

## Chapter 10: Environmental Evidence from Hill Farm

### HUMAN REMAINS

by *Peter Hacking and Ceridwen Boston*

#### Introduction

The human bone discovered during excavations at Hill Farm, Little Wittenham, comprises a near complete inhumation (320) laid out within a sub-rectangular grave; the near complete frontal bone of an adult placed within a middle Iron Age pit; and three fragments of an adult occipital bone found unstratified in spoil from the foundations of a modern garage. These were osteologically analysed by Dr Peter Hacking.

#### Osteological methodology

Adults were aged by dental attrition (Miles 1962) and ectocranial suture closure (Meindl and Lovejoy 1985). The osteological sex of adults was determined from morphology of the skull and pelvis (Ferembach *et al.* 1980; Buikstra and Ubelaker 1994). The above methodology complies with the guidelines for the recording of human remains set out by BABAO and the Institute of Field Archaeologists (Brickley and McKinley 2004).

#### Provenance

One articulated skeleton (320) was discovered within a sub-rectangular grave (333), which truncated the fills of two ditches, clearly post-dating them. No grave goods were recovered, but relative stratigraphy and burial practices suggest a Roman date for this skeleton. The skeleton was orientated north-east - south-west, and had been laid out on his left side, with the head facing the south east. The legs were loosely flexed and both arms were extended in front of the torso. There was no evidence of iron nails or staining of the grave fill to suggest the presence of a coffin. There were no grave goods present.

Two contexts contained disarticulated human skull. The near complete frontal bone of skull 319 had been placed on the base of middle Iron Age pit (149), and overlaid by a primary fill of degraded greenstone and clay (176). It appears that the pit was then deliberately backfilled. Three fragments of the same occipital bone (SF 1) were retrieved from the spoil from garage foundations, and cannot be associated with a specific feature.

#### Preservation and completeness

Bone preservation in skeleton 320 was poor, with bone survival limited to the most dense bone of the skull, diaphyses of long bone shafts and the right acetabulum. Elements composed principally of trabecular bone were very poorly preserved,

although fragments of the left ilium and the bodies of all the cervical vertebrae and T1 and 2 had survived. The extant bone was very fragmented, and in addition to the destruction of the epiphyses of all long bones, stature estimation was not possible on this skeleton.

The frontal bone of the skull (391) was near complete, missing only small portions of the orbital plates. The bone was well preserved, with the outer table intact bar a small area of erosion on posterior aspect of the left side. The cranial sutures were unfused and the bone had been detached along this natural division (probably when the skull was in a skeletonised state).

The occipital bone (SF1) had broken post-mortem into three fragments and was assembled later. The bone was in good condition.

### **Assemblage composition**

The assemblage comprised one articulated skeleton (320), a complete frontal bone (319) and fragments of occipital bone (SF 1), representing the remains of three adult individuals. The severe dental attrition of the 1st and 2nd molars of skeleton 320 indicates a mature adult, approximately 40 years old. The 3rd molars are relatively unworn, which may suggest a younger adult, but this is more probably due to delayed eruption of these teeth (the age of eruption being subject to considerable individual variation). Although few sexually diagnostic traits had survived on skeleton 320, the prominence of the mastoid processes and the external occipital protuberance suggests a possible male individual. No pelvic features are available for sexing and the diameter of the right femoral head (45 mm) is unhelpful in the metrical determination of sex.

Skull 319 was of adult size. The coronal sutures were intact (i.e. fusion had not begun) suggesting an age of less than 40 years. Internally arachnoid granulations are noted, a normal variation. The prominence of the supraorbital ridges suggests that this individual was male.

The occiput (SF 1) was adult in size. The occipital protuberance was prominent, suggesting that the individual was male.

### **Skeletal pathology**

No skeletal pathology was noted in this assemblage.

### **Dental pathology**

The dentition of skeleton 320 showed evidence of dental enamel hypoplasia, calculus and caries.

#### ***Dental enamel hypoplasia***

Dental enamel hypoplasia (DEH) could not be identified on most crowns of the dentition of skeleton 320 due to the high degree of dental attrition which had obliterated most of the crowns. DEH was observed as single or multiple lines on four

of five crowns (4/5; 80 %), up to three marked lines noted in the left mandibular canine and right upper central incisor. DEH is the interruption or slowing of normal enamel formation during tooth crown development in the first six or seven years of life causing permanent thinning of the enamel (Goodman and Rose 1990). DEH manifests on the buccal surface of the crowns of teeth as pits, horizontal lines or lines of pits. Each line forms as a result of a prolonged episode of illness or malnutrition during childhood, lasting several weeks. Unlike bone, enamel does not remodel throughout life and so DEH acts as a permanent indicator of such a stress episode in the early years of life. The clear lines on the dentition of skeleton 320 indicate exposure to multiple moderate stress episodes, such as childhood infections and/or seasonal food shortages. Teeth displayed between 1-3 lines, indicating multiple episodes in the first 8 years of life.

### *Caries and calculus*

Three caries were present in the dentition of skeleton 320 (3/12; 25 % per tooth). These ranged from small to large and were located on the 2nd (n = 1) and 3rd molars (n = 2). Dental caries is a destruction of the enamel surface, the dentine (internal part of the tooth) and the cement (outer layer of the roots), caused by the acid produced by bacteria present in dental plaque (Hillson 1996, 269). The association of acidogenic bacteria and sugars in the diet is a well established cause of cavities.

Compared to later historical periods, the prevalence of many dental diseases in prehistory is generally low. This probably reflects the relatively low intake of carbohydrates, particularly in the form of refined sugar, and the fairly young overall age of the population. In many later post-medieval and modern populations, ingestion of refined foodstuffs results in minimal wear of the occlusal surfaces of the teeth. The folds of enamel trap food residues, and in the absence of stringent oral hygiene, result in caries formation. This was not the case in prehistory and in rural Roman Britain, where the coarseness of the diet and grit introduced during food processing wore flat these folds within the first two decades of life. The dental attrition of skeleton 320 was advanced and probably reduced further dental disease of the occlusal surfaces.

Calculus, colloquially known as tartar, was observed on three of the five teeth with intact or slightly worn crowns (3/5 or 60 %). Calculus is a hard immovable mineralised plaque which forms when dental plaque has not been removed by brushing the teeth. Despite the advanced age of this individual, little calculus formation had taken place, the above teeth only showing flecks of the deposits. Like caries, this is probably most due to the absence of refined carbohydrates in the diet.

### **Discussion**

The deliberate placement of disarticulated body parts within features, such as pits, postholes and ditches is a well recognised aspect of Iron Age burial ritual (Whimster 1981, Wait 1985). Whole or partial skulls were particularly favoured for this treatment, and may refer to the veneration of the head as the seat of the 'soul' or persona in Iron Age Celtic society, suggested by accounts of Gallic traditions by Roman writers, such as Diodorus Siculus, and from indigenous British literary works, such as the story of Bran in the Welsh Mabiogiog. Most skulls found in British Iron

Age contexts appear to have been skeletonised prior to deposition, rather than decapitated prior to or soon after death (in the manner of, say, later Roman decapitation burials). This appears to have been the case with skull 319, where the frontal bone had separated naturally along the coronal suture, and shows no evidence of cut marks to suggest defleshing or dismemberment. Its placement on the base of the pit is clearly deliberate, and certainly represents a secondary funerary rite. The general lack of weathering on this bone suggests that it was little exposed to the elements prior or after deposition within the pit.

The precise dating of the burial of skeleton 320 is uncertain but it certainly shows characteristics consistent with Roman burial practices, although a later date should not be ruled out. Due to the limit of excavation, it is as yet unclear whether this individual was one of a number of burials or was an isolated phenomena. Booth (2001) comments on the prevalence of small 'family' burial plots dating to the late Roman period in Oxfordshire and the Upper Thames Valley, a tradition of which this burial may well be part. However, single burials within purpose-cut graves are also found as isolated phenomena in rural settings in this period. The lone burial of a mature to older adult ?male buried within a sub-rectangular grave was discovered on Northfield Farm, Long Wittenham (Gray 1978, 1-29). Like grave 333, this grave also cut through the fill of two ditches. Iron nails within the backfill indicate that the individual had been interred within a plain wooden coffin, and was accompanied by a 4th- century AD bowl.

Although the conventional body position was supine and extended, there are numerous examples of late Roman interments laid out on their sides (such as burials from Lankhills, Winchester, Hants., and Cotswold Community, Gloucester (Smith forthcoming), and this may reflect a continuity or renewal of earlier Iron Age practice.

## Conclusion

To date, neither Iron Age nor rural Roman burial practices have received the level of academic analysis that they warrant. This is in large part due to the scattered nature of the evidence and newness of osteology as a discipline. The above interments of human remains offer a valuable addition to the current corpus of human remains analysed using modern osteological methodology, and promise valuable insights into this under-investigated field.

## Catalogue

The following abbreviations have been employed in the catalogue below (Table 10.1):

/ post-mortem tooth loss X ante-mortem tooth loss  
- tooth not present A dental abscess  
C caries k calculus  
DEH dental enamel hypoplasia R root only (in relation to dentition)  
L left R right  
DJD degenerative joint disease SDJD spinal degenerative joint disease  
C1-7 cervical vertebra 1 to 7 T1-12 thoracic vertebra 1 to 12  
L1-5 lumbar vertebra 1 to 5

## **ANIMAL BONE**

*by Fay Worley*

### **Introduction**

The 2004 and 2005 excavations at Hill Farm produced 2221 fragments (refitted count) of animal bone weighing 8364 g. The animal bone was assessed and recorded by the author at Oxford Archaeology (OA); the identification of an eel vertebra was confirmed by R. Nicholson. The excavations comprised five separate trenches investigating areas prior to development. Animal bone was recovered from four of these areas (Drainage, the Offices, the Staff Car Park and the Visitors' Car Park).

The animal bone assemblage was recovered from features dating to the early and middle Iron Age and Roman periods. In addition, a single large mammal long bone fragment was recovered from a medieval furrow fill. The majority of the assemblage (80 % of fragments) dates to the middle Iron Age, 5 % dates to the early Iron Age and 9 % dates to the Roman period (Table 10.1). The largest excavations were those in the Offices and the Visitors Car Park, and the majority of fragments came from these excavations (45 % and 47 % of fragments respectively).

### **Methods**

The animal bone was identified by comparison with textual and faunal reference material. All hand collected animal bone was identified and the residues of two environmental samples (the fills of middle Iron Age pits 149 and 769) were scanned for animal bone. Animal bone was identified as specifically as possible to species or taxon. Sheep and goat bone was distinguished following the criteria of Boessneck (1969), Prummel and Frisch (1986) and Hillson (2005). Any evidence of pathological change, butchery marks or gnawing was noted. Age at death was estimated using tooth eruption and wear (following Grant 1982, Halstead 1985, Levine 1982 and Silver 1969) and epiphyseal fusion (following Silver 1969). When a single tooth or mandible could not be placed in one of Halstead's (1985) categories directly, it was compared to other more complete mandibles and assigned to the relevant category. The condition bone fragments was recorded on a five point scale based on that presented by Lyman (1994, 355). All suitably mature and complete elements were measured following standard conventions (von den Dreisch 1976). When possible, measurements were used to calculate the withers heights of individual animals (following May 1985).

### **Condition of assemblage**

The condition of the animal bone assemblage was generally good to poor with the condition deteriorating through time (Table 10.2). If the large middle Iron Age assemblage is considered by feature type, bone from pit and posthole fills was in the best condition, bone from the ditch fills is in slightly poorer condition and animal bone from the shallow gully fills is in the poorest condition (Table 10.3). A high proportion of bones in all phases were broken post-deposition (Table 10.4).

A number of animal bones were burnt, either to a charred or calcined state. The proportion of burnt animal bones varied between phases from only 1 % of the Roman animal bones to 24 % of the early Iron Age bones. (Table 10.4). The majority of the identifiable burnt bones were sheep, goat or medium mammal and were recovered from pit fills. Burnt sheep, goat or medium mammal bone was recovered from early Iron Age pit 882, Iron Age pits 41, 315 and 605, middle Iron Age ditch 871, posthole 67, ring gully 175 and pits 146, 149 and 625. In addition, burnt horse, large mammal, sheep or goat and medium mammal bone was recovered from middle Iron Age pit 769, burnt large and medium mammal bone was recovered from middle Iron Age pit 94, burnt cattle bone was recovered from middle Iron Age ditch 535 and burnt large mammal bone was recovered from middle Iron Age posthole 44. The only Roman burnt animal bones were three calcined unidentified fragments from the backfill of inhumation burial 333.

Gnawing was identified on 2 % of early Iron Age bone fragments and 1% of middle Iron Age to Roman fragments. With the exception of two middle Iron Age fragments that had been gnawed by rodents, all gnaw marks were inflicted by carnivores, probably dogs or foxes. The rodent-gnawed bones were recovered from enclosure/ring ditch 70 and pit 94 cutting the enclosure ditch 80/100 and indicate that the faunal remains were accessible to rodents. Similarly, carnivore gnawed bones indicate that they were either purposely fed to dogs or left lying on the surface and accessible to dogs or foxes prior to being covered.

### **Species identified**

The animal bone assemblage was found to contain cattle (*Bos taurus*), sheep (*Ovis aries*), sheep or goat (*Ovis aries* or *Capra hircus*), pig (*Sus scrofa*), horse (*Equus caballus*), dog (*Canis familiaris*), crow (*Corvus corone*), eel (*Anguilla anguilla*) and vole sp., with further fragments identified as large, medium or small mammal or bird (Table 10.5).

### **Wild Fauna**

Very few wild fauna were identified. A vole femur was recovered from the hand collected fill of middle Iron Age pit 149 and a crow radius was recovered from Roman ditch 177. Vole elements and an eel vertebra were also present in the sieved residues from middle Iron Age pit 149. In addition to these, a bird bone was recovered from the fill of middle Iron Age pit 94 and small mammal (rabbit sized) bones were recovered from the fill of middle Iron Age pit 769 and ditch 871. These bones may be from wild or domestic mammals. There is no evidence for any wild boar amongst the pig remains.

There is no faunal evidence for the hunting of wild mammals or birds in the Hill Farm assemblage. Although eel remains may be found inland without human intervention, the presence of the eel vertebra suggests that fishing was practised in the middle Iron Age, presumably in the adjacent River Thames. The presence of voles suggests a grassland habitat in the middle Iron Age.

## **Metric analysis**

Only twelve animal bones could be measured (Table 10.6). These include cattle, horse, sheep or goat and dog elements dated from the early Iron Age to Roman period. Unfortunately, only one measurement could be used to calculate the withers height of an animal. A Roman equid tibia from the fill of ditch 800 had a greatest length of 331.5 mm which equates to a withers height of just under 14 hands (1.31 m) (following May 1985).

Although fragmentary, a large Roman dog humerus recovered from the fill of ditch 800 in the Offices area was measured. The depth of the proximal end (Dp) was greater than 40.8 mm. When compared to 23 Roman dog humeri Dp measurements recorded in the Animal Bone Metric Archive (ABMAP) (<https://ads.ahds.ac.uk/catalogue/specColl/abmap/index.cfm> accessed 17/03/06), the Hill Farm bone is larger than 83 % 19? of these. If the Hill Farm bone is compared to a scatter plot of 24 Late Iron Age to medieval dog humeri measurements from ABMAP (Fig. 10.1), it falls into a group of late Roman and medieval animals with a humerus greatest lengths (GL) of 158 mm to 208 mm, equating to withers heights of 0.51 m to 0.69 m (following Harcourt 1974). Although this sample size is small and the relationship between GL and Dp shows some variation, it can be suggested that the animal was large, perhaps over 0.51 m placing the dog in the range of the largest dogs of the period (following Clark 1995). A late Roman dog from the adjacent site of Castle Hill was found to be 0.54 m tall (Worley and Kitch forthcoming).

## **Evidence for pathology in animal bone assemblage**

Pathological lesions were noted on four middle Iron Age bone specimens, three cattle bones and a sheep or goat tooth. A cattle anterior first phalanx from the fill of ditch 582 exhibited slight lipping of its abaxial proximal articulation. Very slight lipping was also noted on the anterior lateral articular facet of a proximal metacarpal from the fill of ditch 50. These arthropathies may have developed due to stresses on the joints. A cattle metacarpal from the fill of pit 484 had splayed condyles suggesting that the animal may have been used for traction (Baker 1984).

A sheep or goat mandibular third molar from the fill of ditch 50 had a linear crease in the tooth enamel approximately 9 mm above the cemento-enamel junction. This developmental defect was identified as linear enamel hypoplasia and may be used to suggest that the animal was subject to nutritional or pathological stress (Davies 2005) as the third molar developed in the mandible, between the ages of one and two years old (Hillson 2005, 229-30).

## **The early Iron Age animal bone assemblage**

A total of 114 fragments of animal bone were recovered from Early Iron Age contexts. The animal bone was recovered from the fills of ditch 395 and gully 400 in the Visitors' Car Park, from pits 596 and 742 in the Offices and from pit 882 in Drainage trenches. As animal bone was only recovered from a limited range of features, these are considered separately below. Pit 882 was the only early Iron Age feature to contain burnt animal bone.

The early Iron Age assemblage contained only domestic species (cattle, sheep or goat, pig and horse) with further fragments identified as large or medium mammal sized. Taken as a proportion of all domestic mammal fragments (n=22), cattle represented 50 %, sheep or goat represented 36 % and pig represented 14 %. Only one horse bone fragment was identified. Age at death data indicated that at least two cattle were present in the assemblage (one of them less than a month old). All other taxa were each represented by a minimum of one individuals.

*Ring gully 400 (Visitors' Car Park)*

Cattle was represented by a humerus fragment and a piece of tooth enamel. Horse was represented by a mandibular tooth. A further eleven fragments of large mammal sized bone including long bone, scapula and tooth enamel fragments, may be cattle or horse. Sheep or goat were represented by three fragments of mandibular first or second molar. Pig was represented by a mandible and a humerus fragment. A further eleven unidentified fragments of bone were large or medium mammal sized. The pig humerus was the only fragment to have been butchered; its diaphysis had been broken diagonally while the bone was still fresh. Age-at-death could be estimated for the pig mandible and a sheep or goat tooth. The pig was immature (following Halstead 1985) and the sheep or goat was between three and twenty months old at death (following Halstead 1985).

*Terminus of ditch 395 (Visitors' Car Park)*

A cattle mandibular deciduous fourth premolar and five fragments of medium mammal sized long bone were recovered from the terminus of ditch 395. Attrition on the cattle tooth indicates that the animal was less than a month old at death (following Halstead 1985). This animal bone is probably general refuse from the ditch fill rather than a placed terminus deposit.

*Pits 596, 742 and 882 (Offices and Drainage)*

Pit 596 contained a single, carnivore gnawed, medium mammal long bone fragment.

Pit 742 contained cattle and pig limb elements and seven medium and large mammal sized long bone fragments. Cattle bones comprised fragments of left humerus, right radius and a second phalanx, and a left astragalus. The astragalus had fine cuts across its dorsal face which probably relate to the disarticulation of the foot. The second phalanx and humerus had unfused epiphyses indicating that the animals were less than 13-16 months old and less than 3.5 to 4 years old respectively (following Silver 1969). All cattle bones from this pit may be from the same individual. The pig bone was a fragment of right ulna which had been butchered with its olecranon process chopped off, probably as the forelimb was divided at the elbow. The animal bone from the pit appears to be general domestic refuse and suggests that beef and pork was eaten in the early Iron Age at Hill Farm.

Pit 882 contained cattle, sheep or goat, large and medium mammal sized bone fragments. Cattle was represented by a left mandible fragment, a right scapula fragment, a left femur fragment and a right tibia fragment. Epiphyseal fusion of the long bones (following Silver 1969) indicates that one animal was less than 3.5 to 4 years old at death (unfused distal femur) and other animals were older than 7 to 10 months and 2.5 to 3 years (fused distal scapula and tibia). The cattle bone fragments



represent a minimum of one individual. The femur had been butchered with its diaphysis chopped just at the distal diaphysis. This butchery mark indicates that the hind limb was divided at the knee. Large mammal sized bones comprised eleven scapula fragments, three unidentified fragments, a fragment of tibia and a fragment of long bone. The tibia and long bone had been broken when they were fresh. The sheep or goat bones were all burnt and consisted of a fragment of left pelvis, right tibia, radius, third phalanx and a distal fibula tarsal. No butchery marks or evidence for age-at-death was identified. The medium mammal sized fragments comprise 21 fragments of burnt and seven fragments of unburnt unidentified bone, a burnt long bone fragment and two fragments of unburnt rib. This pit appears to contain domestic refuse with evidence of the portioning of cattle carcasses and a dump of burnt sheep or goat bones. The sheep or goat bones may have been discarded in a fire prior to deposition, they were not all fully calcined.

### **The middle Iron Age animal bone assemblage**

A total of 1775 fragments of animal bone were recovered from middle Iron Age contexts comprising the fills of six ditches (60, 70, 535, 610, 871 and 80/100), five ring gullies (174, 175, 690, 700, 12066), eleven postholes (44, 61, 67, 405, 518, 691, 695, 722, 741, 766 and 819) and seventeen pits (53, 94, 97, 146 (recut of 149), 149, 292, 318, 484, 486, 559, 597, 621, 625, 759, 769, 808 and 872).

Hand collected middle Iron Age animal bone included elements identified as cattle, sheep, sheep or goat, pig, horse dog, vole and bird, with further fragments identified as large and small mammal sized. Taken as a proportion of all cattle, sheep, goat and pig bones (n=170) sheep or goat were the most frequent taxa (64 %), cattle represented 29 % and pigs made up the final 7 % of fragments. The middle Iron Age animal bone is considered by context type below.

Age-at-death from tooth attrition could be estimated for four cattle, six pig and eighteen sheep or goat elements (Tables 10.7 to 10.10). Age-at-death from bone fusion could be estimated for 15 cattle bones, 18 sheep or goat bones, three pig bones, 8 horse bones and a dog ulna (Tables 10.11 to 10.15). Cattle were killed at a range of ages with evidence of animals dying from the ages of 18 to 30 months old and possibly older. Sheep or goats were also killed at all ages, tooth attrition indicates that animals died from 3-10 months old right through to surviving into their third to fifth years. This suggests that sheep and/or goats were not only utilised for meat, but may also have provided milk or wool. Pigs also were killed at a range of ages from 3-20 months through to adult. The evidence does not suggest that a high proportion of newborn pigs were eaten. Pigs may have provided meat and manure for the occupants of the middle Iron Age settlement.

#### *Animal bone from the fills of middle Iron Age postholes (Visitor's Car Park and Offices trenches)*

Animal bone was recovered from five postholes in the Visitors' Car Park (44, 61, 67, 405 and 518), and six postholes in the Offices Trench (691, 695, 722, 741, 766 and 819). Posthole 695 formed the south western corner of four post structure 546 and postholes 691 and 766 formed the north eastern and south eastern corners of four post structure 549. Posthole 722 might have been associated with four post structure 547. The majority of these postholes contained only one fragment of animal bone but

two fragments were recovered from post holes 44 and 691, five fragments were recovered from post hole 766 and 32 fragments were recovered from post hole 819. The bones recovered from the post holes are presented in Table 10.16. The majority of the animal bones from postholes probably represent accidental inclusions with the back fill however the fills of 695 and 741 each contained a butchered distal cattle humerus weighing 121 g and 132 g respectively. These elements seem a little large to have been unwittingly included in post hole backfill. The humerus from 695 had had its diaphysis broken off when fresh, probably to access the bone marrow. The humerus in 741 had in excess of ten small and fine knife cuts on its anterior and lateral diaphysis just above the distal articulation which were probably inflicted when the forelimb was disarticulated at the elbow.

*Animal bones from the fills of middle Iron Age ring gullies (Visitor's Car Park and Offices trenches)*

Animal bone was recovered from the fills of two ring gullies in the Visitors' Car Park (174 and 175) and three ring gullies in the Offices trench (690, 800 and 12066). These gullies can be grouped into two pairs of an inner and outer gully (174/175 and 690/700) and one unpaired gully (12006). A total of 115 fragments of animal bone was recovered from the fills of the gullies with 41 fragments recovered from 174/175, 73 fragments from 690/700 and a single large mammal sized indeterminate fragment from 12006 (Table 10.17). The animal bone from the gully fills was highly fragmented with nearly half the fragments weighing less than 1 g. The only large bone recovered from gully fills was adjoining fragments of recently broken distal cattle humerus (133 g) from ring gully 174. Cattle bone in the gully fills was represented by one each of horn core, axis, humerus, pelvis, tibia and metapodial fragments, and by two loose teeth. Sheep or goat was represented by eight loose teeth and tooth enamel fragments, four mandible fragments, a pelvis fragment and two metatarsal fragments. Dog was represented by an ulna fragment. Given the nature of the contexts and the fragmented and poorly preserved condition of the bone fragments, the animal bone from the gully fills is very unlikely to be intentionally deposited.

*Animal bones from the fills of middle Iron Age pits (Visitor's Car Park, Offices and Drainage trenches)*

Animal bone was recovered from the fills of eight pits in the Visitor's Car Park (94, 97, 149 (and its recut 146), 292, 318, 484 and 486), seven pits in the Offices trench (559, 597, 621, 625, 759, 769 and 808) and two pits in Drainage excavations (559 and 872) (Table 10.18). Approximately half the pits contained less than ten fragments of animal bone (pits 292, 484, 486, 559, 597, 759, 808 and 872), three pits contained eleven to twenty fragments (318, 621 and 625), four pits contained 32 to 69 fragments (53, 94, 97 and 146). Pit 149 contained 119 fragments of animal bone and pit 769 contained 689 fragments (1066 g) of animal bone.

Table 10.19 presents the contents of those pits containing less than 40 animal bone fragments. Animal bone from the remaining pits is considered by pit below. The majority of middle Iron Age pits containing animal bone were located outside the ring gullies in the Offices trench and within the annex formed by ditch (80/100) in the Visitor's Car Park. The two pits containing the most fragments of animal bone were located within the annex formed by ditch 80/100 (pit 149) and within ring gully 700 (pit 769).

*Pit 94 (Visitors' Car Park)*

Pit 94 contained 55 fragments of animal bone, predominantly in its upper fills (contexts 76 and 77). The pit cuts the annex enclosure ditch 80/100. Pit 94 contained horse, large mammal, sheep or goat, medium mammal and bird bone. Horse was represented by a single small tibia fragment. Twelve large mammal fragments comprised mandible, scapula, flat bone, long bone and indeterminate bones, all of which could also be horse. The mandible and flat bone fragments had been butchered. The flat one fragment had two heavy transverse cuts which may indicate that the meat was filleted off the bone. The flat bone may have been part of a mandible, in which case, the cut marks could also have resulted from disarticulating the mandible from the skull. The mandible fragment was from the basal region of the tooth row and had been chopped diagonally at one end, dividing the mandible. This may indicate portioning of the cheek meat, or utilisation of the marrow (See Landon 1996). Sheep or goat was represented by a fragment of first thoracic vertebra, two mandible fragments, an ulna fragment and a metatarsal fragment. Medium mammal sized fragments comprised humerus, long bone, lumbar and thoracic vertebrae, rib and indeterminate fragments. These may also be sheep or goat. The medium mammal humerus and a long bone fragment had been broken longitudinally and transversely, presumably to utilise the bone marrow. The single bird bone was a fragment of possible maxilla. A large and a large or medium mammal indeterminate fragments and a medium mammal long bone fragment had been charred.

*Pit 97 (Visitors' Car Park)*

Pit 97 contained 69 fragments of animal bone including cattle, large mammal and sheep or goat bone. The majority of fragments could not be identified. The cattle elements comprised a maxillary molar and three fragments of tooth enamel which were probably cattle. Large mammal bones included four fragments of long bone and one fragment of innominate. Sheep or goat bone comprised two loose mandibular molar teeth. A total of four large mammal and 54 large or medium mammal sized unidentified bone fragments were also recovered from the pit fill. No burnt or butchered fragments were recovered.

*Pit 149 (Visitors' Car Park)*

Pit 149 contained 119 fragments (1149 g) animal bone including cattle, sheep or goat, large mammal, medium mammal, vole and an eel vertebra recovered from the sieved residue. The pit also contained a portion of human skull (skeleton 319). Cattle (795 g) was represented by a cranium which had been recently broken into 141 fragments (recorded as NISP = 1), a fragment of pelvis and a fragment of distal humerus which had possibly been butchered. In addition to the cattle bone two fragments of mandible, a lumbar vertebra fragment and 25 indeterminate fragments recorded as large mammal may be cattle. Sheep or goat was represented by a worked, charred, metatarsal fragment. A long bone fragment recorded as medium mammal size may also be sheep or goat. The pit also included 85 fragments of indeterminate bone. Pit 149 was a recut of pit 146 which contained charred and unburnt medium mammal fragments (see Table 19). The human and animal bone from pit 149 suggests that the fills of this pit contain a more structured deposition rather than general refuse.

### *Pit 796 (Offices)*

Pit 769 contained 689 fragments (1066 g) animal bone, 64 % of all middle Iron Age animal bone fragments recovered from pit fills and 39 % of all middle Iron Age animal bone fragments recovered from Hill Farm. 99 % of the animal bone from this pit was in good condition. This pit assemblage included cattle, horse, sheep, sheep or goat, large mammal, medium mammal and small mammal bone (Table 10.20). Cattle bone comprised a fragment of skull, a loose tooth and a fragment of mandible. Horse bone comprised a fragment of burnt skull, four loose teeth, a fragment of burnt mandible, a fragment of pelvis, a fragment of second phalanx and a sesamoid bone. Large mammal fragments, which may be from the horse or cattle remains, included skull, tooth, mandible, vertebrae, ribs, pelvis and indeterminate fragments. A cervical vertebra fragment and a skull fragment had been burnt.

A total of 37 fragment of animal bone were identified as sheep or goat, including one tooth which was identified as sheep. Sheep or goat bones comprised a skull fragment, six mandibles (from a minimum of three individuals), nine loose teeth, two carpals, two tibia fragments, two first phalanx fragments, two further phalanx fragments, three innominate fragments and single fragments of cervical vertebra, scapula, humerus, radius, ulna, metacarpal, astragalus, navicular-cuboid and tarsal. The cervical vertebra fragment, two innominate fragments a tibia fragment, the tarsals and most phalanx fragments had been burnt. In addition to the sheep or goat bone, pit 796 contained 556 fragments of medium mammal bone which may be sheep or goat. These fragments included skull, tooth, vertebra, rib, scapula, long bone and indeterminate fragments. 146 medium mammal fragments, including the vertebrae 13 of the 34 rib fragments, a long bone fragment and 128 of the 492 indeterminate fragments, had been burnt. A single small mammal sized rib fragment was also recovered from the pit fills.

Only two fragments of bone from pit 769 had been butchered. A large mammal mandible had been broken while fresh. Like the mandible fragment in middle Iron Age pit 94, this butchery may indicate portioning of the cheek meat or utilisation of the bone marrow. A large mammal long bone fragment had also been broken when fresh, presumably to utilise the bone marrow.

### **The Iron Age assemblage**

A total of 137 fragments of animal bone were recovered from features of Iron Age date. These include the fills of large pits 315 and 41 in the Visitors' Car Park, pits 575, 605 and 698 in the Offices trench, and the fills of ditch 620 in the Offices Trench. The Iron Age assemblage included domestic mammals (cattle, sheep or goat and horse) and large mammal and medium mammal bone fragments. Cattle were represented by eight fragments, sheep or goat by three fragments and horse by two fragments of bone.

### *Pit 41 (Visitors' Car Park)*

A total of 117 fragments of animal bone were recovered from the fourth to sixth fills of this pit. This is 85 % of all animal bone from the phase. The animal bone comprised cattle, horse, sheep or goat, large and medium mammal fragments. Cattle bones comprised a fragmented tooth, left tibia, left scapula and left innominate and a mandibular third molar. These elements had fragmented into 72 pieces but are recorded in the animal bone database as six refitted fragments. Fusion of the tibia indicates that the animal was over 3.5-4 years old at death (following Silver 1969), wear on the molar indicates a senile age at death (following Halstead 1985). No butchery marks were identified on the cattle bones. A horse right innominate fragment was recovered from the pit. The horse had been butchered with a chop mark identified on the dorsal diaphysis of the pubis. This chop may relate to dividing the animal into halves, although it is unlikely that the carcass would have been hung to achieve this. 39 further large mammal long bone, rib and flat bone fragments were identified. Five of the long bone fragments had been butchered; four had been broken when fresh (marrow fractured) and the fifth had been sawn transversely one, possibly both, ends and then split longitudinally. This element was probably a horse metapodial which had been worked to as a raw material for artefacts such as bone pins, spoons and handles. A similarly sawn horse metapodial was recovered from an Iron Age pit in the near by site of Ashville Trading Estate, Abingdon (Wilson 1978, 123). Sheep or goat was represented by a charred fragment of metatarsal and a calcined first phalanx. The phalanx was from an animal of over 13-16 months old at death (following Silver 1969). A calcined medium mammal sized long bone was also recovered.

*Pits 315 (Visitors' Car Park), 575, 605 and 698 (Offices)*

Each of these pits contained one to seven fragments of animal bone. Pit 315 contained three medium mammal and indeterminate fragments, one of which was charred. Pit 575 contained a sheep or goat metatarsal fragment (less than 20-28 months old at death following Silver 1969), a medium mammal tibia, rib and indeterminate fragment, a large mammal tibia fragment and two long bone fragments. The large mammal fragments had been broken while fresh (marrow fractured). Pit 605 contained a large mammal long bone fragment, four medium mammal rib fragments, a medium mammal cervical vertebra and a medium mammal long bone fragment which had been charred. Pit 698 contained a cattle maxillary deciduous premolar from an individual aged less than 30 months old at death (following Silver 1969). The animal bone from these pit fills appears to be general refuse.

*Ditch 620 (Offices)*

Ditch 620 contained a cattle right tibia fragment which had been broken while fresh (marrow fractured) and a fragment of horse scapula from an animal aged over one year old at death (following Silver 1969).

### **The Roman animal bone assemblage**

A total of 148 fragments of animal bone were recovered from two Roman ditches (177 in Visitors' Car Park and 800 in the Offices trench) and the fills of an inhumation grave in the Visitors' Car Park which may be of Roman date. No animal bone was recovered from Roman ditch 20 in the Staff Car Park. The Roman animal

bone assemblage included domestic mammals (cattle, sheep or goat, pig, horse and dog) a fragment of crow bone and further fragments identified as large or medium mammal sized. In ranked order of frequency, the assemblage include four cattle elements, three horse elements, two sheep or goat elements, one pig, one dog and one crow element. The remainder of the assemblage comprised large and medium mammal size fragments.

#### *Ditch 177 (Visitor's Car Park)*

This short remnant stretch of a ditch contained a crow radius and 54 fragments of large mammal bone including a fragment of lumbar vertebra, fragments from a scapula and 52 fragments of unidentified bone, many of which were probably from the scapula. No butchery marks or evidence of age at death were identified.

#### *Ditch 800 (Offices)*

This short section of ditch, crossing the corner of the excavated area contained 93 fragments of animal bone including cattle, horse, sheep or goat, dog, large mammal and medium mammal fragments. Cattle bones comprised a left scapula and right femur, both of which had been butchered. The scapula had a heavy chop into the glenoid cavity approximately in line with the scapula spine, and the femur diaphysis had been broken while the bone was fresh. Fusion of the scapula indicated that the animal was over 7-10 months old at death (following Silver 1969). Horse bones comprised a complete left innominate and right tibia. bone fusion indicated that the bones were from animals older than 1.5-2 years and 3-3.5 years respectively. Both bones come from a minimum of one individual. The length of the tibia indicated that the horse stood at just under 14 hands (following May 1985). A further 41 fragments of bone were identified as large mammal sized and may be from horse or cattle bones. Sheep or goat bones comprised a maxillary tooth and a fragment of tibia which had been broken when the bone was fresh and then gnawed by a canid. The only fragment of dog bone was a large distal humerus. Fragmentation meant that the bone could not be accurately measured but comparison of the minimum dimensions of the bone compared to other Romano-British dog humeri (see above) indicated that it was a large animal for the time. Two medium mammal sized long bone fragments and twelve further large or medium mammal sized fragments were also identified.

#### *Inhumation burial 333 (Visitors' Car Park)*

A total of 44 fragments of animal bone were recovered from fill 332 of this inhumation burial (probably Roman). The animal bone comprised a cattle metapodial and mandibular first or second molar, a horse astragalus, a pig molar and 38 large mammal sized long bone and indeterminate fragments and three calcined medium or large mammal unidentified fragments. The animal bone was all in moderate to poor condition and may have been redeposited in the grave fill from disturbed middle Iron Age features. On large mammal long bone fragment had been butchered. An Age-at-death could be estimated for the cattle and pig teeth. The cattle tooth indicated an age at death of over thirty months and the pig tooth indicated an age-at-death of less than 17-22 months or subadult (following Halstead 1985 and Silver 1969).

## **The economy at Hill Farm**

The Iron Age and Roman economy at Hill Farm is dominated by domestic taxa, predominately sheep or goats (including sheep), cattle and pigs with domestic dogs and horses also present. Butchery evidence suggests that horse meat was sometimes consumed by either people or their animals during the Iron Age with a butchered horse pelvis fragment recovered from pit 41. There is no evidence for hunting mammals or birds and only slight evidence for the consumption of fish. This pattern conforms with previous studies from the southern British Iron Age.

Evidence from pathology suggests that during the middle Iron Age cattle may have been used as traction animals. Sheep were probably also kept as multi-functional animals as age-at-death estimates suggest that they were not primarily killed for meat.

## **CHARRED PLANT REMAINS**

*by Wendy Smith*

A total of 37 samples were collected for charred plant remains during Oxford Archaeology excavations at Hill Farm, Little Wittenham, Oxfordshire (SU 563 926). Six samples from three early Iron Age – middle Iron Age pits and one Romano-British sample from a cremation were deemed suitably rich to merit further analysis (Robinson 2005). Unfortunately, the Romano-British cremation deposit (sample 127, context 332, feature 333) contained residual Iron Age pottery and, therefore, was not considered secure enough archaeologically for analysis.

Full analysis of the middle Iron Age pit samples, however, allows us to examine to following issues:

- what cereal crops were in use?
- does this assemblage provide information on crop processing activities?
- does this assemblage provide information on cultivation conditions?
- does this assemblage provide information on patterns of rubbish disposal on site?

## **Method**

Samples were collected from sealed deposits and were processed by the Oxford Archaeology environmental officers, using water flotation. The flots (the material that floats on the water's surface) were sieved to 250µm and the heavy residues (the material which does not float) were wet sieved to 500µm. Both the flots and heavy residues were air dried at room temperature. The Oxford Archaeology environmental officers examined the heavy residues for charred plant remains, but only charcoal was observed.

Katarzyna Pinska and the author sorted the flots for charred plant remains using a low-power binocular microscope at x15 magnification. In all cases, 100 % of the flot was sorted for charred plant remains. Identifications were made at magnifications between x15 and x45 and in comparison with the Oxford Archaeology's reference collection and illustrations or photographs in floras or standard keys (e.g. Cappers, Bekker and Jans 2006 and Stace 1997). Nomenclature for

the plant remains follows Stace (1997) for indigenous species and Zohary and Hopf (2000) for cultivated species. The traditional binomial system for the cereals has been used here, following Zohary and Hopf (2000, 28, Table 3 and 65, Table 5).

## Results

The charred plant remains recovered from the six pit samples are listed by period, in order of sample number in Table 10. . The summary of the main categories of plant remains is presented in Figure 10.2. The deposits were comprised a mixture of cereal grain, cereal chaff and weed/ wild plants, with the exception of sample 125 (F41, 171) which only contained a mixture of cereal chaff and weed/ wild plants. These types of remain are typical of most charred archaeobotanical assemblages and most likely represent crop processing activities (e.g. Jones 1988, 44).

## Discussion

Two pits (F41, sample 122 (69.5 %), sample 123 (80.6 %), sample 124 (82.2 %), sample 125 (88.2 %) and F137, sample 137 (55.1 %) respectively) are dominated by weed/wild plant remains and include many taxa that typically occur as weeds of cultivation (see habitat coding, column 2, Table 10.). The third pit (F94, sample 116) contained a fairly even mixture of cereal grain (30.7 %), cereal chaff (25.5 %) and weed/ wild plants (30.7 %).

Although sample 116 contained substantially more cereal grain (primarily identified as hulled barley) than other samples, the range of chaff and weed/ wild plants recovered is quite similar to the other pit samples. There is no apparent difference in the composition of samples between pits dating to the early Iron Age/ middle Iron Age and those dating securely to the middle Iron Age. This suggests that throughout the period of site occupation hulled barley and spelt were the main cereal crops cultivated.

In terms of taphonomy, it is likely that all three samples represent secondary deposition of charred plant remains. Use of cereal processing waste as fuel is well attested (Hillman 1981, 1984) and disposal of spent fuel into pits seems the most likely explanation for the arrival of this material on site.

The charred plant remains from Hill Farm, Little Wittenham provide evidence for the type of cereal cultivation, cereal crop processing activities and cultivation conditions. Finally, they are remarkably similar to previous archaeobotanical results from Iron Age pit deposits in the region.

### *Cereals cultivated*

In terms of cultivation of cereal, spelt (*Triticum spelta* L.) was most frequently recovered. In those cases where preservation was good, most glume bases were securely identified as spelt. As a result, it seems likely that spelt was the main wheat crop cultivated. In addition, hulled barley (*Hordeum* sp.) grains were found in small quantities in several samples and were abundant in sample 116 (F94, 76). Preservation of barley chaff and grain was not sufficient to allow identification of two-rowed or six-rowed barley.



Spelt is a hulled wheat (sometimes termed glume wheat), which generally has two grains in each spikelet of the cereal ear. Although rarely grown today, hulled wheats do have a number of properties that would have been advantageous to past farmers. In particular spelt can tolerate poor soil conditions and can resist a range of fungal diseases (Nesbitt and Samuel 1996, 42). During threshing, cereal ears of spelt will break up into individual spikelets, which contain grains surrounded by tough chaff. At this point the ancient farmer could either store or further process the spikelets of hulled wheat. Storage of hulled wheat in spikelet form is well known archaeobotanically and may serve to protect the grain from insect predation (Nesbitt and Samuel 1996, 52).

### *Cereal crop processing activities*

In order to dehusk spelt wheat, the spikelets must be pounded and the resulting mixture of freed grain and chaff is then winnowed, which separates light weed seeds and larger fragments of chaff from the grain. The product of winnowing (i.e. the heavier grains and similarly heavy weed seeds and cereal chaff) is then sieved to remove remaining weed seeds and smaller fragments of chaff from the grain. All six samples contained substantial quantities of spelt wheat and indeterminate hulled wheat chaff and small-sized weed seeds (i.e. < 1 mm diameter). The chaff remains were made up of smaller fragments of glume bases and rachis internodes which strongly suggests that this material is a sieving by-product from the later medium and/or fine sieving stages of cereal processing (Hillman 1981, 1984, 1985). It is not possible to claim that the three pits sampled are fully representative of cereal processing activities taking place on site during the early and middle Iron Age; nevertheless, the consistent recovery of charred cereal remains dominated by small-sized weed seeds does suggest that there may be some continuity of cereal processing activity and the disposal of charred crop processing by-products.

With only one pit representing the early/ middle Iron Age phase of the site (pit Feature 41, samples 122–125), it is not possible to determine if the dominance of barley in sample 116 (pit Feature 94, context 76) represents a shift to increased barley cultivation, in addition to continued spelt cultivation, in the middle Iron Age. The ubiquity of small quantities of barley grain and chaff in the pit Feature 41 samples; however, does suggest that barley was also likely to have been cultivated in the early/ middle Bronze Age phase of the site. Because crop processing of hulled barley grain requires the removal of the awn, a process known as hummelling (e.g. Hillman 1985, 20; Langer and Hill 1991, 67), before consumption by animals or humans, it is, perhaps, not unsurprising that barley was not found in large quantities in deposits clearly dominated by spelt wheat.

The results from Feature 41 are particularly striking, as they represent vertical sampling of different lenses down a section through this pit, from the upper to lower fills. The uniformity of these results suggests repeated activity, both in terms of generating crop processing by-products, but also in terms of their charring and subsequent deposition into the pit. A few vetch/ vetchling (*Vicia* spp./ *Lathyrus* spp.) seeds from sample 123 (context 69), toward the middle of this sequence, were dated to 200 BC and 1 AD (Poz-14320: 2080±35BP).

### ***Cultivation conditions***

The weed/ wild plants recovered from Hill Farm, Little Wittenham frequently occur as weeds of arable crops (see Table 10, column 2). This includes such taxa as possible annual meadow-grass (*Poa* cf. *annua*), black bind-weed (*Fallopia convolvulus*), brome (*Bromus* spp.), chickweed (*Stellaria media*), cleaver (*Galium aparine*), corn spurrey (*Spergula arvensis*), eyebright/ bartsia (*Euphrasia/ Odontites*), possible field poppy (*Papaver* cf. *rhoeas*), goosefoot (*Chenopodium* spp.), greater plantain (*Plantago major*), possible hedge bedstraw (*Galium mollugo*), hoary/ ribwort plantain (*Plantago medialis lanceolata*), knotgrass (*Polygonum aviculare*), narrow-fruited cornsalad (*Valerianella dentata*), oat (*Avena* spp.), orache (*Atriplex* spp.) and scentless mayweed (*Tripleurospermum inodorum*). Several taxa typical of grassland have also been identified such as eyebright/ bartsia (*Euphrasia* spp./ *Odontites* spp.), hairy tare (*Vicia hirsuta*), possible hedge bedstraw (*Galium* cf. *mollugo*) and hoary/ ribwort plantain (*Plantago medialis lanceolata*). In addition, vetch/ vetchling (*Vicia* spp./ *Lathyrus* spp.) typically occur in either arable fields or in grassland (e.g. Stace 1997); however, it is rarely possible to identify these to species level (e.g. Butler 1996).

A few of the taxa recovered in these deposits do provide some indication for the types of soil conditions cultivated; however, it should be born in mind that soil conditions within a reasonably large field system can be highly variable. The recovery of corn spurrey (*Spergular arvensis*) may suggest that lighter soils (i.e. free-draining) were cultivated. The presence of both corn spurrey (*Spergula arvensis*) and hoary/ ribwort plantain (*Plantago medialis lanceolata*) may suggest that basic soils were cultivated. Finally the recovery of a few sedge (*Carex* spp.) seeds may suggest that heavier soils and/ or possibly damp to wet soils were cultivated.

### ***Comparison with other Iron Age results in Oxfordshire***

Iron Age samples from Oxfordshire sites at Ashville Trading Estate, Barton Court Farm and Farmoor studied by Martin Jones (1978, 1984; Robinson *et al.* 1979) had assemblages frequently dominated by spelt wheat grain and chaff or including mixtures of spelt and hulled barley grain and chaff; all with remarkably similar weed floras. Taxa such as brome (*Bromus* spp.), chickweed (*Stellaria media*), cleaver (*Galium* spp.), eyebright/ bartsia (*Euphrasia/ Odontites*), oat (*Avena* sp.), narrow-fruited cornsalad (*Valerianella dentata*), scentless mayweed (*Tripleurospermum inodorum*) and vetch/ vetchling (*Vicia* spp./ *Lathyrus* spp.) are frequently present in deposits from these sites. Results from slightly further afield are less similar; however, the prevalence of spelt glume bases in pit deposits was common at the Cleeve–Didcot Pipeline (Carruthers 1990); Oxford Road, Bicester, Oxfordshire (Pearson 1997); Slade Farm, Bicester, Oxfordshire (Monckton 2000).

### **Conclusions**

The early through middle Iron Age pit samples analysed from Hill Farm, Little Wittenham appear to be part of a remarkably consistent pattern of disposal of crop processing by-products related to the cultivation of spelt in Oxfordshire. Moreover, the results are particular similar to some of the early work carried out by Martin Jones in the region. In most cases, it was possible to determine the repeated deposition of

crop processing by-products from the medium or fine-sieving stages of cereal crop processing. The weed flora from Hill Farm contained a range of taxa typical of arable cultivation with only a few indicators for basic and light (i.e. free-draining) soil conditions. Limited evidence for somewhat heavier soil conditions and/or damp to wet conditions was only due to the recovery of a few sedge (*Carex* spp.) seeds.

### **Comparison of the three Little Wittenham sites**

Late Bronze Age through Middle Iron Age charred plant remains from pit samples at Little Wittenham have generated assemblages containing a mixture of cereal grain, cereal chaff and weed/ wild plants. Notably, there is a marked difference in the general proportion of these remains between sites. Prehistoric Hill Farm pit samples (Smith this volume) were usually dominated by weed/ wild seeds, Castle Hill Trenches 3, 4 and 6 pit samples were dominated by cereal grain and Castle Hill Trench 15 pit samples generally contained a fairly even mixture of cereal grain, cereal chaff and weed/ wild seeds. There is a consistent pattern of deposition of certain mixtures of cereal processing products/ by-products at these three sites.

Whether it is possible to extrapolate this data pattern to location of specific cereal related activities; however, is problematic since Hill Farm deposits are generally later than Castle Hill deposits. We also cannot assume that the Castle Hill Early Iron Age pits were used contemporaneously. Nevertheless, the Castle Hill, Trenches 3, 4 and 6 Early Iron Age deposits are clearly dominated by charred cereal grain, a crop-processing product; whereas, Trench 15 Early Iron Age deposits contain fairly even mixtures of cereal grain, cereal chaff and weed/ wild seeds and are more likely to reflect crop processing by-products, although not excluding products. Whether this pattern in the Early Iron Age Castle Hill pit deposits reflects location of different activities or merely different patterns in rubbish disposal is not clear.

### **CHARCOAL**

*by Wendy Smith*

Ten samples dating either to the Early Neolithic or dating from the Late Bronze Age through Middle Iron Age were assessed for charcoal from the flots (the material which floats) of plant macrofossil samples (Robinson 2005, see also Table 10.23). The majority of samples contained only small quantities of charcoal, so two samples were selected for further analysis. Although these are not particularly rich samples, it was decided that they did merit analysis as charcoal results from either period in the region are limited.

#### **Method**

Identification of charcoal >2mm was made under a high-power, incident light microscope at magnifications between x40 and x200. Charcoal identifications were made in comparison with modern wood comparative material housed at Oxford Archaeology and with reference to identification criteria outlined in Schweingruber (1978) and Gale and Cutler (2000). Nomenclature follows Stace (1997); however, Pomoideae group follows Gale and Cutler (2000).

## Results

Sample 107 (Feature 135, context 179) was from an Early Neolithic pit and contained very small-sized fragments (usually < 4mm<sup>2</sup>) of charcoal. Analysis confirmed that the charcoal assemblage was a mixture of alder (*Alnus* sp.) and hazel (*Corylus* sp.). These results are consistent with other evidence from the period in Oxfordshire, which frequently have charcoal from either species such as at Abingdon (Western 1982), Barrow Hills, Radley (Thompson 1999); City Farm (Dimbleby 1966); Gravelly Guy (Gale 1988 and forthcoming) and the Rollright Stones (Straker 1988).

Sample 117 (Feature 258, context 259) was from a pit dating to the Early and/or Middle Iron Age. Hawthorn group (Pomoideae) taxa are dominant, but oak (*Quercus* sp.) is also present and one fragment of possible birch (cf. *Betula* sp.) charcoal was also identified. In addition, samples from pit deposits and one grave cut dating from the Late Bronze Age through Middle Iron Age also produced provisional identifications of elm (*Ulmus* sp.), alder/ hazel (*Alnus* sp./ *Corylus* sp.) and ash (*Fraxinus excelsior* L.) (Robinson 2005). These taxa are all known from this period in Oxfordshire, such as at Chinnor (Richardson and Young 1951), Gravelly Guy (Gale 1988 and forthcoming) and Stanton Harcourt (Pilcher 1966).

### *Evidence for fuel use*

The material recovered from the Hill Farm pits did not contain any building debris (i.e. roof tiles, nails, etc...) or animal bone, only charcoal and pottery (Lamdin-Whymark and Allen 2005). As a result, this context has also been interpreted as domestic waste and the charcoal recovered from this context is most likely spent fuel.

Although oak (*Quercus* sp.) was present, other wood taxa (e.g. alder, ash, hawthorn group and hazel) are frequently recovered (see Table 10.23). Although from limited analysis and assessment results, the following conclusions can be made:

- It seems that alder and hazel (both capable to tolerating floodplain conditions) were in use as fuel in the Neolithic and a range of other wood taxa were in use in the Late Bronze Age/ Early-Middle Iron Age. The site's location on a terrace above the Thames, suggests that wood resources were being exploited from the Thames floodplain.
- The fact that Late Bronze Age through Middle Iron Age pits are dominated by different taxa (Pomoideae group, alder/hazel, oak, elm or ash) suggests that a variety of habitats were being exploited for wood fuel – in particular both floodplain and the upland (i.e. areas on the terraces above the floodplain)

The limited quantity of material (< 75 ml) and the fact that only one assemblage from each period was fully analysed; however, may mean that neither assemblage is fully representative of the range of wood fuels used at Hill Farm.

## **RADIOCARBON DATING**

*by Tim Allen*

Three samples were submitted to the Poznan Radiocarbon Laboratory for accelerator mass spectrometry (AMS) dating (Table 10.24). One sample each was submitted from fills within pits 41, 135 and 149. The determinations have been calibrated using OxCal v3.10 and atmospheric data from Reimer *et al.* (2004).

The date from charred hazelnut shells in context 179 within pit 135, 3770-3640 cal. BC, is consistent with the Early Neolithic date indicated by the Plain bowl pottery from the same context, and provides a useful addition to the dates for such pottery from the Upper Thames Valley.

The date obtained from charred grains from middle fill 69 within pit 41, 200 cal. BC - cal. 1 AD, is also consistent with the Iron Age pottery from the feature, and the circular form of the pit. By association the radiocarbon date also dates the group of large refitting fragments of Lodsworth rotary quern from the same context. This is the first prehistoric radiocarbon date for such rotary querns in the region, but is consistent with previous evidence from local sites, which includes a group of such querns from a pit at Abingdon Vineyard associated with large sherds of Middle Iron Age pottery (Allen in prep.).

The date obtained upon charred grains from layer 176 at the base of pit 149, 250-410 cal. AD, is however unexpected. Although firm dating for this pit was not provided by the artefacts from the pit fills, these were entirely Iron Age, and the character of the pit and its location made an Iron Age date for the pit probable. While a Late Roman date for this feature is not impossible, given the presence of a probably Roman burial some 20 m to the north-east, the material that was dated may well be intrusive in this feature until corroborated by further scientific dating.