

**Channel Tunnel Rail Link
London and Continental Railways
Oxford Wessex Archaeology Joint Venture**

**Animal bone from White Horse Stone,
Aylesford, Kent
by Jennifer Kitch**

**CTRL Specialist Report Series
2006**

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1 INTRODUCTION

1.1 The site

As part of an extensive programme of archaeological investigations carried out in advance of the construction of the Channel Tunnel Rail Link (CTRL), Oxford Archaeology (formerly Oxford Archaeological Unit) was commissioned to undertake archaeological excavations at the White Horse Stone, Pilgrim's Way, and West of Boarley Farm, on the boundary between Boxley and Aylesford parishes, in Kent. The investigations were carried out between October 1998 and March 1999, under the project management of Rail Link Engineering, on behalf of Union Railways (South) Limited (a subsidiary of London and Continental Railways).

The excavations revealed evidence for human activity stretching back to the early Neolithic, and provided environmental evidence extending back into the late Glacial period. A dry valley within the sites contained a sequence of late Glacial solifluction deposits within which a redeposited soil, probably formed in the Allerød Interstadial, was found. No evidence of human activity was associated with this soil.

The remains of two early Neolithic, post-built, rectangular structures were found sealed below an Iron Age plough soil. Both were associated with very small assemblages of fragmented finds, including small Plain Bowl sherds, flint, animal bone, charred plant remains and charcoal. Radiocarbon dates suggest they date from 4110-3530 cal BC. Although some of the postholes associated with these structures cut tree-throw holes, there is little evidence for any preceding activity. Residual Decorated Bowl sherds suggest activity slightly later in the early Neolithic. Middle Neolithic activity is evidenced by finds of Mortlake-style Peterborough Ware from two small groups of shallow pits near to one of the early Neolithic structures. Two small, round, post- and stake-built structures probably date from the late Neolithic. They were associated with numerous groups of pits distributed widely across the sites. The pits contained varied assemblages consisting of Clacton-style Grooved Ware, worked flint, animal bones, charred plant remains, charcoal, fired clay, a polished ironstone ball and possibly cremated human remains. Activity in the late Neolithic-early Bronze Age is provided by residual Beaker sherds, and sherds of Collared Urn found in a tree-throw hole.

Several dispersed clusters of postholes and a ditch may date to the middle Bronze Age. However, the dating evidence is poor, and structures can be discerned in only two of the clusters. A number of small pits containing usually small deposits of cremated human remains have been dated to the late Bronze Age. A large assemblage of late Bronze Age pottery was also found in a large pit.

A settlement, characterised by numerous four-posters and pits, was occupied in the early-middle Iron Age. The pits around this settlement are characterised by differing kinds of finds, which include a cremation burial associated with a set of iron tools, iron working and production debris, human burials and disarticulated remains, as well as large quantities of pottery, animal bone and charred plant remains. In the late Iron Age-early Roman period a series of trackways was laid out across the site. The Rochester to Hastings road may also have run through the site.

Activity in the Anglo-Saxon period was evidenced by a late Saxon burial lying close to the Pilgrim's Way, and by animal burials, as well as other pits and postholes, at West of Boarley Farm. A section cut across the Pilgrim's Way shows that the trackway at this location was probably Anglo-Saxon or medieval in origin. A corn-drier, dating from the 12th-15th centuries, a hollow-way marking the parish boundary, and other features, provides the latest significant evidence for activity on the sites.

1.2 Method

Details of the animal bone recording method can be found in the CTRL Section 1 Post-excavation Project Design, Volume 2, Contractor's Method Statements (ADS 2006).

2 RESULTS

2.1 The animal bone

A total of 7332 (56561g) fragments of bone were recovered by hand from the excavations at White Horse Stone. A further 5398 (2769g) fragments were recovered from the sieved bulk samples. The excavation and watching brief fall within CTRL Project Area 420. Relevant Fieldwork Event codes are: ARC WHS98, ARC PIL98, ARC BFW98 and ARC 420+58 300.

Species Present and Quantification

Tables 1 - 4 summarise fragment numbers by phase for hand-collected and sieved material. Cattle remains are predominant within the assemblage, followed in dramatically smaller numbers by sheep/goat and pig and equid. A single goat burial has added a large number of goat remains to the assemblage. Domestic fowl, dog, red and roe deer are present within the assemblage represented by relatively small numbers of remains. Three fragments identified as aurochs have been recovered from the assemblage. Small numbers of amphibian and micro-mammal remains have been recovered from both the hand collected and sieved assemblages. These species include wood mouse, house mouse, field vole and mole. Five fragments of cod

bones were recovered from the hand collected assemblage and a fish otolith was recovered from the sieved assemblage.

The minimum number of individuals (MNI) for the hand-collected remains has been calculated for the phases with the larger identifiable assemblages. The calculated MNI support the noted abundance levels of the hand collected assemblage. Cattle are the predominant species within the assemblage for most phases, except for the middle Bronze Age phases, where sheep/goat are predominant. Sheep/goat are the second most frequent species (except for the middle Bronze Age phase) followed by pig and equid. The pig remains generally occur within the earlier phases, where as equids are more prominent in the later phases specifically the early/middle Iron Age and the middle/late Saxon phases.

Table 1: Number of fragments of each taxon from earlier prehistoric contexts, from the hand collected material, by phase

| Taxon | Pre-early Neolithic | Early Neolithic | Late Neolithic | Early Bronze Age | Middle Bronze Age | Middle Bronze Age? | Late Bronze Age | Late Bronze Age? | Total |
|--------------------|---------------------|-----------------|----------------|------------------|-------------------|--------------------|-----------------|------------------|-------------|
| Cattle | | | 827 | 1 | 9 | | | | 837 |
| Sheep/goat | | 1 | 4 | | 9 | 1 | 2 | 48 | 65 |
| Pig | | | 29 | | | | | | 29 |
| Dog | | | 2 | | 1 | | | | 3 |
| Aurochs | | | 1 | | | | | | 1 |
| Red deer | | | 2 | | | | 1 | | 3 |
| Roe deer | | | 1 | | | | | | 1 |
| Large mammal | 1 | | 327 | 13 | 37 | | 13 | | 391 |
| Medium mammal | | | 57 | 6 | 20 | 7 | 10 | 381 | 481 |
| Unidentified | | | 297 | | | | | | 297 |
| Grand Total | 1 | 1 | 1547 | 20 | 76 | 8 | 26 | 429 | 2108 |

Table 2: Number of fragments of each taxon from later prehistoric, Roman and Anglo-Saxon contexts, from the hand collected material, by phase

| Taxon | Pre-Iron Age? | Early/middle Iron Age | Early-middle Iron Age? | Iron Age? | Iron Age/Roman | Roman | Middle-late Saxon | Middle-late Saxon? | Total |
|------------|---------------|-----------------------|------------------------|-----------|----------------|-------|-------------------|--------------------|-------|
| Cattle | 3 | 115 | 2 | | 1 | | 205 | | 326 |
| Sheep/goat | | 112 | 11 | | | 1 | 35 | 7 | 166 |
| Sheep | | 3 | | | | | | | 3 |
| Goat | | | | | | | 83 | 3 | 86 |
| Pig | 3 | 60 | | | | 2 | 12 | | 77 |
| Dog | | 3 | | | | | | | 3 |
| Equid | | 13 | | | | 1 | 97 | | 111 |
| Red deer | | 11 | | | | | | | 11 |
| Roe deer | | 1 | | | | | | | 1 |
| Bird | | | | | | | 6 | | 6 |
| Fowl | | 2 | 11 | | | | 19 | | 32 |

| Taxon | Pre-Iron Age? | Early/middle Iron Age | Early-middle Iron Age? | Iron Age? | Iron Age/Roman | Roman | Middle-late Saxon | Middle-late Saxon? | Total |
|--------------------|---------------|-----------------------|------------------------|-----------|----------------|-----------|-------------------|--------------------|-------------|
| Field vole | | 3 | | | | | | | 3 |
| Vole | | 13 | | | | | 1 | | 14 |
| Rodent | | 6 | | | | | | | 6 |
| Amphibian | | 11 | | | | | | | 11 |
| Large mammal | | 299 | | 6 | | 13 | 291 | | 609 |
| Medium mammal | | 683 | 1 | | | 11 | 10 | | 705 |
| Micro mammal | | 7 | | | | | | | 7 |
| Unidentified | 8 | 111 | 105 | | 2 | | 1747 | | 1973 |
| Grand Total | 14 | 1453 | 130 | 6 | 3 | 28 | 2506 | 10 | 4150 |

Table 3: Number of fragments of each taxon from medieval and post-medieval contexts, from the hand collected material, by phase

| Taxon | Medieval | Medieval? | Medieval/post-medieval | Post-medieval? | Modern | Modern? | Unphased | Total |
|--------------------|-----------|-----------|------------------------|----------------|------------|----------|------------|-------------|
| Cattle | 1 | | | | 12 | | 298 | 311 |
| Sheep/goat | 7 | | | | 17 | | 2 | 26 |
| Pig | | | | | | | 36 | 36 |
| Equid | 2 | | | | 3 | 1 | | 6 |
| Auroch | | | | | | | 2 | 2 |
| Red deer | | | | | 1 | | 10 | 11 |
| Roe deer | | | | | | | 1 | 1 |
| Bird | 1 | | | | | | | 1 |
| Large mammal | | | | | 10 | 1 | 113 | 124 |
| Medium mammal | 2 | 1 | | | 1 | | 144 | 148 |
| Unidentified | 45 | | 1 | 1 | 105 | | 251 | 403 |
| Grand Total | 58 | 1 | 1 | 1 | 149 | 2 | 857 | 1069 |

Table 4: Number of fragments of each taxon from the sieved material, by phase

| Taxon | Early Neolithic | Early Neolithic ? | Late Neolithic | Early Bronze Age | Middle Bronze Age | Late Bronze Age | Early/Middle Iron Age | Roman | Unphased | Total |
|------------|-----------------|-------------------|----------------|------------------|-------------------|-----------------|-----------------------|-------|----------|-------|
| Cattle | | | 19 | | | | 15 | | | 34 |
| Sheep/goat | | 1 | 2 | | | 1 | 90 | 1 | 386 | 481 |
| Pig | | | 26 | 1 | | | 91 | | 9 | 127 |
| Red deer | | | | | | | 1 | 1 | 1 | 3 |
| Roe deer | | | 4 | | | | 1 | | | 5 |
| Deer | | | | | | | 4 | | | 4 |
| Amphibian | | | | | | | 96 | | | 96 |
| Mole | | | | | | 2 | 2 | | | 4 |

| Taxon | Early Neolithic | Early Neolithic ? | Late Neolithic | Early Bronze Age | Middle Bronze Age | Late Bronze Age | Early/Middle Iron Age | Roman | Unphased | Total |
|--------------------|-----------------|-------------------|----------------|------------------|-------------------|-----------------|-----------------------|----------|------------|-------------|
| Bird | | | 1 | | | | 2 | | | 3 |
| Warbler | | | | | | | 1 | | | 1 |
| Field vole | | | | | | | 13 | | | 13 |
| Bank vole | | | | | | | 6 | | | 6 |
| Vole | | | | | | | 11 | | | 11 |
| House mouse | | | | | | | 5 | | | 5 |
| Wood mouse | | | 1 | | | | 2 | | | 3 |
| Mouse | | | | | | | 19 | | 1 | 20 |
| Large mammal | | | 11 | | | | 11 | | 3 | 25 |
| Medium mammal | | | 10 | | | | 53 | | | 63 |
| Small mammal | | | 5 | | | | 4 | | | 9 |
| Micro Mammal | 3 | | 1 | | | 1 | 102 | 1 | | 108 |
| Unidentified | 32 | 13 | 1029 | 64 | 279 | 10 | 2641 | 3 | 305 | 4376 |
| Grand total | 35 | 14 | 1109 | 65 | 279 | 14 | 3170 | 6 | 705 | 5397 |

Table 5: Minimum Number of Individuals, from the hand collected assemblage

| Species | Late Neolithic | Middle Bronze Age | Early/middle Iron Age | Late Iron Age/middle Saxon | Middle/late Saxon | Medieval | Modern |
|------------|----------------|-------------------|-----------------------|----------------------------|-------------------|----------|--------|
| Cattle | 4 | 1 | 5 | 1 | 2 | 1 | 1 |
| Sheep/goat | 2 | 2 | 4 | 1 | 1 | 1 | 1 |
| Pig | 1 | 0 | 3 | 1 | 0 | 0 | 0 |
| Equid | 0 | 0 | 2 | 0 | 2 | 1 | 1 |

2.2 Preservation and Alteration

Condition

Table 6 summarises the condition ranges within the hand collected and sieved assemblages. The condition of the bone within both assemblages is quite variable, ranging from grade 1 to grade 5 on the Lyman criteria (where 1 is pristine, 5 is just recognisable). The majority of the bone from the hand collected assemblage falls within grades 2-4, good to moderate condition and the majority of the bone from the sieved assemblage is in a slightly poorer state falling within grades 3-4, moderate to poor.

Table 6: Condition of the hand collected and sieved bone assemblages

| Condition grade (Lyman 1996) | Percentage of hand collected Assemblage | Percentage of sieved assemblage |
|---------------------------------|---|---------------------------------|
| 1 | 6% | 9% |
| 2 | 38% | 7% |
| 3 | 16% | 28% |
| 4 | 37% | 39% |
| 5 | 3% | 17% |
| Total | 100% | 100% |

Much of the bone condition has been worsened by extensive chemical etching from rootlet growth. The rootlet etching limits the number of observable butchery and pathology evidence within the assemblage.

Burning

A total of 283 fragments of burnt bone were recovered from the hand collected assemblage. A further 511 fragments of burnt bone were recovered from the sieved assemblage. Of the burnt hand collected assemblage 82% of the bones are identifiable to species or size category. From the burnt sieved assemblage only 11% was identifiable to species or size category.

From the identifiable remains from the burnt hand collected assemblage a cattle calcaneus was recovered from late Neolithic pit [7024]. From the Early/Middle Iron Age phase a cattle metatarsal was recovered from pit [2107], a burnt cattle tooth from pit [2260], and a cattle femur from pit [6110]. From early/middle Iron Age pit burial [2184] a burnt sheep/goat axis and a pig astragalus was recovered. From early/middle Iron Age phase pits [4507] and [6101] a burnt sheep/goat metatarsal and a tooth were recovered. A fragment of burnt red deer antler was recovered from early/middle Iron Age pit [7011].

A highly burnt worked bone pin was recovered in a highly fragmented state from a Late Neolithic or Roman cremation deposit [119].

The sieved burnt assemblage consists predominantly of unidentifiable fragments. 56 of the burnt unidentifiable fragments are from the early- late Neolithic from the Neolithic house and associated pit features.

A burnt pig tooth was recovered from a late Neolithic tree throw [5125] containing fragments of a food vessel. From early/middle Iron Age pits [2155], [4507] and [6110] a burnt sheep/goat carpal/tarsal, tibia and third phalanx were recovered. A fragmentary piece of burnt/cremated deer antler was recovered from token cremation deposit [6132], one fragment of antler had potentially been hollowed out in the centre.

Butchery

A total of 38 fragments of butchered bone were recovered from the hand collected assemblage. A single butchered large mammal vertebra was recovered from the sieved assemblage.

A total of 8 fragments from the hand collected butchered assemblage is from the modern pit [1057]. Although this pit contains finds spanning the Iron Age to the post-medieval or modern period, much of the animal bone is likely to be residual from Anglo-Saxon deposits. The majority of the bone from this one feature had been chopped though possibly as part of the jointing process and a cattle and an equid metapodial from the same feature had been split longitudinally possibly for marrow extraction or preparation for bone working.

From Late Iron Age-Middle/Late Saxon pit [1146] a cattle radius and axis were recovered, both were split possibly as part of the disarticulation process.

A cattle atlas from late Neolithic pit [4994] displayed evidence of head removal cut marks.

Thirteen fragments of butchered bone were recovered from the early/middle Iron Age phase. A sheep horncore from pit [2227] displayed evidence of horn removal cut marks, which suggests horn working may have taken place on site. Two large mammal ribs and a medium mammal rib fragment from pits [2214] and [2155] displayed evidence of meat removal cut marks. A large mammal innominate from posthole [2393] and cattle innominate from pit [2171] displayed evidence of disarticulation cut marks. The remaining butchered bones from this assemblage are all recovered from pit assemblages and display evidence of disarticulation chop marks. 10 fragments of unphased bone displays evidence of butchery. From late Neolithic cremation [952] two cattle metatarsals, a cattle tibia, an aurochs tibia and a pig humerus have all been chopped mid-shaft, possibly as part of the jointing process. Two cattle radii and a metatarsal from late Neolithic tree-throws [861] and [909] display evidence of being chopped through the midshaft possibly as part of the disarticulation/jointing process. A cattle innominate from unphased pit [859], and a pig ulna from late Neolithic tree throw [909] have been chopped through possibly as part of the disarticulation/jointing process.

Worked Bone

The worked bone recovered from the White Horse Stone assemblage is primarily in the form of antler. The exception to this is a cremated/burnt fragmentary bone pin from late Neolithic or Roman cremation [119], made from an unidentifiable long bone fragment worked and polished into a pin.

A Single red deer antler tine from early/middle Iron Age pit [2260] has been chopped through and polished. From the modern pit [1057] a red deer antler tine was recovered displaying evidence of being chopped and polished.

From the sieved assemblage fragments of red and roe deer antler that had been sawn through in preparation for working, were recovered from the early/middle Iron Age pit [7009]. Another fragment of sawn red deer antler was recovered from roman ditch [2012].

Gnawing

A total of 24 fragments of bone from the hand collected assemblage displayed evidence of gnawing. A further 6 fragments displaying gnawing marks were recovered from the sieved assemblage. From the hand collected assemblage all of the gnawed remains are from the early/middle Iron Age phase. A large mammal sized bone fragment from pit [8068] displays evidence of rodent gnawing. 21 fragments of medium mammal sized bone from the same feature displayed evidence of carnivore gnawing. A sheep/goat radius and an unidentified humerus from pits [2119] and [7009] displayed evidence of carnivore gnawing.

From the sieved assemblage a sheep/goat radius and a medium mammal vertebra displaying carnivore gnawing were recovered from the early/middle Iron Age pits [2155] and [8068]. A single cattle phalanx displaying carnivore gnawing was recovered from late Neolithic pit [7024]. Late Neolithic pit [4994] contained a juvenile metapodial, humerus and 2nd phalanx displaying evidence of carnivore gnawing.

Early Neolithic

A single cattle tooth was recovered from posthole [4902] from the early Neolithic house structure. A further 19 fragments of unidentifiable burnt bone was recovered from the sieved assemblages of 9 of the postholes from the early Neolithic house structure. A total of 13 unburnt unidentifiable fragments were recovered from postholes [4817], [4886], [5294] and [5280] or the same feature.

Late Neolithic

Cattle

Cattle are the most abundant species recovered from this phase. A large number of primarily juvenile cattle remains were recovered from Grooved Ware pits and a utilised tree throw.

Most skeletal elements are represented within the assemblage suggesting that the entire carcass was initially present of site.

A metacarpal from late Neolithic pit [4994] gave withers height of 1.16m. A metatarsal from the late Neolithic pit [4994] displayed new bone formation on the midshaft. The new

growth is possible periostitis, ossification of the periosteum membrane as a result of trauma or disease.

A number of unfused cattle bones were recovered from the late Neolithic pit [4994]; 4 metatarsal from animals aged below 24-36 months, A humerus from an animal aged below 42-48 months, 4 tibiae from animals aged below 24-30 months, a femur from an animal aged below 42 months, 4 first phalanges and 5 second phalanges from animals aged below 18-24 months and two calcanei from animals aged below 36 months.

Additionally within the late Neolithic phase a tibia from an animal aged below 24-30 months was recovered from pit [5094].

A predominance of juvenile cattle within the assemblage may suggest a dairy base economy.

Pig

Pig remains are the most abundant identified remains after cattle. The numbers of remains are greatly increased by the number of loose teeth within the assemblage. Most skeletal elements are represented within the assemblage, suggesting the entire carcass was present on site.

A total of three mandibles were age scorable from this phase. A pair of mandibles from a sub adult animal was recovered from late Neolithic pit [911]. From the sieved assemblage of late Neolithic pit [4965] a mandible from an immature animal was also recovered. Where possible to assess, all of fusion ageing evidence from the post-cranial bones is from juvenile animals. A pair of radii from an animal aged below 12 months was recovered from pit late Neolithic pit [904] and a calcaneus from an animal aged below 24 months was recovered from pit [5072].

As pigs generally produce large litters of young and produce little in the form of secondary products, they are often slaughtered young for meat production.

Sheep/Goat

Very few sheep/goat remains were recovered from this phase.

From the late Neolithic pit [4994] a tibia from an animal aged below 15-24 months and a humerus from an animal aged below 36-42 months was recovered.

Dog

A single dog mandible and a humerus were recovered from late Neolithic pits [4994] and [911].

Aurochs

An aurochs vertebra was recovered from the late Neolithic pit [958]. From late Neolithic pit [911] a large cattle ulna was recovered, which could be aurochs. Aurochs are a wild species, suggesting that hunting occasionally took place.

Red and Roe Deer

Red deer is represented within this phase as antler. From late Neolithic pit [5094] a fragmentary full antler was recovered and a fragment was recovered from pit [958]. No evidence that the antler was shed was noted from either feature. As antler is shed seasonally, it possible that these antlers may have been found and carried to the site, rather than being evidence of hunting.

Roe deer remains from this phase are represented by four deciduous upper premolars from the sieved deposits of pit [4994]. No further evidence of roe deer was noted within the assemblage; however, as the teeth were from a juvenile individual it is possible that poor preservation has caused a bias in the identifiable remains. The presence of these remains however does suggest that a suitable habitat of uncultivated area such as woodland or scrub was within the local area.

This lot to be added to LN section

Pit [7000] contained a modest number of animal bones, dominated by loose pig teeth. The number of identified teeth suggests that an entire skull may have been present within the assemblage, but poor preservation has left only the teeth.

A single sheep/goat femur, cattle mandible, humerus and several bone fragments unidentifiable to species accompany the pig remains.

Utilised tree throw [861] contained a total of 10 fragments of red deer antler; one beam fragment was from a shed antler. No evidence of working was noted. A single fragment of roe deer antler was also present within the assemblage; no evidence of working was noted.

A pig humerus from an animal aged below 12 months, a calcaneus and a fragment of mandible were recovered within the assemblage.

The remaining assemblage consists predominantly of cattle remains. The remains represent most skeletal elements including a fragmentary skull. A mandible from an adult animal and a radius were noted to be potentially from aurochs.

Cremation [952] contained an aurochs femur and tibia, which had been chopped through the midshaft. Three pig humeri, MNI two individuals, also accompany the assemblage. A total of 15 fragments of cattle remains, including a mandible from an adult individual complete the

assemblage. The skeletal element representation suggests that the entire carcass be have initially present on site.

Middle Bronze Age

Cattle

The cattle remains from this phase are predominately recovered from ditch group [4025], and consist mainly of loose teeth. A single tooth was recovered from pit [7069].

From ditch group [4025], a fragment of cattle skull, a series of loose teeth, with no evidence of association, a metatarsal and a humerus fragment were recovered. Measurements of the metatarsal from Middle Bronze Age ditch group [4025] gave a withers height of 1.11m.

The elements represented were from skeletally mature individuals.

Sheep/Goat

A small assemblage of sheep/goat bones was recovered from this phase, predominantly loose teeth. Three loose teeth, two metapodials and a vertebra were recovered from the Middle Bronze Age ditch group [4025]. Further loose teeth were recovered from middle-late Bronze Age pits [7021] and [7069]. Little further information can be gained save the presence of the species.

Articulated Sheep Skeleton [5454]

A fairly complete articulated skeleton was recovered from a middle Bronze Age pit [5454]. The mandibles of the animal gave an age of 10-20 months. The epiphyseal fusion ages the animal to between 30-42 months. As epiphyseal fusion is often effected by nutritional and health factors, the tooth wear/eruption data is probably closer to the correct age. No evidence of butchery or pathology was noted.

Dog

A single dog skull was recovered from the Middle Bronze Age ditch [4025].

Late Bronze Age

The majority of the late Bronze Age assemblage was recovered from pit [5421]. A fragment of sheep/goat femur fragment and a mandible from an animal aged 3-10 months was recovered. Along with a fragment of shed red deer antler and several unidentified large mammal sized long bone fragments. Two fragments identified as mole were recovered from the sieved assemblage of the pit, these are possibly intrusive. Little further information can be gained save the presence of the species.

Early/Middle Iron Age

Cattle

Cattle were the most abundant species within the early/middle Iron Age assemblage. Most skeletal elements are represented within the assemblage, however, 32% of the cattle assemblage for this phase is from loose teeth.

A single mandible was scorable for tooth wear ageing; a mandible from a senile animal was recovered from [2214]. The fusion data is limited. Where it is possible to assess most of the skeletal elements appear to be from skeletally mature individuals. From the early/middle Iron Age pits [2107], [2171], [8068], [4430], [6110] and posthole [7019], three femurs from animals aged below 42 months, a radius and tibia from animals also aged below 42 months and two metapodials from animals aged below 24 months was recovered.

A metatarsal from the early/middle Iron Age pit [4467] displayed new bone formation on the midshaft. The new growth is possible periostitis, ossification of the periosteum membrane as a result of trauma or disease.

A predominance of skeletally mature animals within the assemblage, especially the presence of a much older individual would suggest an emphasis on dairy and traction rather than just meat production. The presence of several young individuals within the assemblage also suggests an emphasis on dairying.

Sheep/Goat

Sheep/goat are almost as abundant within the assemblage as cattle. Three fragments from this phase, have been positively identified as sheep, no goat remains were identified.

A large number of sheep/goat remains are present within the sieved assemblage for this phase, 66% of which are of loose teeth. Most skeletal elements are represented within the assemblage suggesting the entire carcass was present on site.

There is not enough age data to provide a formal age at death profile. A total 7 mandibles were able to provide an age score. A mandible from an animal age 1-3 months was recovered from pit [2260]; a mandible from an animal aged 3-10 months was recovered from pit [8037]. A mandible from an animal aged 3-5 years was recovered from pit [2339] and two mandibles from animals aged 5-8 years were recovered from pits [4507] and [4511]. From possible early/middle Iron Age pit [14] a mandible from an animal aged 20-34 months and a mandible from an animal aged 5-8 years was recovered.

Epiphyseal fusion data provides a little additional ageing information. A second phalanx from an animal aged below 6 months was recovered from posthole [2278]. A radius from an animal aged below 3 months was recovered from pit [4441]. A tibia from an animal aged

below 15 months was recovered from pit [6110] a femur from an animal aged below 36 months was recovered from pit [6101] and a calcaneus from an animal aged below 30 months was recovered from pit [8037].

There is a range of ages represented within the assemblage. The presence of very young animals suggests that lambing takes place locally. A mix of juvenile and adult remains suggests a mixed husbandry practice emphasising on meat, wool and possible dairy production.

Equid

The equid remains are scattered as solitary fragments throughout the early/middle Iron Age pits [2155], [2254], [2339], [4706], [4295], [4350], [4477], [4385], [8068], [7011], and [8012]. A fragmentary skull was recovered from pit [4350]. An equid femur from pit [4385] was chopped consistent with disarticulation.

Pig

Pig remains are much less abundant within the assemblage than sheep/goat or cattle. Loose teeth represent 50% of the remains from the hand collected assemblage. 85% of the pig remains from the sieved remains are from loose teeth. The large number of loose teeth artificially inflates the number of identified pig remains within the assemblage. The number of loose teeth is probably a resultant factor of poor preservation.

A very limited amount of ageing data was available. A total of four mandibles were able to provide a tooth wear age score. Mandibles from two sub adults and a mandible from an adult individual were recovered from early/middle Iron Age pits [2280], [4055] and [8068]. From the sieved assemblage of early/middle Iron Age pit [4067] a mandible an immature individual was recovered. The epiphyseal fusion scoring provides limited further age data. From the early/middle Iron Age phase a scapula and a humerus from animals aged below 12 months were recovered from pits [4430] and [8012]. From the same phase an ulna from an animal aged below 36 months was recovered from pit [4120].

The identified pig remains appear to be generally from young individuals, which may suggest the low number of pig bones is due to preservational factors. The presence of both juvenile and adult bones suggests the rearing of pigs for meat with a few adults retained for breeding.

Dog

From the early/middle Iron Age phase, a mandible, a metapodial and a humerus were recovered from pits [2119], [2214] and [6110].

Fowl

A domestic fowl femur was recovered from the early/middle Iron Age phase pit [4067]. This bone has been radiocarbon dated to 770-390 cal BC (NZA-22045 2429±55 BP). It thus seems to be amongst the earliest well-dated domestic fowl bones in Britain. Domestic fowl is known from a number of other settlements of similar date (eg Winklebury Camp, Hants, Smith 1977, 64 and Yarnton, Oxon, Hey forthcoming; Coy and Maltby 1987, 228),

Birds

In addition to the domestic fowl remains a further 3 fragments of bird bone were recovered from the sieved assemblage from the early/middle Iron Age phase. Two fragments from pit [2227] could not be identified further to species. A single fragment from a bird of the warbler family was recovered from pit [6110].

Deer

Wild species are predominantly represented by red and roe deer antler fragments. Only two post-cranial bones were recovered from the assemblage. A red deer tibia was recovered from early/middle Iron Age pit [2339] and a femur from pit [2119].

The early/late Iron Age phase produced the most deer remains. From pit [2260] a fragment of possibly shed red deer antler beam was recovered along with an antler tine that had been chopped and polished. A fragmentary shed roe deer antler was recovered from pit [4612] and an antler tine was recovered from pit [8037], no evidence of working was noted. 6 fragments of burnt red deer antler were recovered from pit [7011]. A fragment of red deer antler fragment was recovered from the sieved assemblage of pit [7009] along with a fragment of roe deer antler.

Four fragments of highly burnt antler, only identifiable as deer, were recovered from pit [6132]. One of the pieces appears to have been hollowed, possibly as some form of handle.

The presence of red and roe deer within the assemblage suggest that uncultivated areas suitable for sustaining deer are within the locality. Also the presence of postcranial bones and shed antlers suggests that antler was often collected for working, but the deer were only occasionally hunted to contribute to diet.

Mole

Two fragments identified as mole were recovered from the sieved assemblage from early/middle Iron Age pit [6126]. Little further information can be gained save the presence of the species. However, due to the burrowing nature of these animals the presence of these remains may be intrusive.

Micro Mammals and Amphibians

A total of 29 fragments of micro mammal remains were recovered from the hand collected assemblage from the early/middle Iron Age phase. Additionally a further 158 fragments were recovered from the sieved assemblage. 76% of the hand collected assemblage and 33% of the sieved assemblage were identifiable further to taxon. Represented within the assemblage are field vole, bank vole, house mouse and wood mouse, all consistent with a semi-rural domestic settlement. All of the remains were recovered from pit assemblages possibly as 'pit fall', which may suggest that the pits were left open for a period of time. However, due to the burrowing nature of these species it is possible that these taxa could be intrusive into the assemblage.

A total of 11 amphibian remains were recovered from the hand collected assemblage from the early/middle Iron Age phase. A further 96 fragments were recovered from the sieved assemblage. The remains of a single frog/toad were recovered from the pit burial [2184]. Further remains of amphibians were all recovered from pit deposits most notably pit [2107] which contained a minimum of 3 individuals and pit [2155], which contained the remains of a single individual. As with the micro mammal remains, the presence of these species may suggest that these features were open for a length of time. Again however, it must be noted that these amphibians may also be intrusive.

Early/Middle Iron Age Pit Burial [8012]

A burial pit from the early/middle Iron Age phase of the site contained the placed remains of a young human male. Within the skull of the individual several vole remains were recovered. Further to these remains a small assemblage of sheep/goat, equid and pig bones. The remains of the domestic species do not appear to be anything more than a few fragments of butchery and food waste, and were not deliberately placed grave goods. The presence of the micro mammals may suggest that the burial was left open, allowing 'pit fall' or be intrusive from later burrowing.

Early/Middle Iron Age Pit Burial [2184]

Pit [2184] from the early/middle Iron Age phase contained placed human remains. Accompanying these remains within the pit is an assemblage of fragments unidentifiable beyond size category, and a small assemblage of sheep/goat, cattle and pig remains, predominantly loose teeth. These bones are not significantly different from those occurring in other pits in this area of the site, and do not seem to have been deposited as grave goods. The remains of a single frog/toad were recovered from the pit deposits. A series of micro mammals were recovered from the sieved assemblage including mouse and field vole. The presence of these species within the assemblage may suggest that the feature was left open for

a length of time. They are all burrowing species and therefore may have burrowed into the feature.

Early/Middle Iron Age Pit Burial [2339]

Pit burial [2339] contained a very small assemblage of a sheep/goat mandible, sheep/goat, cattle and equid loose teeth, a fragment of red deer tibia chopped through the midshaft, and several fragments unidentifiable beyond size category. They seem to have been stray, incidentally incorporated fragments of bone rather than deliberately deposited grave goods. Little further information can be gained save the presence of the species.

Roman

Pig

A pig humerus was recovered from ditch group [2463] and an ulna was recovered from ditch group [4454].

Sheep/Goat

A single sheep/goat mandible from an animal aged 10-20 months was recovered from roman ditch [2161].

Equid

A single equid first phalanx was recovered from ditch group [2423].

All of these bone fragments may well be residual from the early-middle Iron Age settlement.

Middle/Late Saxon

Cattle

Cattle are the most abundant species within this phase, however 95% of the cattle assemblage is recovered from a single articulated cattle burial [1036], discussed separately below. Therefore the abundance of cattle remains may not provide an accurate representation of husbandry practices.

Removing the cattle burial, a total of 10 fragments identified as cattle were recovered from this phase. Where possible to assess all of the remains appear to be from skeletally mature individuals. No tooth wear ageing data was recovered.

Middle/Late Saxon Cattle Burial [1036]

A complete cattle skeleton was recovered from the Boarley Farm area of the White Horse Stone excavation. Tooth wear evidence from the mandibular teeth suggests the animal is an

adult, the epiphyseal fusion for the animal suggests an age of approximately 3.5 years. The measurements of the intact long bones gave a withers height of 1.08-1.1m. No evidence of butchery or pathology was noted on any of the remains.

Sheep/Goat

A total of 42 fragments identified as sheep/goat were recovered from this phase and possible middle/late Saxon phase features. A series of lower limb bones and phalanges were recovered from the cattle burial pit [1036], although appear to be separate from the deposit of lower goat limbs discussed below. A mandible and maxilla were also recovered from the same feature. A further mandible, 4 metapodials and a phalanx were recovered from possible middle/late Saxon pit [1038]. Skull fragments and a mandible were recovered from pit [1146]. A single phalanx was recovered from pit [1061], two loose teeth were recovered from pit [1040] and a single mandible was recovered from pit [1142]. As can be seen from the descriptions above, the assemblage is dominated by skull and lower limb elements. This suggests the area was used for a specific activity, possibly a primary butchery site or activities such as leather preparation.

A very limited amount of ageing information is available. Only two mandibles were available to provide tooth wear ageing. A mandible from an animal aged 20-34 months was recovered from pit [1038] and a mandible from an animal aged 10-20 months was recovered from pit [1142]. The fusion data provides only a limited amount of further information. Three metatarsals from pit [1038] were from animals below 18 months old and two first phalanges from animals aged below 6 months were recovered from pit [1036]. The remaining skeletal elements where possible to assess, are all from skeletally mature individuals. The limited age ranges represented within the assemblage suggest sheep/goats were primarily raised for meat and wool.

Goat

A total of 83 fragments have been positively identified as goat, 80 of which belong to a burial of partially articulated lower goat limbs and horncores [1040]. A goat metacarpal, metacarpal and a horncore were recovered from possible middle/late Anglo-Saxon pit [1038].

Withers heights can be calculated from several bones. A goat metatarsal from possible middle/late Anglo-Saxon pit deposit [1038] gave withers height of 0.59m

Middle/Late Saxon Goat Feet From Pit [1040]

A deposit of partially articulated lower goat limbs and two horncores were positioned to the right of the forelimb of the cattle burial [1036]. The deposit contains a MNI of 4 individuals. All, but one individual, are skeletally mature. The fusion evidence suggests that

at least one individual is below the age of 9 months. There was no evidence of butchery noted.

Deposits of lower limbs and horncores are regularly associated with skinning and tanning processes (Serjeantson, 1989; Sykes. In Prep), especially in later periods such as the medieval and post medieval. Goatskin in particular was used for parchment, bookbinding and gloves (Serjeantson, 1989:129). However, it is possible that these remains could also represent a deposit of primary butchery waste.

Pig

The identified pig remains from this phase are very limited. From middle/late Saxon pit [1146] a radius from a neonatal animal was recovered, along with a fragment of juvenile animal. A partial neonatal animal was recovered from the middle/late Saxon pit [1040], discussed below.

Middle/Late Saxon Pig Burial [1040]

A partial neonatal pig was recovered from the Boarley farm area of excavation. The remains consisted of a pair of femora, a pair of humeri, a left ulna and a metapodial. It is possible, due to the porous nature of neonatal bone; it is likely that more of the animal was present at deposition and has not survived. No evidence of butchery, gnawing or pathology was noted on any of the bones.

Equid

The equid remains from this phase are represented by a burial of an articulated skeleton and a partial skeleton; both are discussed separately below.

Middle/Late Saxon Equid Burial [1061]

A fully articulated equid burial was recovered from the Boarley farm area of excavation. All of the skeletal elements were fused measurements from the upper premolar gives an age of 9-11.25 years. From the pelvis and the lack of canines the sex of the animal was established as female. No evidence of butchery or pathology was noted on the skeleton.

Middle/Late Saxon Partial Equid Burial [1004]

A partial disturbed burial of a young equid was recovered from the Boarley farm area of the excavation.

The burial consisted of a maxilla, a pair of mandibles, a pair of radii and a broken pair of humeri.

From the pair of mandibles the age of the animal is estimated at 7-12 month from the eruption of the first molar. The pair of humeri and a radius is unfused giving an age of below 15 months. The presence of a young individual within the assemblage may suggest that horse rearing may have taken place on or near site.

Fowl

A total of 19 fragments of domestic fowl remains were recovered from this phase. A single ulna was recovered from pit [1036]. The remaining assemblage was recovered from pit [1146]. All of the remains from pit [1146] were from very young individuals suggesting that breeding possibly took place on site, all through due to the size of the birds portability needs to be taken into account. Domestic fowl would have been kept as a ready source of meat and eggs.

Medieval

Cattle

A single cattle metatarsal was recovered from the medieval corndrier [390].

Sheep/goat

A total of 7 fragments of sheep/goat remains were recovered from the medieval phase. A single mandible from an animal aged 3-10 months was recovered from medieval corndrier [390], a humerus and a tibia fragment was recovered from the same feature. Three loose teeth were recovered from the medieval quarry [423] and hollow way [472], along with a single humerus fragment.

Equid

Two fragments of equid remains were recovered from the medieval corndrier [390]. A fragment of maxilla and a first phalanx.

Modern

The entire modern phase assemblage was recovered from pit [1057]. This pit contained finds ranging in date from the Iron Age to the post-medieval or modern period. Much of the bone, however, is likely to be residual from Anglo-Saxon features, one of which was cut by this pit.

Cattle

A total of 12 cattle remains were recovered from this phase. Three bone fragments display evidence of butchery consistent with disarticulation. Where possible to assess all of the remains appear to be from skeletally mature individuals.

Sheep/Goat

A total of 17 fragments of sheep/goat remains were recovered from this phase. No differentiations between species were noted within the assemblage. One fragment displayed evidence of disarticulation cut marks. Two mandibles were recovered from the assemblages that were able to provide an age score. A mandible from an animal aged 20-34 months and a mandible from an animal aged 5-8 years was recovered from pit [1057].

Equid

A fragment of skull, a second phalanx and a metapodial displaying evidence of being split and chopped was recovered from pit [1057]. Although equid were primarily retained for traction and riding, it was not unusual for equids to be processed for meat after death.

Red Deer

A single fragment of red deer tine was recovered from the modern pit [1057]. The antler displayed evidence of working. There is no evidence to suggest that the antler was shed.

Site Interpretation

The site of White Horse Stone is very dynamic with a long period of activity taking place. In the terms of the animal bone assemblages there are three main periods of activity, Late Neolithic, Early/Middle Iron Age and the Middle/Late Saxon phase. The assemblages from the remaining phases provide little further information save the presence of the species. The faunal assemblages from these three main phases suggest changes in husbandry practices take place throughout the occupation of the site. Cattle are predominant within the late Neolithic phase, and then are replaced with sheep/goat as the dominant species during the early/middle Iron Age phases. Then during the middle/late Saxon phase cattle are again the dominant species. Pigs are present within the early phases in modest numbers. Equids are present also in modest numbers throughout most phases.

The diminishing numbers of pig within the assemblage may be purely preservational, due to the tendency to slaughter the animal at a fairly young age when the bone are less like to survive. However, this may be an indication of the removal suitable woodland grazing for pigs in exchange for more cultivated lands more suitable for crops and larger species, such as cattle and equids.

The White Horse Stone assemblages seem to represent a producer site economy. Animals are primarily raised and utilised on site. The utilisation of animal appears to remain fairly constant throughout phases of activity.

Cattle are generally retained for dairy and traction as well as meat, leather and horn. Sheep/goat retained for wool, leather, horn, milk and meat. Pigs generally slaughtered young as a provision of meat. Equids retain for traction, riding and meat.

The late Neolithic assemblage provides a slightly skewed picture of the utilisation of animal from that phase, due the nature of the deposit. The remains are recovered from Grooved Ware vessel pits and utilised tree throws, which are often accompanied with assemblages of cattle and pig remains (Thomas 1991). The potential special nature of these few deposits may limit the amount of information on the husbandry practices.

Dog remains are present in many of the phases of activity. Dogs would have been present as working animals, guarding, hunting and herding or as scavengers.

Domestic fowl are present within the early/middle Iron Age phase and the middle/late Saxon phases. Domestic fowl were often retained as a ready source of meat, eggs and feathers.

Wild animals are occasionally present within the assemblage. In the late Neolithic and some of the unphased features the presence of aurochs suggest that hunting of these animals took place. Red and Roe deer antler are present in most phases, some with evidence of working. Post cranial bones from red deer in the early/middle Iron Age phase suggest that these animals were hunted as well as their antler collected. The presence of these wild species within the assemblage suggests that there was a suitable habitat within the locality of the site.

Micro mammals and amphibians are present within varying amounts throughout the assemblage, most noticeably within the early/middle Iron Age phase. The predominance of the species within this phase suggests that the features would often be left open for a time allowing for 'pit-fall'. Purposeful collection of these animals either for special placement or deposit after pest control cannot be ruled out. The intrusive nature of these animals must be taken into account also. The micro species represented are typical of a semi-rural environment.

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