauma are rare in the Iron

Age, despite the real or symbolic emphasis on conflict suggested by the presence of hillforts and weaponry in this period.

Degenerative joint disease

Evidence of degenerative joint disease, such as slight to moderate porosity of the joint surfaces and new bone formation at the joint margins, was present in the mature to older male skeleton 2295. The above changes are probably the result of natural and progressive degeneration of the joint surfaces with advancing age, but may also have an activity-related aetiology. As they were either only slight or moderate in severity, they are unlikely to have caused any major pain or joint stiffness. The degenerative changes were present bilaterally in the hip, wrist joints and metacarpo-phalangeal joints of the 1st metacarpal, in the right shoulder, and in the metacarpo-phalangeal joint of the left hallux.

Degenerative changes were also present in the spine of this individual, with osteo-arthritis of the cervical vertebrae, and slight to moderate degenerative changes throughout the thoracic and lumbar vertebrae. Marginal osteophytes and porosity of the joint surfaces are common in adults over the age of 30 years in modern populations and are caused by normal wear and tear of the skeleton.

Metabolic disorders

Cranium 8015 exhibited slight porosity on the ectocranial surface of the parietal bones of the skull. Known as porotic hyperostosis, this lesion is thought to be due to iron deficiency anaemia during childhood (Stuart-Macadam 1991). Iron deficiency anaemia is most commonly caused by the poor oral intake of iron (found most prolifically in red meat, and to a lesser extent leafy green plants) and/or by severe intestinal parasitic infestation. Alternatively, the presence of the porosity on cranium 8015 may have a very different aetiology, and instead, may be associated with healing of the traumatic cranial lesions described above. The lesions on the cranium of skeleton 8015 were well healed by the time of his death.

Neoplasms

A small button osteoma was present on the left parietal bone of cranium 8015. This is a benign tumour that generally affects more adult males than females (Aufderheide and Rodríguez-Martín 1998, 375), and is associated with advancing age.

Skeleton 2291 exhibited a single projecting exostosis on the posterio-medial aspect of the metaphysis of the left tibia. The osseous projection appears to have been crowned by a cartilaginous cap. It is likely to have been an osteochondroma. This type of defect occurs during skeletal development in childhood. The only clinical symptom would have been a localised swelling (Roberts and Manchester 1995, 187-188).

Pyre technology and cremation ritual

The cremated bone (143 and 6131) was generally white in colour indicative of full oxidation (Holden *et al* 1995a and b; McKinley 2000b, 40). However, the fragments of black spongy bone present in all spits of deposit 6131, and black femoral shaft fragments and light grey tibia shaft fragments in deposit 143 indicates that the bone was not uniformly cremated. The significance of colour in cremation deposits was discussed above.

Cremation deposit 143 weighed 292 g. Similar low weights are recorded from the late Iron Age/early Roman cemetery of Westhampnett, West Sussex (McKinley 1997, 59-62). Although, in part demineralisation due to the acidic soil conditions would have reduced the weight of the original deposit, this may equally be due to the incomplete collection and/or burial of the cremated bone following cremation, and reflects the lack of concern attached to the collection of the remains of the entire individual felt by the mourners or pyre attendants. A token deposit may well have sufficed for reburial, or the remainder of the bone may have been curated or dispersed in a non-burial context.

The majority of the bone (66%) from the burial was recovered from the 5 mm sieve fraction, and the maximum surviving bone fragment was *c*. 48mm. A number of factors may affect the level of fragmentation of cremation bone (McKinley 1994b), and have been discussed above. In this instance, soil acidity is likely to have been a major factor.

Elements from all parts of the body were represented in the burial. The small quantity of fragments from the axial skeleton is more representative of demineralisation due to soil acidity than to the deliberate exclusion of these body parts. The relatively high proportion of cranial fragments is probably due to the ease of identification of these bones. There was no apparent preference in skeletal elements included in the burial.

The 11 g of cremated bone from 6131 is clearly only a small proportion of the original cremation deposit. Mixed with the human bone were burnt fragments of deer antler, fragments of unburnt iron and a shiny metal fragment. The bone within this deposit may represent a cenotaph. These type of features has also been found at Westhampnett (McKinley 1997, 72). The lack of charcoal within the deposit makes it unlikely to be redeposited pyre debris.

The Roman period

A single unburnt human bone was recovered within the fill of a Roman pit (4006). The results of the osteological analysis are summarised in Table 4. Further details are held in the archive.

Table 4: Summary of results from analysis of human bone (n = 1)

context	cut	quantification	deposit type	age/sex
unburnt disarticulated bone				
4005	4006	180 g	Disarticulated bone fragment	>15yr. unknown

The human remains consisted of a well preserved but incomplete foot phalanx. The unfused epiphysis indicated that this individual was aged less than 15 years. Considering the earlier Iron Age activities on the excavation area, this bone is likely to have been re-deposited from an earlier feature.

3.4 The late Anglo-Saxon period

A single unaccompanied prime adult female (9025) dating to the late Anglo-Saxon period (10th century AD) was discovered in an isolated grave. The results of the osteological analysis are summarised in Table 5 below. Further details are stored in the archive.

Table 5: Summary of results from analysis of the Anglo-Saxon human bone (n = 1)

context	cut	quantification	deposit type	age/sex	pathology summary
Articulated bone					
9025	9011	75%	Inhumation burial	25-35 yr.; female	Schmorl's nodes, slight spinal degenerative changes, scars of parturition.

Disturbance and condition

The skeleton was in a good condition but was incomplete. The cranium, all of the cervical vertebrae, the first two thoracic vertebrae, both arms and the right hand were missing. The lack of these elements is likely to have been due to post-depositional disturbance due to the shallowness of the grave.

Demography

The remains consisted of a female aged between 25 and 35 years.

Pathology

Degenerative joint disease

Schmorl's nodes were present on the 1st and 2nd lumbar vertebral bodies. These are indentations in the surface of the vertebral body caused by compression and herniation of the contents of the vertebral discs (Roberts and Manchester 1995, 107). Slight porosity of the articular processes of the thoracic vertebrae was also present. These changes indicate

degenerative joint disease, associated with advancing age and/or activity related stress on the joints (such as repetitive bending). Given the youth of skeleton 9025, the latter is more likely.

3.5 Undated cremated bone deposits

Eleven cremation deposits (453, 552/553, 553, 544/545, 565/566, 569, 871, 926, 927, 955 and 2416) from six features (452, 543, 870, 925 and 2415) and one disarticulated unburnt bone (565/566) from pit 543 could not be dated. The results of the osteological analysis are summarised in Table 6 below. Further details are held in the archive.

Table 5: Summary of results from analysis of the undated human bone (n = 12)

Context	cut	quantification	deposit type	age/sex
burnt bone				
453	452	3.g	Redeposited in post hole fill	> 18 yr. unknown
552/553	543	87 g	Unurned cremation burial	> 18 yr. unknown
553	543	7 g	Unurned cremation burial	
544/545	543	177 g	Unurned cremation burial	
565/566	543	42 g	Unurned cremation burial	
569	543	1 g	Unurned cremation burial	
871	870	188 g	Unurned cremation burial	
926	925	2 g	Cremation-related deposit	> 18 yr. unsexed
927	925	12 g	Cremation-related deposit	
955	952	1 g	Redeposited in pit fill	unknown, unsexed
2416	2415	10 g	Redeposited in pit fill	> 18 yr. unsexed
unburnt disarticulated bone				
565/566	543	teeth, 6 cranial vault fragments	Disarticulated bone fragments	2-3 yr. unsexed

Disturbance and condition

The unurned cremation burials 543 and 870 survived to a depth of 0.15 m and 0.2 m, respectively. Both had been heavily truncated by ploughing. Truncation of all other contexts above had occurred, with the exception of the burnt bone within pit 952, contained within the primary fill of the feature not exposed to ploughing. Thus, deposits 926 and 927 comprise the entire deposit.

Demographic data

A minimum number of six individuals were present in the cremation assemblage. These included four adults of unknown sex. The unburnt bone (565/563) comprised the cranial vault and teeth of a 2-3 year old subadult. This was recovered within the same fill as the unurned cremation deposit in pit 843

Pyre technology and cremation ritual

The cremated bone was white in colour, indicative of full oxidation (Holden *et al* 1995a and b; McKinley 2000, 40). The combined weight of the bone of unurned cremation burial 543 (contexts 552/553, 553, 544/545, 565/566 and 569) was 314 g. The weight of cremation deposit 870 was 188 g. This does not represent the entire remains of any one individual.

Elements from all skeletal areas were represented in the burials and no area of the body had been deliberately excluded. The maximum fragment surviving bone fragment was *c.* 54mm. size A number of factors may affect the level of fragmentation to cremation bone (McKinley 1994b). In this instance, the soil acidity and plough disturbance are likely to played major roles in bone fragmentation.

Burial 543 contained one unburnt animal tooth. This may be the remains of a food offering placed within the burial pit. Twelve deciduous teeth and six cranial fragments of a 2-3 year old child were also found within the cremated bone deposit. These bones may be part of a disarticulated skull, but given the soil acidity, it is quite possible that they are the only surviving traces of a complete subadult burial. Thus, burial 843 may comprise a double burial of a cremated adult and a child inhumation. It is quite probable that they were related, and were accorded different funerary rites according their respective ages. For example, Roman-Britons seldom cremated infants (Philpott 1991). The youngest cremation deposits are usually aged four years or older.

4 DISCUSSION

The human bone assemblage from White Horse Stone has a wide date range, with only a small number of individuals from each period. The smallness of each group precludes meaningful palaeodemographical analysis, and hence, the osteological potential of this assemblage is somewhat limited. Osteologically, the most unusual discovery was the series of cut marks on the skull 8012. Such evidence of violence is rare in this period.

However, a number of interesting aspects of burial ritual from each period was apparent. Human bone recovered from late Neolithic pits is not well recorded in the literature, but a growing, albeit scattered number of these deposits are coming to light. Similarly, an increasing number of unurned and unaccompanied cremation burials have been scientifically dated to the late Bronze Age. Two cremation burials at White Horse Stone date to this period.

The largest assemblage at White Horse Stones dates to the early and middle Iron Age and includes both cremation and inhumation burials, and a number of disarticulated bone. Interment of articulated bodies, articulated but dismembered body parts, and disarticulated human bone within pits is a common feature of Iron Age settlements and hillforts (Whimster 1981). Less common in the middle Iron Age are inhumations within purpose-built graves, although a cemetery of such graves was discovered at Yarnton, Oxon. (Hey *et al* 1999). Later

Iron Age graves are known from Kent at Mill Hill, Deal (Parfitt 1995) and Pepper Hill, Springhead (Boston and Witkin, forthcoming). Early to middle Iron Age cremation is also an uncommon find, most Iron Age cremation in Kent beginning later in the 1st century BC (Taylor 2000).

Roman features on the site contained only one fragment of disarticulated bone that may have been residual.

The solitary Late Anglo-Saxon female inhumation presents an enigma. Evidently buried with care, the location of her grave outside consecrated ground in the liminal location along parish boundaries, that some reason precluded her from normative burial within a churchyard. By this period normative burial occurred within the consecrated grounds surrounding the parish church. Occasionally, outcasts were buried outside the limits of the churchyard and the settlement (Reynolds 1997). A 10th century law explicitly decreed that executed individuals were not permitted burial in consecrated ground (Reynolds 1999, 97). Instead, they were buried at or close to principal boundaries (such as parish boundaries).

A series of characteristics have been used to identify execution burials. These include random orientation, prone and decapitated corpses, instances of tied hands and location on, or adjacent to, principal boundaries (*ibid*). The grave of skeleton 9025 was buried some 5 m to the north of the parish boundary of Aylesford and Boxley. Although the location does suggest the burial of an executed criminal, the carefully laid out body position is not consistent with this interpretation. Although the individual was missing the cranium, all of the cervical and first two thoracic vertebrae, both arms and the right hand, there is no real evidence that this individual was beheaded or dismembered. The very shallow grave cut and subsequent post-depositional disturbance may very well have accounted for these missing bones.

Several interesting aspects of burial practice have been noted in this assemblage, including rare examples of deliberate deposition of human remains within late Neolithic pits, the presence of late Bronze Age and early Iron Age cremations; a middle Iron Age grave, and the presence of an aberrant late Anglo-Saxon burial. Osteologically, the discovery of cut marks on the disarticulated skull placed within a middle Iron Age pit is a rare example of interpersonal violence in this period.

5 BIBLIOGRAPHY

Aufderheide, A C and Rodríguez-Martín, C 1998 *The Cambridge encyclopedia of human paleopathology*, Cambridge University Press

Bass, W M 1987 *Human osteology. A laboratory and field manual*, 3rd edn, Columbia

Boston, CV and Witkin, A forthcoming, The human remains, in Biddulph, E *The Roman cemetery at Pepper Hill, Southfleet, Kent*, CTRL Integrated Site Report Series; Archaeological Data Services (internet)

Brookes, S and Suchey, J M 1990 Skeletal age determination based on the os pubis: a comparison of the Acsadi-Nemeskeri and Suchey-Brooks methods, *Human Evolution* **5**, 227-238

Brothwell, D 1981 *Digging up bones*, 3rd edn, New York

Buikstra, J E and Ubelaker, D H 1994 *Standards for data collection from human skeletal remains*, Arkansas

Boylston A 2000 *Evidence for weapon-related trauma in British archaeological samples* In Cox, M and Mays, S (eds) Human osteology. In archaeology and forensic science, London. 357-380

Goodman, AH and Rose, J, 1990 Assessment of systemic physiological perturbations from dental enamel hypoplasias and associated histological structures, *Yearbook of Physical Anthropology* **33**, 59-110

Hey, G, Bayliss and Boyle, A 1999 Iron Age inhumation burials at Yarnton *Antiquity* **73** No 281 551-562

Hillson, S 1996 *Dental anthropology*, New York

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

Hoppa, R.D. 1992 Evaluating human skeletal growth: an Anglo-Saxon example; *International Journal of Osteoarchaeology* 2; 275- 288

Levin, J 2003 Periodontal disease (Pyrorrhoea); in Kiple K F (ed) *The Cambridge historical dictionary of disease,* Cambridge University Press

Manchester, K 1983 *The archaeology of disease*, Bradford

McKinley, J 1994a *The Anglo-Saxon cemetery at Spong Hill, North Elmham, part VIII: The cremations.* East Anglian Archaeology. Report number **69**

McKinley, J 1994b Bone fragment size in British cremation burials and its implications for pyre technology and ritual. *Journal of Archaeological Science* **21**, 339-342

McKinley, J 1997 The cremated human bone from burial and cremation related contexts. In A.P. Fizpatrick (ed.) *Archaeological excavations on the route of the A27 Westhampnett bypass, west Sussex, 1992. Volume 2: the cemeteries* 55-73.

McKinley, J 1 2000a Cremation burials, in Barber, B and Bowsher, D *The Eastern Cemetery of Roman London. Excavations 1983-1990*, MoLAS Monograph **4**, 264-227

McKinley, J 2000 The analysis of cremated bone in M. Cox and S. Mays (eds.) *Human osteology in archaeology and forensic science*, London 403-421

McKinley, J 1 2000c Funerary practice, in *The Eastern Cemetery of Roman London. Excavations 1983-1990* (eds B Barber and D Bowsher), MoLAS Monograph **4**, 60-81

Miles, A 1962 Assessment of age of a population of Anglo-Saxons from their dentition, *Proceedings of the Royal Society of Medicine* **55**, 881-886

Moorees, C F A, Fanning, E A, and Hunt, E E 1963 Age variation of formation stages for ten permanent teeth, *Journal of Dental Research* **42**, 1490-1502

Parfitt, K 1995 *Iron Age burials from Mill Hill Deal*, British Museum Press, London

Philpott 1991: *Burial practices in Roman Britain: a survey of grave treatment and furnishings: AD 43-410* BAR British Series **219**

Reynolds, A. 1997 *The identification and ideology of Anglo-Saxon execution sites and cemeteries*. Lecture paper given at Medieval Europe Conference, 1997, Brouge

Reynolds, A 1999 *Later Anglo-Saxon England. Life and Landscape*, Gloucester

Roberts, C and Manchester, K 1995 *The archaeology of disease*, 2nd edn, New York

Standards Workshop of European Anthropologists 1980 Recommendations for age and sex diagnoses of skeletons, *Journal of Human Evolution* **9**, 517-49

Stuart-Macadam, P 1991 Anaemia in Roman Britain, in Bush, H and Zvelebil, M (eds) *Health in past societies*, BAR International Series Vol **567,** 101-113, Tempus Repartum, Oxford

Taylor, A 2000 *Burial practice in early England* Tempus Books U.K.

Ubelaker , D H 1989 *Human skeletal remains*, 2nd edn, Washington

Whimster, R 1981 *Burial practices in Iron Age Britain 700 BC- 43AD,* BAR British Series **90**