Cambourne New Settlement

Iron Age and Romano-British settlement on the clay uplands of west Cambridgeshire

Volume 2: Specialist Appendices

Web Report 11

Animal bone, *by Sheila Hamilton-Dyer*

Marine shell, *by Sarah F. Wyles*

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Iron Age and Romano-British Settlement on the Clay Uplands of West Cambridgeshire

By
James Wright, Matt Leivers, Rachael Seager Smith and
Chris J. Stevens

with contributions from
Michael J. Allen, Phil Andrews, Catherine Barnett, Kayt Brown, Rowena Gale,
Sheila Hamilton-Dyer, Kevin Hayward, Grace Perpetua Jones,
Jacqueline I. McKinley, Robert Scaife, Nicholas A. Wells and Sarah F. Wyles

Illustrations by
S.E. James

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Animal Bone

By Sheila Hamilton-Dyer

Introduction and methods

[*Note*: All tables are grouped together at the end of this report]

Following assessment, assemblages from the main sites were selected for analysis. Just over 10,000 individual bone specimens were recorded, at two levels of analysis.

For contexts analysed at the higher level all bone was recorded in detail, including the small amounts recovered by sieving. Each bone was identified to taxon as closely as possible, using the author's modern comparative collections. All individual bone specimens were identified to element with the following exceptions: ribs and vertebrae of the ungulates (other than axis, atlas, and sacrum) were identified only to the level of cattle/horse-sized and sheep/pig-sized. This restriction does not apply to burials and other associated bones where ribs and vertebrae were assigned to species. Unidentified shaft and other fragments were similarly divided. Any fragments that could not be assigned even to this level have been recorded as mammalian only. Where possible, sheep and goat were separated using the methods of Boessneck (1969), Payne (1985) and Halstead and Collins (2002). Recently broken bones were joined where possible and have been counted as single specimens. Tooth eruption and wear stages of cattle, sheep and pig mandibles were recorded following Grant (1982). A suite of measurements was taken on bones with at least one fused epiphysis, or with a mature appearance for non-fusing bones such as the astragalus. These mainly follow von den Driesch (1976) for mammals and birds and are in millimetres unless otherwise stated. Withers height calculations of the domestic ungulates are based on factors recommended by von den Driesch and Boessneck (1974). Shoulder heights of dogs are calculated using the factors of Harcourt (1974). Other information such as preservation, gnawing, butchery and abnormality was recorded as appropriate.

The second group of material was recorded at a lower level of detail. For the main (domestic) taxa the taxon, measurements and mandibular aging only were recorded. Minor species such as birds were recorded in detail as in the first group. Notes were also made of any unusual bones or special groupings in the main taxa. Supporting tables not given in text form part of the archive.

Results

The total of individual bone specimens recorded at the higher level of detail is 5573 (Group A). The total recorded at the lower level is 4482 (Group B, scan). The selection was split as evenly as possible between the phases. The bones from the smaller sites of Knapwell Plantation (KP), Jeavons Lane (JL) and Little Common Farm (LCF) were all recorded at the higher level, as was a selection from Lower Cambourne (LC; also referenced here as LG). The bone selected for the lower level of detail is the remainder from this large site (LC/LG scan). The small amount of bone from other sites was not examined.

Sieved material

Bone from sieved samples offers two main types of data: the smallest elements of large mammals and the remains of small fauna such as fish. These are less likely to be fully collected by hand and may even be missed completely. Animal bone from sieved samples thus provides a check on the possible biases in the hand collected assemblage and can also provide significant information on the smaller fauna. All the sieved samples were examined from the contexts selected for detailed analysis (Group A). Not all contexts were sampled and not all samples produced animal bone. There is bone from 113 samples, but totalling only 1014 bone specimens. These include a few bones of voles and mice and some of cattle, sheep and pig. There are no bones of fish or birds. The vast majority of the remains (71% in Phase 2 and 91% in Phase 3) were undiagnostic fragments of large mammals, often no more than a couple of centimetres in size. Most samples offered less than 10 specimens in total and were added to the context totals, but a summary of the taxa by context is given in archive. Although the contribution is minor, it is worth noting that several of the smaller foot elements of sheep/goat are mainly from these samples and, for Phase 2, all four of the 2nd phalanx and all five of the 3rd phalanx. Any samples from the Group B contexts were not closely examined but appeared to be similar in character.

Material from minor phases

There are just 34 fragments from contexts assigned to Phase 1 (Bronze Age), which includes material from features classified as natural. As there are so few, these are mainly excluded from the analysis detailed below. The taxa counts are listed in those tables that give all phases and are fully detailed in archive. Similarly there is a small amount of material from Phases 4 (Saxon), 5 (medieval) and 6 (post-medieval) and some unphased material, these are treated in the same way and the majority of the analysis concentrates on Phases 2 and 3, the Iron Age and Romano-British material respectively.

Taphonomic considerations

With such a large excavation area covering several separate sites it is particularly important to examine the preservation of material prior to other analysis; differing condition is likely to affect, among others, taxa representation, ageing data and measurements and therefore introduce bias into the analysis.

The overall preservation state of each context group was classified to one of five categories:

1 Good
2 Quite good
3 Fair
4 Poor
5 Very poor
6 Mixed

To be classed as 1 (good) almost all bone fragments in the context were required to have intact surfaces with no erosion or breakage. Class 2 (quite good) was assigned to contexts where most bones had slight surface damage but where fine details such as butchery are still visible. Class 3 (fair) contexts contain bones where at least half have

such a degree of surface damage that some details are obscured and measurements are restricted. Contexts classed as 4 (poor) contained many bones that were damaged enough by breakage and attrition to prevent detailed recording, while in the case of 5 (very poor) the bones are much eroded and few can be identified beyond a general grouping. Class 6 (mixed) was used where contexts contain bones with several different individual states of preservation and no clear overall category. In addition the individual records of Group A material give further details of the condition of each specimen. These include erosion, gnawing, burning and other aspects of appearance such as flaking and staining.

Most of the bones are lightly soil-stained and with a chalky appearance where broken. Many have poor mechanical integrity and were often recorded as brittle, fragmenting along natural weaknesses. The bone surfaces frequently show meandering 'root' marks where plant roots and/or fungal hyphae have chemically eroded the bone (**Plate Animal Bone 1**). Although many contexts have been classed poor or fair, there is an enormous amount of variation both within and between contexts. Regardless of condition, it was usually possible to classify the majority of fragments to taxonomic group and anatomical element. Where bone surfaces were not intact fine details (such as butchery, gnawing and pathology) were difficult to see and sometimes all details were obliterated entirely. This must inevitably bias results at an individual bone and context level. If these effects apply to equal proportions of assemblages (e.g. to both Iron Age and Romano-British) then overall analysis will remain valid, if not then this bias must be taken into account during analysis. Comparisons were thus made between sites, phases, context types and taxa to establish whether there were any patterns to the preservation state.

Plate Animal Bone 1. 'Root' marks on surface of bone

In total there are 10,055 bone specimens from 1072 contexts, of which 92% is from Phases 2 and 3, Iron Age and Romano-British respectively. The Lower Cambourne material combined accounts for 69% of the contexts and almost 73% of all bone. Over a third of contexts (36.6%) were classed as fair and a further 28% as quite good. Contexts classed as poor account for 25%. Little Common Farm and Lower Cambourne have the highest numbers of quite good contexts and the lowest number of poor (**Table Animal Bone 1**). Contexts and fragments classed as mixed or at either extreme are relatively few from any of the sites. If fragment counts are examined the results are similar for overall percentages: 36% fair, 29% quite good and 20% poor. There are, however, marked differences between the sites (**Table Animal Bone 2**). Knapwell Plantation and Little Common Farm have the highest proportion of quite good and the lowest for poor. Jeavons Lane has the lowest value for quite good, most fragments being classed as fair or poor. The two groups of material from Lower Cambourne are similar but not as close as might be expected; the Group B, scanned, material is slightly less well preserved. This difference appears to be relative to the amounts of bone from the two main phases. In both groups Phase 2 material is better preserved than Phase 3 and a much higher proportion of the Group B material is from this phase. For Group B 60% of the bone is from Phase 3 and 31% from Phase 2 whereas this is almost reversed for the Group A material – 60% from Phase 2 and 27% from Phase 3 (**Table Animal Bone 3**). This might also explain the results for Jeavons Lane as this too has a higher proportion of material from Phase 3. Again, Little Common Farm has quite well preserved material and almost all from this site is from Phase 2. Although this difference is not large it appears to be consistent and cannot be due to recorder bias as the material was recorded prior to phase assignment.

Context type can also affect preservation; shallow features often contain less well-preserved material than ditches and pits. Overall the best preserved bone is from well fills, with 87% of the bone from contexts classed as quite good, but this feature type accounts for only 98 bones, just 1% of the total. The majority of the bone is from ditch fills, 6224 specimens and 63% of the total (**Table Animal Bone 4**). For ditch fills 30% of the bones are from fills classed as quite good, 36% as fair and 16% poor. Pit fills are the next highest contributor of bones at 1579 specimens, 16% of the total. These fills are similar in preservation class as the ditch fills but with a slightly higher proportion of quite good (39%). The smallest site, Knapwell Plantation, has the highest proportion of material from pits (487, 56%). The number of pit fill fragments equals that from Lower Cambourne, but at that site this type contributes only 20%. Jeavons Lane is the only site with significant amounts from other feature types, in this case spreads account for 17.4% of the bone (**Table Animal Bone 5**). The difference already noted between the phases, however, does not reflect feature type; most bone from both main phases is from ditches, 50% in Phase 2 and 46% in Phase 3 (**Tables Animal Bone 6** and **7**).

The proportions of the taxa can also be affected by preservation; large bones are more likely to survive and be collected than small ones. It can be seen that there is a higher proportion of cattle specimens than sheep/goat from Phase 3. This might be related to survival but first a check must be made on the size of the cattle bones; if they are more broken or butchered than from Phase 2 then the fragment count will be higher although the number of originating bones may not be. The approximate sizes of all

specimens of the main taxa are shown in **Table Animal Bone 8**. It can be seen that, although there is an expected size difference between taxa, there is no significant difference in the cattle or sheep/goat fragment size between the phases. The representation of phalanges was also examined; due to preservation and recovery bias it is normally expected that those of cattle will be better represented than those of sheep/goat and that the large first phalanx will be more frequent than the smaller 2nd and 3rd within the taxa. This inequality is likely to be greater in poorly preserved material. It can be seen that there is a difference for both cattle and sheep/goat in the representation of the individual phalanges (**Table Animal Bone 9**). As expected there are more cattle phalanges and less bias towards the first phalanx. There is also a phase difference in both taxa; the proportion of the larger first phalanx in Phase 3 is greater for both taxa, but not markedly so. There may well have been a greater number of sheep/goat phalanges preserved but not collected, as it has already been noted that most of the smaller ones were from sieved samples. Summaries of the taphonomic traces recorded for the bones by phase and by taxon are given in **Tables Animal Bone 10** and **11**. Half of all the specimens have recent breaks; it has already been noted that the mechanical strength of the bones is often weak. Some bones were often almost intact in the ground but were very soft and recovered in pieces. The large bones of cattle and horse suffered more than those of sheep/goat. Almost 69% of cattle bones had recent breaks whereas 47% of sheep/goat had breaks. Gnawing affected around 18% of both cattle and sheep/goat bones but both gnawing and breakages were more commonly observed on the few horse bones. Phase differences are negligible. It would therefore appear that, although there is a preservational difference between the two phases this is not related to context type, breakage, gnawing or any other obvious taphonomic factors and the affect on taxa representation seems to be minor.

The assemblage overall is typically dominated by bones of the domestic ungulates: cattle, sheep/goat and pig. Other taxa present in small numbers are horse, deer, dog, cat, mustelids (weasel, badger etc), hedgehog, small rodents, birds and an amphibian. The distribution of taxa in the two main phases is summarised in **Tables Animal Bone 12** and **13**. Archive tables detail taxa distribution by context, site and phase.

Cattle

Cattle bones dominate the identified assemblage, both in terms of fragment numbers (almost 50%) and in physical mass. Cattle-sized bones also dominate the undiagnostic fraction (25.7%) and, given that there are few horse bones or red deer bones, almost all of these indeterminate large mammal fragments will be of cattle. There is a slight difference between the two main phases in the proportion of cattle bones to those of sheep and pig. In Phase 3 the proportion of cattle and of cattle-sized fragments is higher, 56.5% compared with 49% in Phase 2 (**Table Animal Bone 14**). There are more pig bones in Phase 2 and when cattle is compared to sheep/goat alone the difference is smaller but still present, 58.9% compared with 54.8%. The proportion of cattle-sized fragments is also higher. It has already been discussed that this might well include a taphonomic element but seems to be a genuine, if small, difference.

All parts of the carcase are represented from the best meat cuts, such as shoulder and rump, to the low value or waste parts of the head and feet. There is inequality in the representation, with the expected taphonomic bias against small bones such as carpals. There are just 13 of these from the entire Group A material, barely enough for a single

animal. The larger and the most sturdy elements such as metapodia, tibia and humerus are much more frequent. Loose teeth account for just over 15% of the count in both Phase 2 and Phase 3. Any differences in the anatomical distribution between these two phases are negligible (**Table Animal Bone 15**).

Butchery

The poor surface condition of many of the bones obscures fine details and precludes detailed analysis. Some specimens, especially those from better preserved contexts, do however show butchery marks. Just 81 specimens in total from all of the detailed analysis (from 5573 bones) were recorded as having tool marks of any kind. Most of these (63 marks on 55 bones) were on cattle and cattle-sized fragments (10). It is probable that some of the breaks observed on limb bone shafts were also the result of butchery but breaks, including the spiral type often resulting from a chop to the bone, can also result from trampling and other post-mortem damage. These were, therefore, not recorded as butchery unless damage from the originating implement could be observed and, as has already been noted, few bones were sufficiently preserved. The marks were observed on a wide spread of anatomical elements and were probably made by two different types of implement. The finer marks, probably made by knives, were more frequent in Phase 2, on 13 bones compared with just two in Phase 3. Several of these are consistent with disjointing the ankle to remove the foot, two with separating the humerus and radius at the elbow. Knife marks round two metatarsals and a 1st phalanx would have been made when skinning. Two mandibles from Phase 2 had been cut, one on the inside (tongue removal) and one on the lateral side (skinning or cheek meat removal). The remaining marks also from Phase 2 are on radius, scapula and pelvis and were probably made when removing pieces of meat from the bone. The other, more frequent, type of mark would have been made by a heavy blade, a cleaver or axe. Some of these marks are similarly from removal of feet and joint separation but are much heavier and have often resulted in removal of parts of the bones. Of particular interest are marks on five scapulae from Phase 3 contexts at Jeavons Lane. These include the removal of the process spina and/or shave marks along the edges. These have been reported from many Romano-British assemblages, sometimes in considerable numbers from large-scale butchery dumps. Only one example was observed in a Phase 2 context (5604).

Ageing

There are very few complete cattle mandibles but there are several with at least one recordable tooth. The distribution of toothwear stages is broadly similar for the two phases, most mandibles are from subadult, adult or even aged animals (**Table Animal Bone 16**). There are a few of younger animals but none are from young calves. For Phase 2 the distribution, while not even, is well spread out over the stages present but with a peak at the final, adult but not elderly, stage. Loose teeth from this phase include five deciduous 4th premolars and eight 3rd molars, one of which is from an elderly animal. For Phase 3 the distribution is less even with two peaks; one at the subadult stage and another at the adult/elderly stages. For this phase there are no loose 4th deciduous premolars but there are nine 3rd molars, two of which are from elderly animals. Epiphysial fusion data is likely to be less reliable (due to taphonomic factors) and can only give information up to the age of about 4 years when all bones have fused. However, the limited amount of data does offer a similar pattern of mainly

adult and subadult animals. There are only two unfused acetabulae in all of the group of bone elements that fuse by about 10 months. There were, however, a few porous bones as well that probably match the juvenile mandibles in age. In addition there are one or two bones of neonates in both phases. The epiphysial data are similar for the two phases except for the final fusion stage; there are more unfused specimens from Phase 3, 69.6% compared with 56.8% in Phase 2 (**Table Animal Bone 17**). As the poorer state of preservation would, if anything, produce a bias against unfused bones this difference implies that more cattle were killed under 4 years old in Phase 3, matching the mandible data.

Breakages, erosion and unfused epiphyses reduce the number of bones that offer metrical data. A total of 174 specimens were measured, 157 from the two main phases. Measurements are mainly of the elements that have early fusing epiphyses such as scapula, humerus, tibia and metapodia. A summary of the most frequent is given in **Table Animal Bone 18**. Withers height estimates, mostly but not exclusively from metapodia, range from 1.032 m to 1.322 m with a mean of 1.169 from 30 specimens (**Table Animal Bone 19**). The metacarpal index was also calculated and gives six as probably male (index value of over 30) and four as probably female (index under 30). There is a slight but discernable increase in the measurements and the withers heights between Phase 2 and Phase 3.

Pathology

Pathologies and non-metrical variations were recorded on 27 specimens, mainly on mandibles, feet and pelvis. Oral pathologies and abnormalities are the most commonly observed. One loose 3rd molar is of the type with a very small final column; not a disease but a variation that may be more prevalent in material of Romano-British date (O'Connor 1989). One mandible exhibits the other non-metrical trait commonly seen in cattle: absence of the 2nd premolar. Other mandibles show evidence of periodontal disease with swelling, erosion and porosity around the molar/premolar gum line. One jaw has a noticeable depression in the probable region of the 4th premolar root (all teeth had been lost), which is probably the site of an abscess with a healed drainage sinus (**Plate Animal Bone 2**). A maxilla has two abnormalities, the 4th premolar impacted on the 1st molar and a mis-worn 3rd molar. This tooth projects at the rear, probably indicating that the corresponding lower molar is absent or lacks the final column (**Plate Animal Bone 3**). An astragalus from Lower Cambourne Phase 2 (context 90449) has eburnation (polishing) of the distal lateral face. This part articulates with the distal part of the calcaneum and indicates breakdown of the cartilage. Eburnation is often seen on the pelvic acetabulum and there are two examples here. In the specimen from Phase 2 context 90046 the wear is so severe that the underlying cancellous tissue is exposed (**Fig AB4**). One metacarpus and two metatarsi are slightly lopsided; this may be an indication of a plough or cart animal. Two other metacarpi, both from Phase 3 contexts, are slightly expanded laterally. One of these also has some eburnation of the distal joint, both further indications of possible draught animals. That particular bone, from Jeavons Lane, was very large (i.e. probable bull or castrate), but was so fragmented that measurement was not possible. Three phalanges also exhibit changes that might indicate working animals; they all have flared or spread proximals. One also has bone extensions involving the shaft (**Plates Animal Bone 5** and **6**). The cattle include at least some horned animals. Although mainly fragmented, it can be observed that the horn cores are rather

variable. They include short, dense specimens and longer, thinner ones, one of which was noticeably grooved. While age and sex strongly influence horn cores one specimen shows that they can vary individually; this bucranium had both cores, one shorter than the other and down-turned while the longer one was grooved and more horizontally positioned.

Plate Animal Bone 2. Cattle mandible, with probable site of abscess with a healed drainage sinus

Plate Animal Bone 3. Cattle mandible, with the 4th premolar impacted on the 1st molar and a mis-worn 3rd molar

Plate Animal Bone 4. Cattle pelvic acetabulum, with severe eburnation which has exposed underlying cancellous tissue

Plate Animal Bone 5. Cattle phalange, with flared proximal and bone extension involving the shaft

Plate Animal Bone 6. Cattle phalange, with flared proximal and bone extension involving the shaft

Sheep and goat

Of the large number of ovicaprid bones (1373 from the two main phases) relatively few could be distinguished to sheep or goat, partly because they are undiagnostic elements but also because most bones are incomplete. In total 134 could be identified, five as goat and 128 as sheep. There are three fragments of definite goat horn cores; from Phase 2 Lower Cambourne contexts 1143 and 2783, and a piece from a large (male) specimen from Jeavons Lane context 80227 in Phase 2. A frontal bone from

the Lower Cambourne Phase 2 context 90453 can also be identified as goat from the position of the horn core bases and the cranial sutures. One mandible from a goat kid could be identified in the Phase 2 Lower Cambourne context 90040. In contrast 16 mandibles could be identified as being from young lambs. Other positively identified sheep bones include elements of the foot, humeri, radii, scapulae, skull fragments, horn cores and loose deciduous premolars (**Table Animal Bone 20**).

Just five sheep/goat bones had any observable butchery marks. The partial, horned, goat skull from Phase 2 context 90453 had been axially divided (either to more easily access the horns for working, or to extract the brain). There was a similar example for sheep in Phase 3 context 241. The three remaining marks were made by finer, probably knife, blades on an astragalus, distal tibia and humerus, all consistent with disarticulation.

Ageing data from toothwear and eruption is a little more frequent than for cattle but again there are few complete mandibles. Very few mandibles (or loose teeth) were of young lambs, but there is a wide spread of other stages equating to animals from nine months upwards and including elderly stock. There is a slight difference between the phases, most of the mandibles from Phase 2 fall between stages 3 and 5 and represent subadult and adult animals but not aged ones (**Table Animal Bone 21**). Phase 3 on the other hand has many mandibles of these stages but also has a peak of mandibles at stages 6 and 7. These mandibles with well-worn teeth came from animals between about four to eight years old at death (Zeder 2003).

Bones with epiphysial fusion data are rather few considering the number of bones; this reflects the number of shaft fragments in comparison with surviving epiphysial ends. As this is likely to be biased against the latest-fusing, least-dense epiphyses the data is less reliable than that from mandibles. Again, although the numbers are small, there does seem to be a distinct difference between the phases (**Table Animal Bone 22**. Of the bones that have early fusing epiphyses most (over 90%) are fused in both phases and represent animals that had survived at least the first 7–10 months. After this stage there are fewer fused bones and a steady decline in the survival percentage. In Phase 2 over 80% of the bones that fuse last are still unfused; representing animals killed before about 3-4 years. For Phase 3 there are comparatively more old animals; a third of the bones in this final fusion stage had fused epiphyses and were therefore from animals over four years. As with the mandibles there are a few bones that represent neonatal mortalities.

Metrical data is available for some (68) of the bones, although these are biased in favour of the most sturdy and early fusing elements (a summary of the most frequent is given in **Table Animal Bone 23**). Withers height estimates could be calculated for just 10 bones, as these were the only ones both complete and fused. They include six metatarsi, two metacarpi, a radius and a humerus, and are from various sites and phases. These 10 values range from 0.508 m to 0.672 m with a mean of 0.579 m (**Table Animal Bone 24**).

Abnormalities were observed on three horncores and 13 mandibles; none were recorded on postcranial elements, although this lack might in part reflect the poor surface condition of many bones. The three horncores are all of sheep and from Phase 3. They have the ‘thumb’ marks probably related to a period of malnutrition

(Albarella 1995). The oral abnormalities include malocclusion of the 1st and 2nd molars and the 4th premolar and 1st molar. There are two instances where the deciduous 4th premolar is impacted on the fully erupted permanent premolar, with associated periodontal erosion (**Plate Animal Bone 7**). In one specimen the whole mandible is swollen in the midregion, perhaps the result of an abscess. The 1st molar is absent and the alveolus is beginning to infill, the premolars are also absent but may have fallen out post-mortem. Similarly there is a pair of mandibles with a porous swelling below the deciduous 4th premolar on both sides that might indicate an underlying infection.

Plate Animal Bone 7. Sheep mandible, with the deciduous 4th premolar impacted on the fully erupted permanent premolar, with associated periodontal erosion

Pig

There are only 269 pig bones, and consistently fewer in each phase than either cattle or sheep, with the exception of the statistically unreliable handful of bones from Phase 1. Overall pig bones constitute only 7.3% of the cattle/sheep/pig total. In Phase 2 pig remains are at 10.5% while they reach only 4.1% in Phase 3.

All areas of the body are represented with a bias in favour of the head. Loose teeth and foreleg also appear to be frequent in Phase 3, but as the total for this phase (for the Group A, detailed, material) is just 14 bones this is unlikely to be very reliable. For Phase 2 less than 10% are loose teeth but 21% of the remains are of mandibles (**Table Animal Bone 25**). These jaws are mainly of sub-adult or adult animals with the 3rd molar visible or in wear; very few are of young piglets. There are few other bones of young piglets either – although it should be remembered that the poor preservation in some contexts will have reduced the likelihood of their survival. Almost all of the epiphysial fusion data comes from Phase 2 material; only two bones from Phase 3 had recordable data. In Phase 2 just over 11% of the bones with early fusing epiphyses were unfused and were, therefore, from animals killed under a year

old. In contrast over 83% were unfused at the next stage (animals of under 2–3 years old) and all the bones from the last fusion stage were unfused, implying that none of the remains were from pigs over three years (**Table Animal Bone 26**).

Just 11 pig bones were measured, no large values were recorded and the appearance of all bones is of domestic animals. Even fewer had visible butchery marks. One skull and two jaws evidenced the typical axial division of the head, another jaw (from Phase 3, context 5722) had been chopped though ventrally near the rear, perhaps when cutting the whole head off.

Other taxa

Horse

There are 233 equid bones in total, less than 3% of all bone and under 6% of identified bone. All the teeth and phalanges are definitely of horse, the remainder are indeterminate but probably also horse. Most occur as single bones or small groups of teeth. None of the remains are from clear associations beyond two or three elements, but as several of the remains are from segments of ditches they may belong to partial or complete skeletons not fully excavated. Most, but not all, of the horse bones are fused. One tibia from Phase 2 context 5064 at Lower Cambourne and two (not a pair) from Jeavons Lane Phase 3 context 80205 have unfused epiphyses, ie, are from animals under two years old and therefore not yet old enough for work. Most of the teeth are the permanent set and are in wear, but are not often of aged animals. Approximate ages range from 3 to 14 years based on crown heights (Levine 1982). In comparison to the other ungulates measurable bones are relatively frequent at 39 specimens. This is undoubtedly due to the difference in purpose; horses tend to be kept well beyond the age at which the epiphyses are fused and are less commonly butchered. The bones include 11 complete specimens from which withers height estimates could be made. These range from 1.154 m to 1.417 m, ie, pony-sized ((**Table Animal Bone 28**). One horse bone is butchered and in an unusual manner; this is a 1st phalanx from Phase 2 context 90009 at lower Cambourne that has been chopped in half axially. Two trial chop marks are also visible on the plantar side. This type of butchery was extremely common at the Roman quarry site of Mons Claudianus in Egypt (Hamilton-Dyer 2001a) and was suggested as reflecting an industrial use, for glue for example, but this author does not know of any examples from Britain. Another phalanx, this time a 2nd, is one of two horse bones exhibiting pathology. It has considerable extra growth around but not affecting the articular surfaces. The other specimen is a metacarpus with the lateral metacarpus fused to it on the medial side.

Dog

Dog bones at 232 specimens are numerically as frequent as those of horse, but 75% (174) are from a single animal from Phase 3 pit 1550. The remaining 58 occur mainly as single bones.

Despite the fragility of the remains almost the entire skeleton from context 1550 at Lower Cambourne was recovered, including most of the phalanges and carpals. In view of the excellent recovery, the lack of an os penis probably indicates that this was

a female. The skull is extremely fragmented and only the maxillary tooth row was measurable. The teeth in both the maxilla and mandibles are the permanent dentition and are well worn. The teeth and jaw fragments have no visible abnormalities, however, and the teeth are well spaced and not crowded. Few bones were sufficiently complete to allow measurements but a humerus and radius do offer shoulder height estimates of 0.539 m and 0.544 m respectively . A femur and tibia were also largely complete but much fragmented; estimates of shoulder height from these were calculated at 0.535 and 0.552 m respectively. Several of the postcranial bones show pathological changes that are commonly seen in old dogs. These include extra bone growth around the elbow joint and on some vertebrae, as well as fusion of the fibula with the tibia shaft. In addition the left calcaneum is unusually thickened and has a perforation in the proximal surface. Two ribs also have extra bone growth on the shaft, which might indicate reaction to an injury.

A high proportion of the remaining 58 dog remains are of skull or mandible fragments. Few are substantially complete, although most of a skull from Phase 3 context 5647 at Lower Cambourne could be reconstructed. The wear on the teeth of this individual suggests an old dog and the 2nd upper molar had been lost and part healed over before death. The limb bones and mandibles range in size and shape from 'small terrier' to animals of retriever size. A humerus and 4th metacarpus from Phase 3 context 1952 are from an extremely small dog similar in size to recent types such as Yorkshire terrier. The estimate of shoulder height from the humerus gives a value of just 0.244 m. Bones of larger dogs include a complete ulna from Phase 2 context 2811 that offers a shoulder height estimation of 0.578 m.

The dog remains all have fused epiphyses except for an isolated foetal or neonatal humerus from Phase 2 context 5212.

Cat remains are more rare than dog but present; a complete fused radius from the scanned Phase 2 context 2792 and a partial femur and tibia from the scanned Phase 3 context 2507.

Wild mammals

Red deer remains number 15. Just one of these is a postcranial element, a partial humerus from Jeavons Lane Phase 3 context 80763 with a distal trochlea breadth of 51.6 mm. Although this is quite large there is no certainty that it is from a male. Antler pieces, however, can be identified as stag. There are eight contexts with antler fragments. The remains from Lower Cambourne Phase 2 context 509 are much fragmented but are assumed to be from what must have been a complete, large, shed antler. A partial shed antler was also found in Phase 3 context 162. This specimen had the brow tine chopped off. The four large beam fragments from Phase 2 context 128 are probably from a single antler, whether shed or not cannot be determined. The two fragments of antler from Phase 2 context 5064 are probably from the partial cranium in the same context, which included part of an antler pedicle. The remaining find is a jaw from Jeavons Lane Phase 3 context 80313 with the 3rd and 4th premolars in full wear.

Remains of roe are less frequent, just four bones. Two of these are antler pieces, one from Jeavons Lane Phase 2 context 80768 and one from Lower Cambourne Phase 3

context 1983. Neither is complete and it cannot be determined whether these were naturally shed or from carcasses. The radius from the Lower Common Farm Phase 2 context 90036 and the metatarsus from Lower Cambourne Phase 3 context 1738 may well be from hunted animals. The metatarsus is worked, with the proximal end sawn off and the shaft slightly polished.

A badger radius and ulna were recovered from the scanned Phase 2 context 1990. Without butchery evidence it is impossible to ascertain whether these are from a natural mortality of this common burrowing animal, or the remains of a utilised one.

A radius of a smaller mustelid was recovered from 2032, also a scanned Phase 2 context. This matches pinemarten, a valuable fur species but one that has also been regarded as vermin for predating domestic poultry.

Smaller mammals were recovered from a few of the sieved samples and also from two contexts by hand. Water vole is the most frequent species and is present in four Phase 2 contexts. Field vole occurs in one Phase 3 sample and an unphased context. A hedgehog ulna was recovered from scanned Phase 3 context 2666. Until recently the watervole was a common sight along reedy stream banks and water meadows. Field voles can also be found in water meadows and also along wood and field margins. Hedgehogs prefer bushy areas such as hedges, orchards, gardens and woodland margins.

Birds

Bird bones are rare, just 77 in total, less than 1% of the remains and over half of these came from one context. Domestic fowl bones are the most frequent of the remains (53 bones). Most of these are a large group of 40 bones recovered from unphased context 2638. These are not from a single burial but are from at least two birds of differing sizes. Both spurred and unspurred metatarsi are present and it seems probable that the remains are of at least one male and one female. No head elements are present but there are some toes and other small bones. The remaining 13 bones are scattered across sites and phases as one or two bones per context. Just one bone, a humerus from context 147, has butchery marks. These are repeated small cuts near the distal joint, consistent with removal of the lower part of the wing.

Birds other than domestic fowl number 24 of at least eight species, mainly from Lower Cambourne. The largest of these is swan, two partial bones from Phase 2 context 1339. The only bone of goose is a cut ulna shaft from 5258. The smoothed end forms a tube that might have been intended for use as a flute. Ducks are represented by three bones from Phase 3 contexts; a carpometacarpus and a coracoid comparable with mallard from 1234 and 2308 respectively and a tibiotarsus from a slightly smaller duck of wigeon/gadwall size in 1953. Two wader ulnae of plover size occur in separate contexts - Phase 2 context 1943 and Phase 3 context 1234. The ulna of a corncrake was recovered from the scanned Phase 3 context 1738. This small migratory bird is now absent from most of Britain (Snow and Perrins 1998) but was once a common summer visitor to damp hay meadows (Reid-Henry and Harrison 1988). There are three separate occurrences of raven, from Phase 2 contexts 1943 (Lower Cambourne) and 90404 (Little Common Farm) and context 5057 (Lower Cambourne) in Phase 3. This species is also now much reduced in its range but was

once a familiar bird, scavenging dead sheep and stillborn lambs. The final bird bone is the femur of an owl. This comes from the Phase 3 context 1877 at Lower Cambourne and matches the genus *Asio* rather than those of the tawny and barn owl families. Two *Asio* species are currently present in Britain, *A. otus*, the long-eared owl, and *A. flammeus*, the short-eared. Both are resident in the north but the latter is only a winter visitor to the southern half of Britain (Snow and Perrins 1998). While long-eared therefore seems the most likely, the bones are too similar to distinguish the species from a single damaged bone.

No fish remains were found, even in the sieved samples. One amphibian fragment was recovered from Phase 3 context 2308.

Discussion

The animal bone assemblages are derived from a wide area and certainly from the activities of more than one farmstead or settlement (although they may be closely connected). Although the total amount of bone seems large (NISP 10,055 from all phases) over half is indeterminate and the average number of specimens per context is just 10.7 in total. Hambleton (1999) considers that a minimum of 300 specimens of the main taxa (cattle, sheep, pig) is needed for useful analysis. Here, therefore, it has been necessary to analyse the data in large groupings, mainly by phase. As a result any subtleties of the data between individual areas of each site are subsumed in the overall picture. Although this is not ideal it has the advantage of a broader view not possible at smaller sites where individual peculiarities can over-emphasise certain aspects of the assemblage.

The overall taxa representation is similar for both the Iron Age (Phase 2) and Romano-British (Phase 3) assemblages. The material is typically dominated by the bones of cattle and sheep/goat with a lesser amount of pig. Horse is a minor but consistent component. Both assemblages have a few occurrences of dog, cat, domestic fowl, watervole, and one bone each of raven and plover. Other species are so rare that their distribution may be random. In Phase 2 there is pinemarten, badger, and swan, in Phase 3 there is hedgehog, duck, owl, corncrake and an amphibian.

Cattle are more prominent than sheep/goat and the larger carcase would have provided more meat. There is just a hint that cattle is more important in the later phase and for both there seems to be a shift towards older stock, perhaps a greater interest in secondary products. This has been noted at other local Cambridge sites such as Orton Hall Farm (King 1996) and Tunbridge Lane, Bottisham (Baxter 2001) and may indicate that the younger beasts were being sent to supply the towns. Larger individuals of both taxa are also present in Phase 3, again something that has been noted locally and further afield (Dobney 2001).

There is, however, almost no difference in the carcase distribution between the two phases. In particular there are none of the bulk beef butchery dumps often seen in many urban and military assemblages (Hamilton-Dyer 2001b, 2005; Maltby 1989, 1994; O'Connor 1986). Pig is also very minor at this site, even in the later phase; again it is more frequent at some Romanised sites.

Evidence for bone and antler working is negligible but present. One of the few pieces of antler found had the brow tine chopped off. This is a shed antler and therefore presumed to have been deliberately collected (context 162). The roe deer metatarsus from context 1738 seems to have been deliberately worked; this is the distal half of the bone and, although rather eroded, appears to have been sawn mid-shaft and has a slight polish. A sheep/goat metacarpus from context 2874 has similar polish; it is unknown whether this was a complete bone as it has a recent break at the polished area. A cattle femoral caput from Little Common Farm (context 90447) was both chopped off and centrally pierced, perhaps intended as a spindle whorl. The bone is, however, just the unfused epiphysis and it is possible that this was not realised until the two parts separated. No doubt some of the cattle, sheep and goat horns were also made use of but no evidence has survived. One fragment of cattle metatarsal shaft from context 90453 had been sawn and is therefore probably an offcut from working, as saws were not used in butchery.

Site specifics

Although this analysis has mainly concentrated on the assemblages as a whole, there are some differences between the individual sites.

Knapwell Plantation is the smallest assemblage with a few hundred specimens, divided almost equally between the two main phases. Comparatively little bone was found in the densely packed Phase 2 Iron Age features, and pits contributed a higher proportion of the total than from other sites. The number of cattle bones is the same for both phases but there are many more sheep/goat bones from Phase 2.

Little Common Farm and Jeavons Lane both contribute just over 1000 specimens from the two phases. At Little Common Farm almost all of this bone is from Iron Age contexts, mainly ditch segments. All of the minor mammal taxa are present except cat; raven is also present.

Jeavons Lane generally has the least well preserved material but, as already mentioned, this seems related to the phase and most of the bone is from Phase 3 Romano-British contexts. Much of the bone comes from linear ditches, perhaps animal enclosures, and a spread and pit within these enclosures. The cattle bones from this site and phase include several larger than from the other sites. In addition the few butchery marks include ‘classic’ Roman style trimming of scapulae, considered to represent cured shoulders. These findings most commonly occur in urban deposits but also at some other sites such as villas and roadside settlements (Dobney *et al*. 1996; Hamilton-Dyer 2001b, 2005; Lauwerier 1988; Maltby 1989, 1994; O’Connor 1986).

Associated bones and special deposits

There are very few instances of associated bones and partial skeletons at Cambourne but they are present. The dog in Phase 3 pit 5550 at Lower Cambourne is the most complete example. No other remains were in this feature and it seems likely that the pit was dug specifically for disposal of this old dog. In another Phase 3 pit (1308) at Lower Cambourne the 20 bones of a partial lamb are mixed with other, domestic-type waste and are assumed to be disposal of a natural mortality. With a few exception cattle skulls are mainly found in association with other bone waste and do not seem to

be specially placed. There is an example of a partial skull with little else in one fill of pit 140, but with mixed material in the other. A similar candidate for possible ritual is pit 90149 at Little Common Farm. From the top fill of this feature came a sheep/goat axis and the very fragmentary remains of a cattle skull and maxillary teeth. At the time of excavation this could be seen as a mostly complete skull placed upside down in the centre of the top of the pit. This might go unremarked except that four large stones and two late Iron Age pot rims had been placed on the base of the pit.

The remains of a horse skull and mandibles were found together with a red deer antler but no other bone in ditch segment 80351 at Jeavons Lane. These last were in poor condition and much fragmented. Ditch segment 5259 at Lower Cambourne contained many cattle and cattle-sized bones, but apparently no skull (this was dug in two parts with a smaller amount within the scanned bone; a pair of scapulae were noted in this but no mandibles or obvious skull). At least some of these bones are probably from one, apparently unbutchered, carcase but other, butchered, bones are also present. Similarly there are several cattle bones that may be from one carcase in fill 60295 of pit 60282 at Knapwell Plantation and another possible grouping in fill 60322. It is quite common to find complete or partial carcasses in ditches, as these are convenient places to dispose of large, noxious, waste (Wilson 1996). Dumps of stripped carcases can also be found in pits (Maltby 1985a). While special deposits can be found in Iron Age ditches, particularly at the terminals (including two horses at nearby Love's Farm, St Neots, Ian Baxter pers comm.), these are more usually found in pits, for example the deposits in grain pits at Danebury hillfort (Grant 1984b). At Fordham, near Newmarket, several associated bone groups were found in this large Early Iron Age assemblage (Baxter 1998). Such structured deposits, such as skulls and skeletons at pit bottoms associated with other non-faunal remains, may be more frequent at some site types and in some regions than others. Hill (1995) considers that all structured deposits should be regarding as having some symbolic content, as secular and profane activities may not have been separate.

The tripole graphs and division of settlement types of King (1988) are probably an oversimplification but they give a useful guide for comparisons. For both phases the relative percentages of cattle, sheep and pig at Cambourne fall well within the polygon for unromanised settlements. The percentages also fall just inside the polygons for vici and villas, although in this case the earlier Phase 2 is very much on the edge as might be expected.

Comparison with other sites regionally and further afield

The area in the vicinity of Cambourne is generally low-lying and open, and the whole region lies outside the zone dominated by hillforts such as Danebury, so perhaps it is not unexpected that the Iron Age animal bone assemblages are not quite like that found there.

The proportions of the main taxa are quite close to the Romano-British site at Orton Hall Farm near Peterborough (King 1996). Cambourne is also similar in this respect to Haddon, Cambridgeshire, especially the very low pig, but with slightly less sheep (Baxter 2000). Haddon, however, has relatively high horse not seen at Orton Hall Farm. The Romano-British villa/farmstead at Bottisham, Cambridgeshire, had a much higher proportion of cattle and horse and very little sheep and other taxa (Baxter

2001). This may be a combination of taphonomy and disposal practises as much of the bone was from metalled surfaces (counting against the smaller and more fragile bones) and the excavation site seems peripheral to the main occupation (large waste is often disposed of in peripheral features – see Wilson 1996). Sites around Norman Cross on Ermine Street also had high levels of horse, perhaps because of their roadside position (Albarella 1997). A Middle Iron Age site at Fen Ditton is similar to Cambourne in that it has a high level of cattle, rather than sheep, and other taxa representations are also similar (Baxter 1999). Associated bones were rare and there were no complete skeletons. Middle Iron Age Haddenham on the fen edge has, among others, a high level of beaver and seems a special case (Evans and Serjeantson 1988). Wardy Hill nearby is Late Iron Age; it has a very high amount of sheep and also has pike and otter (Davis 1999), again rather different from sites away from the fens.

The very low level of pig at Cambourne and at other local sites could in part reflect the local environment – lacking extensive woodland for pannage (Albarella 1998). There may also have been little interest in pig from the local inhabitants. The owl, if the long-eared, may indicate stands of conifers or scattered deciduous trees rather than dense woodland. The low amount of bird generally is typical, poultry seem to become more frequent when associated with 'Roman' (eg, urban) rather than 'native' sites and wild birds are often restricted to a few waterfowl, waders and scavengers. The swan, ducks, plover and raven are therefore to be expected from this area. Corncrake is uncommonly identified even from sites that might be expected to offer a suitable habitat – damp hay meadows, but this is almost certainly because its small bones do not survive or are overlooked, particularly if there was little or no sieving. An almost complete carcase was recovered from Romano-British deposits at Bottisham (Hamilton-Dyer 2003).

Fish is completely absent at this site; Saxon and later sites in Cambridgeshire usually offer quite a few bones of fresh and marine species but it seems typical that Iron Age sites have very few, and those usually restricted to local freshwater species such as eels. Romano-British sites sometimes have a better representation of fish, but usually only from urban/military settlements.

These results, although not exactly the same as others from the immediate area, do seem to fit a regional pattern. The usual Iron Age dominance of sheep is rather less in this rather wet, low-lying region than at the 'classic' chalk downland sites. The proportion of cattle increases in the Romano-British period, especially at certain sites, probably with a higher degree of Roman influence and increased demand for beef. Sheep in the later material are often older than in Iron Age assemblages, probably kept for wool. Pig, a notable feature of some, mainly urban, sites elsewhere (for example Dorchester, Maltby 1985b; 1994) is at a low level in all of these sites; Cambourne is no exception. Remains of hunted animals are rare, a finding also not restricted to Cambridgeshire. Poultry and wild birds are present but infrequent. In conclusion these assemblages appear to represent local Iron Age farmsteads that continue into the Romano-British period with only minor changes.

There does seem to be some improvement of animal husbandry, or introduction of some larger stock. There is also a change of emphasis to more and older cattle and older sheep. At least one site, Jeavons Lane, indicates influence of Roman butchery

style with evidence of cured beef shoulders, although these were probably traded in for consumption rather than produced on site.

It is curious that the later, Phase 3, material is generally less well preserved than the earlier, Phase 2 even in the same context type. It is perhaps possible that local environmental conditions were different, i.e. drier or wetter, while the material was accumulating, but before it had stabilised within the burial environment.

SPECIES LIST AND ABBREVIATIONS USED IN TEXT, TABLES AND ARCHIVE

HOR	domestic horse, *Equus caballus*
COW	domestic cattle, *Bos taurus*
SHE	domestic sheep, *Ovis aries*
GOA	domestic goat, *Capra hircus*
S/G	sheep, *Ovis aries* and/or goat, *Capra hircus*
PIG	domestic pig, *Sus domesticus*
RED	red deer, *Cervus elaphus*
ROE	roe, *Capreolus capreolus*
LAR	large ungulate size (probably mostly cattle but may also include some horse)
SAR	small ungulate size (probably mostly S/G and PIG)
MAM	unidentified bone, probably mostly SAR and/or LAR
DOG	domestic dog, *Canis familiaris*
CAT	domestic cat, *Felis catus*
BADGER	badger, *Meles meles*
ERI EUR	hedgehog, *Erinaceus europaeus*
ARV TER	watervole, *Arvicola terrestris*
FOW	domestic fowl, *Gallus gallus*
GOO	domestic goose or greylag, *Anser anser*
ANAS/D	domestic duck or mallard, *Anas platyrhynchos*
ANA SPP	other duck, cf. wigeon, *Anas penelope*
WADER	wader cf. woodcock, *Scolopax rusticola*
RAVEN	raven, *Corvus corax*
BIR	bird bone fragments, probably mostly fowl
AMPH	amphibian, includes common frog, *Rana temporaria*

Table Animal Bone 1. Bone preservation by site and context totals

site	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*	*Total*	*%*
Lower Cambourne	8	92	68	6	39	4	217	*20.2*
Lower Cambourne scan	3	130	203	21	175	31	563	*52.5*
Jeavons Lane	4	14	50	0	28	11	107	*10.0*
Knapwell Plantation	9	17	33	1	19	2	81	*7.6*
Little Common Farm	7	45	38	0	9	5	104	*9.7*
Total contexts (no.)	31	298	392	28	270	53	1072	

site	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*
Lower Cambourne	*3.7*	*42.4*	*31.3*	*2.8*	*18.0*	*1.8*
Lower Cambourne scan	*0.5*	*23.1*	*36.1*	*3.7*	*31.1*	*5.5*
Jeavons Lane	*3.7*	*13.1*	*46.7*	*0*	*26.2*	*10.3*
Knapwell Plantation	*11.1*	*21.0*	*40.7*	*1.2*	*23.5*	*2.5*
Little Common Farm	*6.7*	*43.3*	*36.5*	*0*	*8.7*	*4.8*
Total contexts (%)	*2.9*	*27.8*	*36.6*	*2.6*	*25.2*	*4.9*

Table Animal Bone 2. Bone preservation by site and fragment totals

site	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*	*Total*	*%*
Lower Cambourne	76	916	886	206	350	28	2462	*24.5*
Lower Cambourne scan	53	895	1489	674	1172	199	4482	*44.6*
Jeavons Lane	106	113	502	0	366	49	1136	*11.3*
Knapwell Plantation	75	466	235	6	83	5	870	*8.7*
Little Common Farm	19	516	492	0	53	25	1105	*11.0*
Total contexts (no.)	329	2906	3604	886	2024	306	10,055	

site	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*	*Total*
Lower Cambourne	*3.1*	*37.2*	*36.0*	*8.4*	*14.2*	*1.1*	
Lower Cambourne scan	*1.2*	*20.0*	*33.2*	*15.0*	*26.1*	*4.4*	
Jeavons Lane	*9.3*	*9.9*	*44.2*	*0*	*32.2*	*4.3*	
Knapwell Plantation	*8.6*	*53.6*	*27.0*	*0.7*	*9.5*	*0.6*	
Little Common Farm	*1.7*	*46.7*	*44.5*	*0*	*4.8*	*2.3*	
Total contexts (%)	*3.3*	*28.9*	*35.8*	*8.8*	*20.1*	*3.0*	

Table Animal Bone 3. Bone preservation by site and phase

phase	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*	*Total*	*%*
Lower Cambourne								
0	0	21	56	52	86	0	215	*8.7*
2	25	703	576	9	151	7	1471	*59.7*
3	51	144	186	142	113	21	657	*26.7*
4	0	48	68	3	0	0	119	*4.8*
Total (no.)	76	916	886	206	350	28	2462	
Lower Cambourne								
0	*0*	*9.8*	*26.0*	*24.2*	*40.0*	*0*		
2	*1.7*	*47.8*	*39.2*	*0.6*	*10.3*	*0.5*		
3	*7.8*	*21.9*	*28.3*	*21.6*	*17.2*	*3.2*		
4	*0*	*40.3*	*57.1*	*2.5*	*0*	*0*		
Total (%)	*3.1*	*37.2*	*36.0*	*8.4*	*14.2*	*1.1*		
Lower Cambourne scan								
0	0	32	65	0	153	15	265	*5.9*
1	0	0	0	0	13	0	13	*0.3*
2	10	321	622	130	276	44	1403	*31.3*
3	43	464	801	544	723	128	2703	*60.3*

phase	*Good*	*Quite good*	*Fair*	*Mixed*	*Poor*	*Very poor*	*Total*	*%*
4	0	78	1	0	1	12	92	*2.1*
5	0	0	0	0	3	0	3	*0.1*
6	0	0	0	0	3	0	3	*0.1*
Total (no.)	53	895	1489	674	1172	199	4482	
Lower Cambourne scan								
0	*0*	*12.1*	*24.5*	*0*	*57.7*	*5.7*		
1	*0*	*0*	*0*	*0*	*100*	*0*		
2	*0.7*	*22.9*	*44.3*	*9.3*	*19.7*	*3.1*		
3	*1.6*	*17.2*	*29.6*	*20.1*	*26.7*	*4.7*		
4	*0*	*84.8*	*1.1*	*0*	*1.1*	*13.0*		
5	*0*	*0*	*0*	*0*	*100*	*0*		
6	*0*	*0*	*0*	*0*	*100*	*0*		
Total (%)	*1.2*	*20.0*	*33.2*	*15.0*	*26.1*	*4.4*		
Jeavons Lane								
0	0	2	28	0	14	1	45	*4.0*
2	1	3	44	0	31	42	121	*10.7*
3	105	108	409	0	321	6	949	*83.5*
6	0	0	21	0	0	0	21	*1.8*
Total (no.)	106	113	502	0	366	49	1136	
Jeavons Lane								
0	*0*	*4.4*	*62.2*	*0*	*31.1*	*2.2*		
2	*0.8*	*2.5*	*36.4*	*0*	*25.6*	*34.7*		
3	*11.1*	*11.4*	*43.1*	*0*	*33.8*	*0.6*		
6	*0*	*0*	*100.0*	*0*	*0*	*0*		
Total (%)	*9.3*	*9.9*	*44.2*	*0*	*32.2*	*4.3*		
Knapwell Plantation								
0	0	3	23	0	0	0	26	*3.0*
2	60	165	145	6	72	2	450	*51.7*
3	15	298	67	0	11	3	394	*45.3*
Total (no.)	75	466	235	6	83	5	870	
Knapwell Plantation								
0	*0*	*11.5*	*88.5*	*0*	*0*	*0*		
2	*13.3*	*36.7*	*32.2*	*1.3*	*16.0*	*0.4*		
3	*3.8*	*75.6*	*17.0*	*0*	*2.8*	*0.8*		
Total (%)	*8.6*	*53.6*	*27.0*	*0.7*	*9.5*	*0.6*		
Little Common Farm								
0	0	0	11	0	9	20	40	*3.6*
2	19	516	475	0	44	4	1058	*95.7*
3	0	0	6	0	0	1	7	*0.6*
Total (no.)	19	516	492	0	53	25	1105	
Little Common Farm								
0	*0*	*0*	*27.5*	*0*	*22.5*	*50.0*		
2	*1.8*	*48.8*	*44.9*	*0*	*4.2*	*0.4*		
3	*0*	*0*	*85.7*	*0*	*0*	*14.3*		
Total (%)	*1.7*	*46.7*	*44.5*	*0*	*4.8*	*2.3*		
Grand total (no.)	329	2906	3604	886	2024	306	10,055	
Total (%)	*3.3*	*28.9*	*35.8*	*8.8*	*20.1*	*3.0*		

Table Animal Bone 4. Bone preservation by site and context type

	Good	*Quite good*	*Fair*	*Poor*	*Very poor*	*Mixed*	*Total NISP*	*total %*
ditch/ segment	280	1848	2226	1105	187	688	6334	63.0
gully/ segment	5	131	172	158	5	59	530	5.3
spread intervention		3	242	222	9		476	4.7
pit	44	611	587	235	15	87	1579	15.7
plough scar				6			6	0.1
pond		24		1			25	0.2
posthole		85	130	28		40	283	2.8
scoop				28	58		86	0.9
tree throw/hollow		36	33	32			101	1.0
well		85	1		12		98	1.0
waterhole			69				69	0.7
kiln/ oven			2	7			9	0.1
grave		1	8	82			91	0.9
unknown/ no data		106	110	120	20	12	368	3.7
Total (no.)	329	2930	3580	2024	306	886	10,055	
%	*3.3*	*29.1*	*35.6*	*20.1*	*3.0*	*8.8*		

	Good	Quite good	Fair	Poor	Very poor	Mixed
% of context type in each category						
ditch segment	*85.1*	*63.1*	*62.2*	*54.6*	*61.1*	*77.7*
gully/ segment	*1.5*	*4.5*	*4.8*	*7.8*	*1.6*	*6.7*
spread intervention	*0*	*0.1*	*6.8*	*11.0*	*2.9*	*0*
pit	*13.4*	*20.9*	*16.4*	*11.6*	*4.9*	*9.8*
plough scar	*0*	*0*	*0*	*0.3*	*0*	*0*
pond	*0*	*0.8*	*0*	*0*	*0*	*0*
posthole	*0*	*2.9*	*3.6*	*1.4*	*0*	*4.5*
scoop	*0*	*0*	*0*	*1.4*	*19.0*	*0*
tree throw/hollow	*0*	*1.2*	*0.9*	*1.6*	*0*	*0*
well	*0*	*2.9*	*0*	*0*	*3.9*	*0*
waterhole	*0*	*0*	*1.9*	*0*	*0*	*0*
kiln/ oven	*0*	*0*	*0.1*	*0.3*	*0*	*0*
grave	*0*	*0*	*0.2*	*4.1*	*0*	*0*
unknown/ no data	*0.0*	*3.6*	*3.1*	*5.9*	*6.5*	*1.4*
% of category for each context type						
ditch/ segment	*4.4*	*29.2*	*35.1*	*17.4*	*3.0*	*10.9*
gully/ segment	*0.9*	*24.7*	*32.5*	*29.8*	*0.9*	*11.1*
spread intervention	*0*	*0.6*	*50.8*	*46.6*	*1.9*	*0*
pit	*2.8*	*38.7*	*37.2*	*14.9*	*0.9*	*5.5*
plough scar	*0*	*0*	*0*	*100*	*0*	*0*
pond	*0*	*96.0*	*0*	*4.0*	*0*	*0*
posthole	*0*	*30.0*	*45.9*	*9.9*	*0*	*14.1*
scoop	*0*	*0*	*0*	*32.6*	*67.4*	*0*
tree throw/hollow	*0*	*35.6*	*32.7*	*31.7*	*0*	*0*
well	*0*	*86.7*	*1.0*	*0*	*12.2*	*0*
waterhole	*0*	*0*	*100*	*0*	*0*	*0*
kiln/ oven	*0*	*0*	*22.2*	*77.8*	*0*	*0*
grave	*0*	*1.1*	*8.8*	*90.1*	*0*	*0*
unknown/ no data	*0*	*28.8*	*29.9*	*32.6*	*5.4*	*3.3*
%	*3.3*	*29.1*	*35.6*	*20.1*	*3.0*	*8.8*

Table Animal Bone 5. Totals by site and fragment totals

	LC	*LC scan*	*JL*	*KP*	*LCF*	*Total NISP*	*total %*
ditch/ segment	1665	3253	484	170	762	6334	63.0
gully/ segment	49	236	28	181	36	530	5.3
spread intervention		275	198	3		476	4.7
pit	486	261	179	487	166	1579	15.7
plough scar		6				6	0.1
pond		6	19			25	0.2
posthole	118	81	11	11	62	283	2.8
scoop		86				86	0.9
tree throw/hollow	64	28	2	7		101	1.0
well		88		10		98	1.0
waterhole			69			69	0.7
kiln/ oven		9				9	0.1
grave	6	1	84			91	0.9
unknown/ no data	74	152	62	1	79	368	3.7
Total	2462	4482	1136	870	1105	10,055	
%	*24.5*	*44.6*	*11.3*	*8.7*	*11.0*		
% of site contribution to each context type							
ditch/ segment	*26.3*	*51.4*	*7.6*	*2.7*	*12.0*		
gully/ segment	*9.2*	*44.5*	*5.3*	*34.2*	*6.8*		
spread intervention	*0*	*57.8*	*41.6*	*0.6*	*0*		
pit	*30.8*	*16.5*	*11.3*	*30.8*	*10.5*		
plough scar	*0*	*100*	*0*	*0*	*0*		
pond	*0*	*24.0*	*76.0*	*0*	*0*		
posthole	*41.7*	*28.6*	*3.9*	*3.9*	*21.9*		
scoop	*0*	*100*	*0*	*0*	*0*		
tree throw/hollow	*63.4*	*27.7*	*2.0*	*6.9*	*0*		
well	*0*	*89.8*	*0*	*10.2*	*0*		
waterhole	*0*	*0*	*100*	*0*	*0*		
kiln/ oven	*0*	*100*	*0*	*0*	*0*		
grave	*6.6*	*1.1*	*92.3*	*0*	*0*		
unknown/ no data	*20.1*	*41.3*	*16.8*	*0.3*	*21.5*		
%	*24.5*	*44.6*	*11.3*	*8.7*	*11.0*		
% of context type at each site							
ditch segment	*67.6*	*72.6*	*42.6*	*19.5*	*69.0*		
gully/ segment	*2.0*	*5.3*	*2.5*	*20.8*	*3.3*		
spread intervention	*0*	*6.1*	*17.4*	*0.3*	*0*		
pit	*19.7*	*5.8*	*15.8*	*56.0*	*15.0*		
plough scar	*0*	*0.1*	*0*	*0*	*0*		
pond	*0*	*0.1*	*1.7*	*0*	*0*		
posthole	*4.8*	*1.8*	*1.0*	*1.3*	*5.6*		
scoop	*0*	*1.9*	*0*	*0*	*0*		
tree throw/hollow	*2.6*	*0.6*	*0.2*	*0.8*	*0*		
well	*0*	*2*	*0*	*1.1*	*0*		
waterhole	*0*	*0*	*6.1*	*0*	*0*		
kiln/ oven	*0*	*0.2*	*0*	*0*	*0*		
grave	*0.2*	*0*	*7.4*	*0*	*0*		
unknown/ no data	*3.0*	*3.4*	*5.5*	*0.1*	*7.1*		

Table Animal Bone 6. Totals (Phase 2) by site and context type

	LC	*LC scan*	*JL*	*KP*	*LCF*	*Total*	*total %*
Phase 2						NISP	
ditch/ segment	1133	1134	66	113	729	3175	70.5
gully/ segment	46	182	10	160	36	434	9.6
spread intervention						0	0
pit	174	67	24	158	166	589	13.1
plough scar						0	0
pond			19			19	0.4
posthole	78	11		11	58	158	3.5
scoop						0	0
tree throw/hollow	34	1		7		42	0.9
well						0	0
waterhole						0	0
kiln/ oven		7				7	0.2
grave	6	1	2			9	0.2
unknown/ no data				1	69	70	1.6
Total	1471	1403	121	450	1058	4503	
%	*32.7*	*31.2*	*2.7*	*10.0*	*23.5*		
% in each site							
ditch/ segment	*35.7*	*35.7*	*2.1*	*3.6*	*23.0*		
gully/ segment	*10.6*	*41.9*	*2.3*	*36.9*	*8.3*		
spread intervention							
pit	*29.5*	*11.4*	*4.1*	*26.8*	*28.2*		
plough scar							
pond	*0*	*0*	*100*	*0*	*0*		
posthole	*49.4*	*7.0*	*0*	*7.0*	*36.7*		
scoop							
tree throw/hollow	*81.0*	*2.4*	*0.0*	*16.7*	*0*		
well							
waterhole							
kiln/ oven	*0*	*100*	*0*	*0*	*0*		
grave	*66.7*	*11.1*	*22.2*	*0*	*0*		
unknown/ no data	*0*	*0*	*0*	*1.4*	*98.6*		
%	*32.7*	*31.2*	*2.7*	*10.0*	*23.5*		
% of each context type by site							
ditch segment	*77.0*	*80.8*	*54.5*	*25.1*	*68.9*		
gully/ segment	*3.1*	*13.0*	*8.3*	*35.6*	*3.4*		
spread intervention	*0*	*0*	*0*	*0*	*0*		
pit	*11.8*	*4.8*	*19.8*	*35.1*	*15.7*		
plough scar	*0*	*0*	*0*	*0*	*0*		
pond	*0*	*0*	*15.7*	*0*	*0*		
posthole	*5.3*	*0.8*	*0*	*2.4*	*5.5*		
scoop	*0*	*0*	*0*	*0*	*0*		
tree throw/hollow	*2.3*	*0.1*	*0*	*1.6*	*0*		
well	*0*	*0*	*0*	*0*	*0*		
waterhole	*0*	*0*	*0*	*0*	*0*		
kiln/ oven	*0*	*0.5*	*0*	*0*	*0*		
grave	*0.4*	*0.1*	*1.7*	*0*	*0*		
unknown/ no data	*0*	*0*	*0*	*0.2*	*6.5*		

Animal Bone Table 7. Totals (Phase 3) by site and context type

	LC	*LC scan*	*JL*	*KP*	*LCF*	*Total*	*total %*
Phase 3						NISP	
ditch/ segment	409	2064	408	54	7	2942	62.5
gully/ segment		41	15	1		57	1.2
spread intervention		275	198			473	10.0
pit	243	147	142	329		861	18.3
plough scar						0	0
pond		6				6	0.1
posthole		61				61	1.3
scoop		86				86	1.8
tree throw/hollow		14	2			16	0.3
well				10		10	0.2
waterhole			69			69	1.5
kiln/ oven		2				2	0
grave			82			82	1.7
unknown/ no data	5	7	33			45	1.0
Total	657	2703	949	394	7	4710	
%	*13.9*	*57.4*	*20.1*	*8.4*	*0.1*		
% in each site							
ditch/ segment	*13.9*	*70.2*	*13.9*	*1.8*	*0.2*		
gully/ segment	*0*	*71.9*	*26.3*	*1.8*	*0*		
spread intervention	*0*	*58.1*	*41.9*	*0*	*0*		
pit	*28.2*	*17.1*	*16.5*	*38.2*	*0*		
plough scar							
pond	*0*	*100*	*0.0*	*0*	*0*		
posthole	*0*	*100*	*0*	*0*	*0*		
scoop	*0*	*100*	*0*	*0*	*0*		
tree throw/hollow	*0.0*	*87.5*	*12.5*	*0.0*	*0*		
well	*0*	*0*	*0*	*100*	*0*		
waterhole	*0*	*0*	*100*	*0*	*0*		
kiln/ oven	*0*	*100*	*0*	*0*	*0*		
grave	*0*	*0*	*100*	*0*	*0*		
unknown/ no data	*11.1*	*15.6*	*73.3*	*0*	*0*		
	13.9	*57.4*	*20.1*	*8.4*	*0.1*		
% of each context type by site							
ditch segment	*62.3*	*76.4*	*43*	*13.7*	*100*		
gully/ segment	*0*	*1.5*	*1.6*	*0.3*	*0*		
spread intervention	*0*	*10.2*	*20.9*	*0*	*0*		
pit	*37*	*5.4*	*15*	*83.5*	*0*		
plough scar	*0*	*0*	*0*	*0*	*0*		
pond	*0*	*0.2*	*0*	*0*	*0*		
posthole	*0*	*2.3*	*0.0*	*0*	*0*		
scoop	*0*	*3.2*	*0*	*0*	*0*		
tree throw/hollow	*0*	*0.5*	*0.2*	*0*	*0*		
well	*0*	*0*	*0*	*2.5*	*0*		
waterhole	*0*	*0*	*7.3*	*0*	*0*		
kiln/ oven	*0*	*0.1*	*0*	*0*	*0*		
grave	*0*	*0*	*8.6*	*0*	*0*		
unknown/ no data	*0.8*	*0.3*	*3.5*	*0*	*0*		

Table Animal Bone 8. Fragment sizes for cattle, sheep / goat and pig

Taxon	*Phase*	*size <10mm*	*10-50mm*	*50-100mm*	*100-150mm*	*>150mm*	*total*
cattle	2	0	161	181	125	106	573
	3	0	119	112	76	75	382
	% 2	*0.0*	*28.1*	*31.6*	*21.8*	*18.5*	
	% 3	*0.0*	*31.2*	*29.3*	*19.9*	*19.6*	
sheep/goat	2	10	274	156	31	5	476
	3	0	88	56	13	3	160
	% 2	*2.1*	*57.6*	*32.8*	*6.5*	*1.1*	
	% 3	*0.0*	*55.0*	*35.0*	*8.1*	*1.9*	
pig	2	3	43	54	10	0	110
	3	0	7	5	2	0	14
	% 2	*2.7*	*39.1*	*49.1*	*9.1*	*0.0*	
	% 3	*0.0*	*50.0*	*35.7*	*14.3*	*0.0*	

Table Animal Bone 9. Cattle and sheep / goat phalanges by phase

phalanges cattle					
	Ph1	*Ph2*	*Ph3*	*total ph*	*total bones*
Ph 2	10	5	5	20	573
Ph 3	14	5	3	22	382
% Ph 2	*50.0*	*25.0*	*25.0*	*3.5*	
% Ph 3	*63.6*	*22.7*	*13.6*	*5.8*	

phalanges sheep/goat					
	Ph1	*Ph2*	*Ph3*	*total ph*	*total bones*
Ph 2	14	4	5	23	476
Ph 3	5	1	1	7	160
% Ph 2	*60.9*	*17.4*	*21.7*	*4.8*	
% Ph 3	*71.4*	*14.3*	*14.3*	*4.4*	

Table Animal Bone 10. Bone condition by species

	recent breaks	*butchered*	*gnawed*	*eroded*	*charred*	*calcined*	*ivoried*	*loose teeth*	*total excl.teeth*	*overall total*
horse	61	1	17	62	1	0	0	30	70	100
%	*87.1*	*1.4*	*24.3*	*62.0*	*1.0*	*0*	*0*	*30.0*		
cattle	600	55	161	379	11	1	1	152	872	1024
%	*68.8*	*6.3*	*18.5*	*37.0*	*1.1*	*0.1*	*0.1*	*14.8*		
sheep/goat	236	5	89	206	8	1	1	186	504	690
%	*46.8*	*1.0*	*17.7*	*29.9*	*1.2*	*0.1*	*0.1*	*27.0*		
pig	45	6	17	34	0	2	0	17	117	134
%	*38.5*	*5.1*	*14.5*	*25.4*	*0*	*1.5*	*0*	*12.7*		
cattle-sized	949	10	38	835	22	2	1	0	1416	1416
%	*67.0*	*0.7*	*2.7*	*59.0*	*1.6*	*0.1*	*0.1*	*0*		
s/g/pig-size	188	3	38	186	31	40	0	0	739	739
%	*25.4*	*0.4*	*5.1*	*25.2*	*4.2*	*5.4*	*0*	*0*		
indet. mammal	396	0	19	376	55	89	0	0	1236	1236
%	*32.0*	*0*	*1.5*	*30.4*	*4.4*	*7.2*	*0*	*0*		
dog	111	0	0	16	0	0	2	4	193	197
%	*57.5*	*0*	*0*	*8.1*	*0*	*0*	*1.0*	*2.0*		
birds	1	1	0	1	0	0	3	0	11	11
%	*9.1*	*9.1*	*0*	*9.1*	*0*	*0*	*27.3*	*0*		
other	9	0	0	6	0	0	1	0	26	26
%	*34.6*	*0*	*0*	*23.1*	*0*	*0*	*3.8*	*0*		
Total	2596	81	379	2101	128	135	9	389	5184	5573
%	*50.1*	*1.6*	*7.3*	*37.7*	*2.3*	*2.4*	*0.2*	*7.0*		

calculations of butchery and gnawing exclude loose teeth

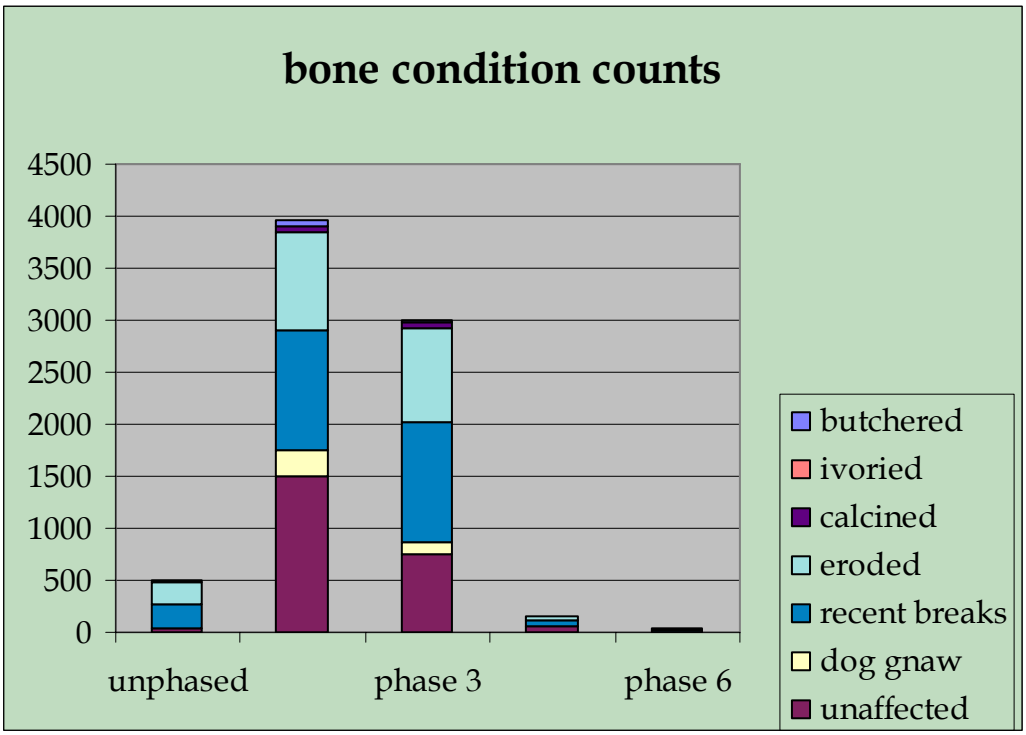
Table Animal Bone 11ba Bone condition by phase

fragments	*unaffected*	*recent breaks*	*butchered*	*dog gnaw*	*eroded*	*charred*	*calcined*	*ivoried*	*total excl. teeth*	*total bones*	*loose teeth*
unphased	39	213	1	8	213	8	26	0	295	326	31
Ph 2	1493	1160	51	258	943	75	49	3	2872	3100	228
Ph 3	758	1164	28	106	888	43	57	6	1886	2007	121
Ph 4	59	43	1	6	39	2	3	0	110	119	9
Ph 6	0	16	2	1	18	0	0	0	21	21	0
Total	2432	2596	83	379	2101	128	135	9	5184	5573	389

%	*unaffected*	*recent breaks*	*butchered*	*dog gnaw*	*eroded*	*charred*	*calcined*	*ivoried*	*total excl. teeth*	*total bones*	*loose teeth*
unphased	*13.2*	*72.2*	*0.3*	*2.7*	*72.2*	*2.7*	*8.8*	*0*	295	326	31
Ph 2	*52.0*	*40.4*	*1.8*	*9.0*	*32.8*	*2.6*	*1.7*	*0.1*	2872	3100	228
Ph 3	*40.2*	*61.7*	*1.5*	*5.6*	*47.1*	*2.3*	*3.0*	*0.3*	1886	2007	121
Ph 4	*53.6*	*39.1*	*0.9*	*5.5*	*35.5*	*1.8*	*2.7*	*0*	110	119	9
Ph 6	*0*	*76.2*	*9.5*	*4.8*	*85.7*	*0*	*0*	*0*	21	21	0
Total	*46.9*	*50.1*	*1.6*	*7.3*	*40.5*	*2.5*	*2.6*	*0.2*	5184	5573	389

calculations of condition exclude loose teeth

Table Animal Bone 11b. Bone condition by phase



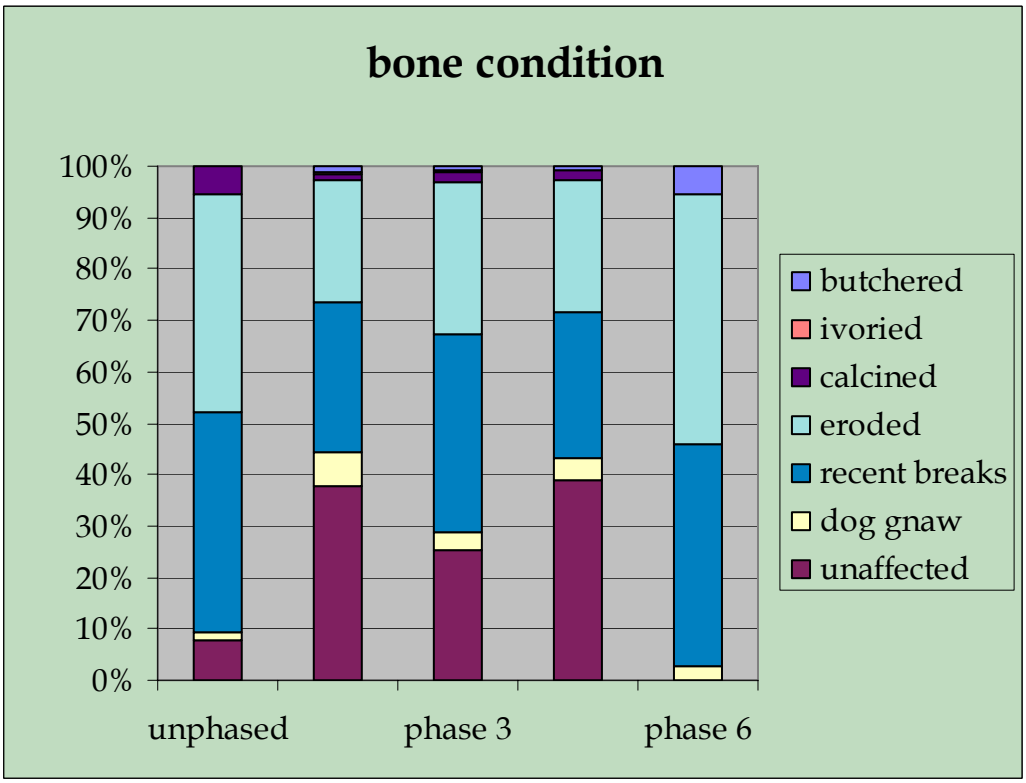


Table Animal Bone 12. Cattle, sheep / goat and pig (Phase 2) by site

site	*phase*	*horse*	*cattle*	*sheep/ goat*	*sheep*	*goat*	*pig*	*red deer*	*roe*	*cattle-sized*	*s/g/pig -size*	*indet. mammal*	*dog*	*cat*	*other mammal*	*fowl*	*other birds*	*indet. bird*	*amphib.*	*Total*
Lower Cambourne	total	30	265	166	21	0	74	4	0	259	204	437	6	0	3	1	1	0	0	1471
	%	*2.0*	*18.0*	*11.3*	*1.4*	*0.0*	*5.0*	*0.3*	*0.0*	*17.6*	*13.9*	*29.7*	*0.4*	*0.0*	*0.2*	*0.1*	*0.1*	*0.0*	*0.0*	
% cattle, sheep, pig			*50.4*	*31.6*	*4.0*	*0*	*14.1*													526
% of identified		*5.3*	*46.6*	*29.2*	*3.7*	*0*	*13.0*	*0.7*	*0*				*1.1*	*0*	*0.5*	*0.2*	*0.2*	*0*	*0*	569
Jeavons Lane	total	2	28	3	0	1	2	1	1	48	6	29	0	0	0	0	0	0	0	121
	%	*1.7*	*23.1*	*2.5*	*0.0*	*0.8*	*1.7*	*0.8*	*0.8*	*39.7*	*5.0*	*24.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
% cattle, sheep, pig			*82.4*	*8.8*	*0*	*2.9*	*5.9*													34
% of identified		*5.3*	*73.7*	*7.9*	*0.0*	*2.6*	*5.3*	*2.6*	*2.6*				*0.0*	*0*	*0*	*0*	*0*	*0*	*0*	38
Knapwell Plantation	total	1	49	53	7	0	6	0	0	102	102	122	1	0	7	0	0	0	0	450
	%	*0.2*	*10.9*	*11.8*	*1.6*	*0.0*	*1.3*	*0.0*	*0.0*	*22.7*	*22.7*	*27.1*	*0.2*	*0.0*	*1.6*	*0.0*	*0.0*	*0.0*	*0.0*	
% cattle, sheep, pig			*42.6*	*46.1*	*6.1*	*0*	*5.2*													115
% of identified		*0.8*	*39.5*	*42.7*	*5.6*	*0*	*4.8*	*0*	*0*				*0.8*	*0*	*5.6*	*0*	*0*	*0*	*0*	124
Little Common Farm	total	17	231	202	21	2	28	1	1	238	235	71	7	0	2	0	1	1	0	1058
	%	*1.6*	*21.8*	*19.1*	*2.0*	*0.2*	*2.6*	*0.1*	*0.1*	*22.5*	*22.2*	*6.7*	*0.7*	*0.0*	*0.2*	*0.0*	*0.1*	*0.1*	*0.0*	
% cattle, sheep, pig			*47.7*	*41.7*	*4.3*	*0.4*	*5.8*													484
% of identified		*3.3*	*45.1*	*39.5*	*4.1*	*0.4*	*5.5*	*0.2*	*0.2*				*1.4*	*0*	*0.4*	*0*	*0.2*	*0.2*	*0*	512
Lower Cambourne scan	total	33	289	215	19	2	74	4	0	355	249	142	10	1	4	2	4	0	0	1403
	%	*2.4*	*20.6*	*15.3*	*1.4*	*0.1*	*5.3*	*0.3*	*0*	*25.3*	*17.7*	*10.1*	*0.7*	*0.1*	*0.3*	*0.1*	*0.3*	*0*	*0*	
% cattle, sheep, pig			*48.2*	*35.9*	*3.2*	*0.3*	*12.4*													599
% of identified		*5*	*44*	*32.7*	*2.9*	*0.3*	*11.3*	*0.6*	*0*				*1.5*	*0.2*	*0.6*	*0.3*	*0.6*	*0*	*0*	657
Phase 2	total	83	862	639	68	5	184	10	2	1002	796	801	24	1	16	3	6	1	0	4503
	%	*1.8*	*19.1*	*14.2*	*1.5*	*0.1*	*4.1*	*0.2*	*0*	*22.3*	*17.7*	*17.8*	*0.5*	*0*	*0.4*	*0.1*	*0.1*	*0*	*0*	
% cattle, sheep, pig			*49.0*	*36.3*	*3.9*	*0.3*	*10.5*													1758
% of identified		*4.4*	*45.3*	*33.6*	*3.6*	*0.3*	*9.7*	*0.5*	*0.1*				*1.3*	*0.1*	*0.8*	*0.2*	*0.3*	*0.1*	*0*	1904

Table Animal Bone 13. Cattle, sheep / goat and pig (Phase 3) by site

site	*phase*	*horse*	*cattle*	*sheep/ goat*	*sheep*	*goat*	*pig*	*red deer*	*roe*	*cattle-sized*	*s/g/pig -size*	*indet. mammal*	*dog*	*cat*	*other mammal*	*fowl*	*other birds*	*indet. bird*	*amphib.*	*Total*
Lower Cambourne	total	11	73	47	11	0	5	0	0	69	62	201	175	0	1	0	1	1	0	657
	%	*1.7*	*11.1*	*7.2*	*1.7*	*0.0*	*0.8*	*0.0*	*0.0*	*10.5*	*9.4*	*30.6*	*26.6*	*0.0*	*0.2*	*0.0*	*0.2*	*0.2*	*0.0*	
% cattle, sheep, pig			*53.7*	*34.6*	*8.1*	*0*	*3.7*													136
% of identified		*3.4*	*22.6*	*14.6*	*3.4*	*0*	*1.5*	*0*	*0*				*54.2*	*0*	*0.3*	*0*	*0.3*	*0.3*	*0*	323
Jeavons Lane	total	26	260	82	10	0	9	2	0	446	41	67	3	0	0	1	0	2	0	949
	%	*2.7*	*27.4*	*8.6*	*1.1*	*0.0*	*0.9*	*0.2*	*0.0*	*47.0*	*4.3*	*7.1*	*0.3*	*0.0*	*0.0*	*0.1*	*0.0*	*0.2*	*0.0*	
% cattle, sheep, pig			*72.0*	*22.7*	*2.8*	*0*	*2.5*													361
% of identified		*6.6*	*66.3*	*20.9*	*2.6*	*0*	*2.3*	*0.5*	*0*				*0.8*	*0*	*0*	*0.3*	*0*	*0.5*	*0*	392
Knapwell Plantation	total	2	48	7	0	0	0	0	0	106	9	222	0	0	0	0	0	0	0	394
	%	*0.5*	*12.2*	*1.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*26.9*	*2.3*	*56.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
% cattle, sheep, pig			*87.3*	*12.7*	*0*	*0*	*0*													55
% of identified		*3.5*	*84.2*	*12.3*	*0.0*	*0*	*0.0*	*0*	*0*				*0.0*	*0*	*0*	*0*	*0*	*0*	*0*	57
Little Common Farm	total	0	1	3	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	7
	%	*0.0*	*14.3*	*42.9*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*14.3*	*0.0*	*28.6*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
% cattle, sheep, pig			*25.0*	*75.0*	*0*	*0*	*0*													4
% of identified		*0.0*	*25.0*	*75.0*	*0.0*	*0*	*0.0*	*0*	*0*				*0.0*	*0*	*0*	*0*	*0*	*0*	*0*	4
Lower Cambourne scan	total	80	565	462	39	0	54	3	2	668	485	297	24	2	1	7	6	7	1	2703
	%	*3.0*	*20.9*	*17.1*	*1.4*	*0*	*2.0*	*0.1*	*0.1*	*24.7*	*17.9*	*11*	*0.9*	*0.1*	*0*	*0.3*	*0.2*	*0.3*	*0*	
% cattle, sheep, pig			*50.4*	*41.3*	*3.5*	*0*	*4.8*													1120
% of identified		*6.4*	*45.1*	*36.9*	*3.1*	*0*	*4.3*	*0.2*	*0.2*				*1.9*	*0.2*	*0.1*	*0.6*	*0.5*	*0.6*	*0.1*	1253
Phase 3	total	119	947	601	60	0	68	5	2	1290	597	789	202	2	2	8	7	10	1	4710
	%	*2.5*	*20.1*	*12.8*	*1.3*	*0*	*1.4*	*0.1*	*0*	*27.4*	*12.7*	*16.8*	*4.3*	*0*	*0*	*0.2*	*0.1*	*0.2*	*0*	
% cattle, sheep, pig			*56.5*	*35.9*	*3.6*	*0*	*4.1*													1676
% of identified		*5.9*	*46.6*	*29.5*	*2.9*	*0*	*3.3*	*0.2*	*0.1*				*9.9*	*0.1*	*0.1*	*0.4*	*0.3*	*0.5*	*0*	2034

Table Animal Bone 14. Species total by phase

		horse	*cattle*	*sheep/ goat*	*pig*	*cattle-sized*	*s/g/pig -size*	*indet. mammal*	*Total*	*all bones in phase*
Ph 2	Total	83	862	712	184	1002	796	801	4440	4503
	%	*1.9*	*19.4*	*16.0*	*4.1*	*22.6*	*17.9*	*18.0*		
% cattle, sheep, pig			*49.0*	*40.5*	*10.5*				1758	
% cattle, sheep			*54.8*	*45.2*					1574	
% of identified		*4.5*	*46.8*	*38.7*	*10.0*				1841	
Ph 3	Total	119	947	661	68	1290	597	789	4471	4710
	%	*2.7*	*21.2*	*14.8*	*1.5*	*28.9*	*13.4*	*17.6*		
% cattle, sheep, pig			*56.5*	*39.4*	*4.1*				1676	
% cattle, sheep			*58.9*	*41.1*					1608	
% of identified		*6.6*	*52.8*	*36.8*	*3.8*				1795	
both phases	Total	202	1809	1373	252	2292	1393	1590	8911	9213
	%	*2.3*	*20.3*	*15.4*	*2.8*	*25.7*	*15.6*	*17.8*		
% cattle, sheep, pig			*52.7*	*40.0*	*7.3*				3434	
% cattle, sheep			*56.9*	*43.1*					3182	
% of identified		*5.6*	*49.8*	*37.8*	*6.9*				3636	

Table Animal Bone 15. Cattle anatomy

NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Ph 6*	*Total*
horncore	4	7	14	1		26
skull	4	28	18			50
skull fragment		1				1
maxilla	2	14	3			19
mandible	4	69	47	4		124
lower premolar	1	8	6			15
lower dp4		5	1	1		7
lower molar	1	22	8	2		33
lower molar 3		6	4			10
lower incisor		3	1			4
upper premolar	2	6	10			18
upper deciduous premolar		2				2
upper molar	5	24	29			58
tooth frag		5				5
humerus	3	31	28	2	1	65
radius	2	21	16			39
ulna	1	14	7		1	23
scapula	2	33	20	2	2	59
pelvis		29	26	1	1	57
sacrum	1	5				6
femur	1	32	27			60
tibia	3	44	22	1		70
fibula		2				2
patella		3	5			8
metacarpus	1	11	19	1		32
carpal	1	7	5			13
metatarsus	1	27	13	1		42
astragalus	2	12	6	1		21
calcaneum		13	8			21
cuboid/centroquartal	1	8	1			10
tarsal		1				1
sesamoid			4			4
metapodial	1		3			4
phalanx 1	1	10	14	2	1	28
phalanx 2		5	5			10

	all		*Ph 2*		*Ph 3*	
	Total	*%*	*Total*	*%*	*Total*	*%*
area						
head & neck	236	*23.0*	126	*24.2*	91	*23.8*
teeth	152	*14.8*	81	*15.6*	59	*15.4*
shoulder	59	*5.8*	33	*6.3*	20	*5.2*
pelvis	63	*6.2*	34	*6.5*	26	*6.8*
foreleg	127	*12.4*	66	*12.7*	51	*13.4*
hindleg	130	*12.7*	76	*14.6*	49	*12.8*
hindleg (small bones)	10	*1.0*	5	*1.0*	5	*1.3*
feet	194	*18.9*	99	*19.0*	81	*21.2*
other	53	*5.2*				

NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Ph 6*	*Total*		*all*		*Ph 2*		*Ph 3*	
								Total	*%*	*Total*	*%*	*Total*	*%*
phalanx 3		5	3			8							
atlas		2	6			8							
axis		5	3			8							
thoracic vertebra		10				10							
lumbar vertebra		6				6							
caudal vertebra		4				4							
sternebra/sternum		1				1							
rib		20				20							
sesamoid rib		12				12							
Total	44	573	382	19	6	1024		1024	*100*	520	*99.9*	382	*99.9*
Percent													
horncore	*9.1*	*1.2*	*3.7*	*5.3*				Total	*%*				
skull	*9.1*	*4.9*	*4.7*				*area*						
skull fragment	*0*	*0.2*	*0*				head & neck	236	*23.0*				
maxilla	*4.5*	*2.4*	*0.8*										
mandible	*9.1*	*12.0*	*12.3*	*21.1*									
lower premolar	*2.3*	*1.4*	*1.6*				teeth	152	*14.8*				
lower dp4	*0*	*0.9*	*0.3*	*5.3*									
lower molar	*2.3*	*3.8*	*2.1*	*10.5*									
lower molar 3	*0*	*1.0*	*1.0*				shoulder	59	*5.8*				
lower incisor	*0*	*0.5*	*0.3*				pelvis	63	*6.2*				
upper premolar	*4.5*	*1.0*	*2.6*										
upper deciduous premolar	*0*	*0.3*	*0*				foreleg	127	*12.4*				
upper molar	*11.4*	*4.2*	*7.6*										
tooth frag	*0*	*0.9*	*0*										
humerus	*6.8*	*5.4*	*7.3*	*10.5*	*16.7*		hindleg	130	*12.7*				
radius	*4.5*	*3.7*	*4.2*										
ulna	*2.3*	*2.4*	*1.8*		*16.7*		hindleg (small bones)	10	*1.0*				
scapula	*4.5*	*5.8*	*5.2*	*10.5*	*33.3*								
pelvis	*0*	*5.1*	*6.8*	*5.3*	*16.7*		feet	194	*18.9*				
sacrum	*2.3*	*0.9*	*0*										
femur	*2.3*	*5.6*	*7.1*				other	53	*5.2*				
tibia	*6.8*	*7.7*	*5.8*	*5.3*									
fibula	*0*	*0.3*	*0*										
patella	*0*	*0.5*	*1.3*										
metacarpus	*2.3*	*1.9*	*5*	*5.3*									
carpal	*2.3*	*1.2*	*1.3*										

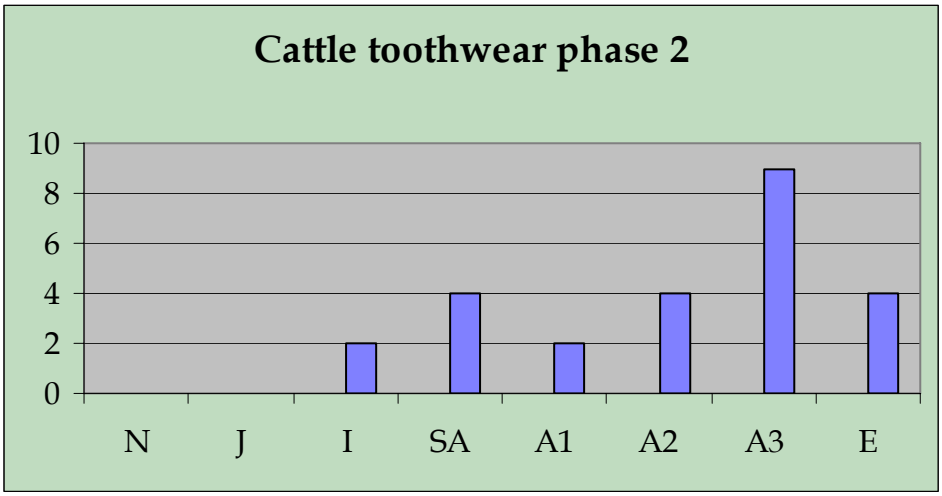
NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Ph 6*	*Total*	*all*		*Ph 2*		*Ph 3*	
							Total	*%*	*Total*	*%*	*Total*	*%*
metatarsus	*2.3*	*4.7*	*3.4*	*5.3*								
astragalus	*4.5*	*2.1*	*1.6*	*5.3*								
calcaneum	*0.0*	*2.3*	*2.1*									
cuboid/centroquartal	*2.3*	*1.4*	*0.3*									
tarsal	*0*	*0.2*	*0*									
sesamoid	*0*	*0*	*1.0*									
metapodial	*2.3*	*0*	*0.8*									
phalanx 1	*2.3*	*1.7*	*3.7*	*10.5*	*16.7*							
phalanx 2	*0*	*0.9*	*1.3*									
phalanx 3	*0*	*0.9*	*0.8*									
atlas	*0*	*0.3*	*1.6*									
axis	*0*	*0.9*	*0.8*									
thoracic vertebra	*0*	*1.7*	*0*									
lumbar vertebra	*0*	*1.0*	*0*									
caudal vertebra	*0*	*0.7*	*0*									
sternebra/sternum	*0*	*0.2*	*0*									
rib	*0*	*3.5*	*0*									
sesamoid rib	*0*	*2.1*	*0*									

Table Animal Bone 16. Cattle ageing (toothwear) by phase (no jaws)

Stage	*N*	*J*	*I*	*SA*	*A1*	*A2*	*A3*	*E*	*total*
Ph 2	0	0	2	4	2	4	9	4	25
Ph 3	0	0	3	8	1	2	9	6	29

Cattle toothwear stages from O'Connor 2003

N		neonatal	dp4 not in wear
J		juvenile	dp4 in wear, LM1 not
I		immature	LM1 in wear LM2 not
SA		subadult	LM2 in wear LM3 not
	SA1		LM3 forming
	SA2		LM3 erupting
A		adult	LM3 in wear
	A1		LM3 Grant stage a-b
	A2		LM3 Grant stage c-d
	A3		LM3 Grant stage e-h
E		elderly	LM3 Grant to or beyond j



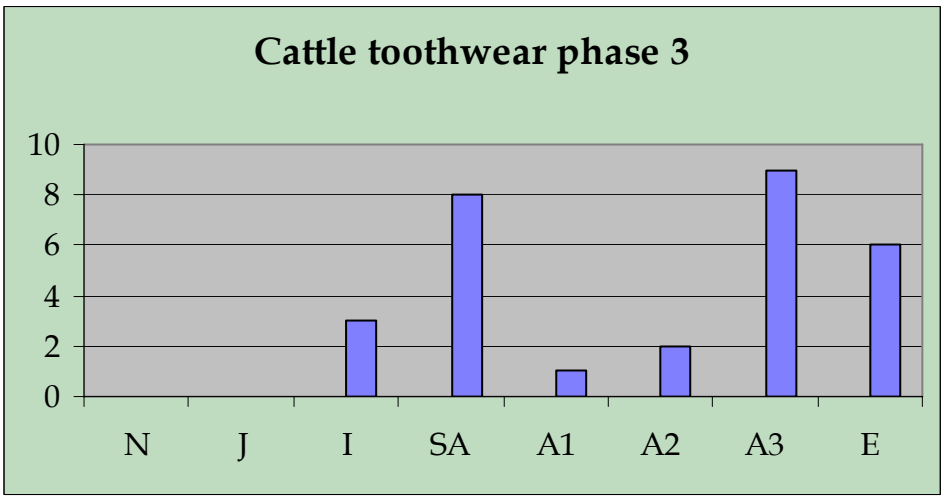


Table Animal Bone 17. Cattle ageing (bone fusion) by phase

		Ph 2 epiphysial state		*Ph 3 epiphysial state*	
	element	*fused*	*unfused*	*fused*	*unfused*
group 1	distal scapula	11	-	12	
	pelvis acetabulum	21	2	15	
group 2	proximal radius	12	1	10	
	distal humerus	19	-	11	3
	proximal phalanx	14	1	17	1
group 3	distal metapodial	12	3	14	3
	distal tibia	14	3	9	2
group 4	femur	8	12	10	14
	proximal tibia	3	5	2	5
	proximal calcaneus	3	-		2
	distal radius	4	1	1	3
	proximal humerus	1	3		5
	ulna		4	1	3
	totals	122	35	102	41
	survival % cattle age (months)				
group 1	7–10	*94.1*	*5.9*	*100*	*0*
group 2	12–18	*95.7*	*4.3*	*90.5*	*9.5*
group 3	24–36	*81.3*	*18.8*	*82.1*	*17.9*
group 4	42–8	*43.2*	*56.8*	*30.4*	*69.6*

Age classes adapted from Silver (1969) and Moran & O'Connor (1994)

Table Animal Bone 18. Cattle measurements

phase 2	*humerus BT*	*scapula GLP*	*tibia Bd*	*astragalus GLl*	*metatarsus SD*	*metatarsus Bd*
	72.7	56.9	63.1	62.9	28.7	56.9
	70.0	69.0	53.5	57.1	30.5	59.6
	69.4	67.4	56.8	60.9	27.8	54.8
	76.6	66.4	56.4	60.3	24.0	45.7
	73.5	59.2	54.5	59.9	22.8	46.0
	69.0	57.1	61.1	61.2	22.8	46.8
	73.5	62.6	51.1	61.5	24.7	
	63.1	58.5	59.0	57.5		
	61.9	66.2	67.4	58.1		
	65.1		53.7	53.2		
	66.5		60.3	58.4		
	66.8			58.2		

	humerus BT	*scapula GLP*	*tibia Bd*	*astragalus GLl*	*metatarsus Bp*	*metatarsus Bd*
MAX	*76.6*	*69.0*	*67.4*	*62.9*	*30.5*	*59.6*
MIN	*61.9*	*56.9*	*51.1*	*53.2*	*22.8*	*45.7*
N	*12*	*9*	*11*	*12*	*7*	*6*
MEAN	*69.0*	*62.6*	*57.9*	*59.1*	*25.9*	*51.6*
SD	*4.3*	*4.5*	*4.6*	*2.5*	*2.9*	*5.6*
Co.Var.	*6.2*	*7.2*	*7.9*	*4.2*	*11.2*	*10.9*

phase 3	*humerus BT*	*scapula GLP*	*tibia Bd*	*astragalus GLl*	*metatarsus SD*	*metatarsus Bd*
	86.0	81.3	52.4	73.7	30.0	63.0
	75.1	83.7	56.8	59.8	28.7	51.7
	72.2	63.7	66.6	63.8	30.2	57.0
	79.2	71.7	64.5	57.3	29.5	60.9
	67.0	84.2	55.4	77.0		53.0
	78.4	67.6	62.4	71.4		56.5
	66.0	69.9	65.8	67.5	24.8	50.0
	65.0	64.1	48.8	61.5	27.0	
		70.7	68.2		24.7	51.0
			57.8		22.5	49.4
			71.7			61.5
						52.1

	humerus BT	*scapula* GLP	*tibia* Bd	*astragalus* GLl	*metatarsus* Bp	*metatarsus* Bd
MAX	*86.0*	*84.2*	*71.7*	*77.0*	*30.2*	*63.0*
MIN	*65.0*	*63.7*	*48.8*	*57.3*	*22.5*	*49.4*
N	*8*	*9*	*11*	*8*	*8*	*11*
MEAN	*73.6*	*73.0*	*60.9*	*66.5*	*27.2*	*55.1*
SD	*7.0*	*7.6*	*6.9*	*6.6*	*2.7*	*4.7*
Co.Var.	*9.5*	*10.4*	*11.3*	*9.9*	*9.9*	*8.5*

Measurement codes as per von den Driesch (1976)

Table Animal Bone 19. Cattle withers heights

phase	*context*	*anatomy*	*measurement Gl (mm)*	*withers height (m)*		*Bd*	*index*	*?sex*
0	2263	metacarpus	195	1.194		68.8	*35.3*	M
1	1811	metacarpus	195	1.194		54.1	*27.7*	F
2	90203	tibia	300	1.035	estimated			
2	90401	tibia	326	1.125				
2	90107	radius	240	1.032				
2	90507	radius	252	1.084	estimated			
2	5243	metacarpus	180	1.103		53.9	*29.9*	F
2	2573	metacarpus	170	1.041		60.9	35.8	M
2	80455	metacarpus	200	1.225		63.5	*31.8*	M
2	1382	metatarsus	225	1.226				
2	80493	metatarsus	190	1.036	estimated			
2	90383	metatarsus	205	1.117				
2	90450	metatarsus	208	1.134				
3	2413	femur	381	1.322				
3	80763	femur	320	1.110				
3	2443	tibia	320	1.104				
3	80391	tibia	362	1.249	estimated			
3	2413	humerus	295	1.407	estimated			
3	1846	radius	296	1.273				
3	1234	metacarpus	190	1.164		51.9	*27.3*	F
3	2413	metacarpus	200	1.225		71.8	*35.9*	M
3	2415	metacarpus	206	1.262		67.4	*32.7*	M
3	5647	metacarpus	198	1.213		54.8	27.7	F
3	80186	metacarpus	197	1.207		66.1	*33.6*	M
3	242	metatarsus	226	1.232				
3	1446	metatarsus	206	1.123				
3	2413	metatarsus	240	1.308				
3	2678	metatarsus	226	1.232				
3	80763	metatarsus	216	1.177				
4	2552	radius	290	1.247				

	Total	*max wht*	*min wht*	*mean*	*sd*	*cv*
Ph 2	*11*	*1.226*	*1.032*	*1.105*	*0.067*	*6.1*
Ph 3	*16*	*1.407*	*1.104*	*1.225*	*0.083*	*6.8*
All	*30*	*1.407*	*1.032*	*1.18*	*0.092*	*7.8*

Table Animal Bone 20. Sheep/goat anatomy

NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Ph 6*	*Total*
horncore		3	3	1		7
skull	1	5	6	1		13
maxilla		4	2	1		7
mandible	3	60	20	3		86
mandibular tooth group		1		1		2
lower premolar		7				7
lower deciduous premolar	1		1			2
lower dp4		5	1			6
lower molar	3	30	16	3		52
lower molar 3	2	7	5	1		15
lower incisor	2	5	4	1		12
upper premolar		2	2			4
upper deciduous premolar		1				1
upper molar	8	59	12	1		80
upper molar 3	1		3			4
tooth frag		3				3
humerus	1	23	7	2		33
radius	3	41	7		1	52
ulna		5				5
scapula		15	4	1		20
pelvis	1	9	3		1	14
femur	2	19	5			26
tibia	1	65	18	1		85
patella			1			1
metacarpus	1	26	11	2		40
carpal		3	3			6
metatarsus		29	12	1		42
astragalus		8	1			9
calcaneum		6	2			8
cuboid/centroquartal		2				2
metapodial		3	1			4
sesamoid		2				2
phalanx 1		14	5			19
phalanx 2	2	4	1			7
phalanx 3		5	1			6
atlas		1	3			4
axis		4				4
Total	32	476	160	20	2	690

	Total	*%*	*Ph 2 Total*	*Ph 2 %*	*Ph 3 Total*	*Ph 3 %*
area						
head & neck	121	*17.5*	77	*16.2*	31	*19.7*
teeth	188	*27.2*	120	*25.2*	44	*28.0*
shoulder	20	*2.9*	15	*3.2*	4	*2.5*
pelvis	14	*2.0*	9	*1.9*	3	*1.9*
foreleg	90	*13.0*	69	*14.5*	14	*8.9*
hindleg	111	*16.1*	84	*17.6*	23	*14.6*
hindleg (small bones)	1	*0.1*	0	*0.0*	1	*0.6*
feet	145	*21.0*	102	*21.4*	37	*23.6*
	690	*99.8*	476	*100*	157	*99.8*

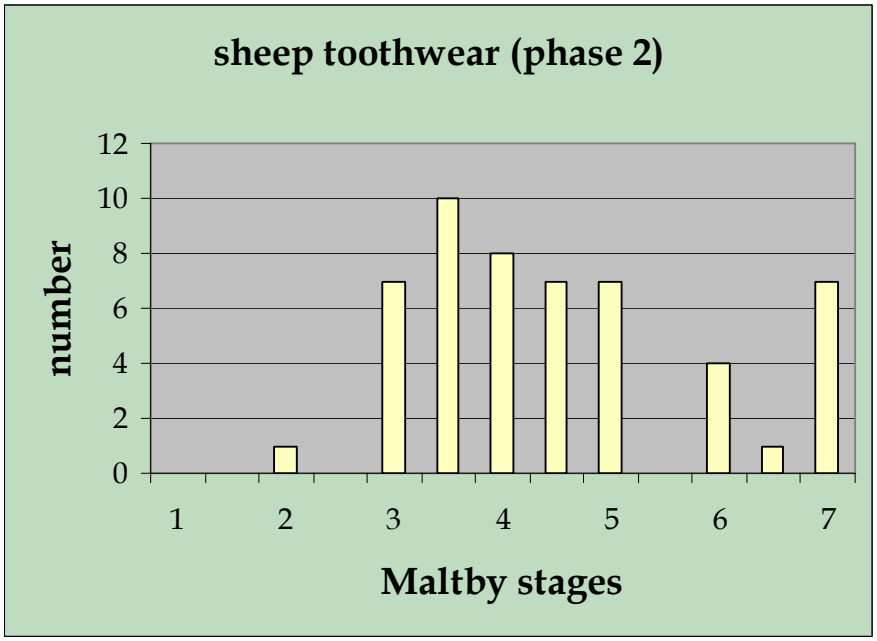
NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Ph 6*	*Total*		*Ph 2*		*Ph 3*	
						Total	*%*	*Total*	*%*	*Total*	*%*
Percent	unphased	2	3	1	1						
horncore	*0*	*0.6*	*1.9*	*5.0*							
skull	*3.1*	*1.1*	*3.8*	*5.0*							
maxilla	*0*	*0.8*	*1.3*	*5.0*							
mandible	*9.4*	*12.6*	*12.5*	*15.0*							
mandibular tooth group	*0*	*0.2*	*0*	*5.0*							
lower premolar	*0*	*1.5*	*0*								
lower deciduous premolar	*3.1*	*0*	*0.6*								
lower dp4	*0*	*1.1*	*0.6*								
lower molar	*9.4*	*6.3*	*10.0*	*15.0*							
lower molar 3	*6.3*	*1.5*	*3.1*	*5.0*							
lower incisor	*6.3*	*1.1*	*2.5*	*5.0*							
upper premolar	*0*	*0.4*	*1.3*								
upper deciduous premolar	*0*	*0.2*	*0*								
upper molar	*25.0*	*12.4*	*7.5*	*5.0*							
upper molar 3	*3.1*	*0*	*1.9*								
tooth frag	*0*	*0.6*	*0*								
humerus	*3.1*	*4.8*	*4.4*	*10.0*							
radius	*9.4*	*8.6*	*4.4*		*50*						
ulna	*0*	*1.1*	*0*								
scapula	*0*	*3.2*	*2.5*	*5.0*							
pelvis	*3.1*	*1.9*	*1.9*		*50*						
femur	*6.3*	*4.0*	*3.1*								
tibia	*3.1*	*13.7*	*11.3*	*5.0*							
patella	*0*	*0*	*0.6*								
metacarpus	*3.1*	*5.5*	*6.9*	*10.0*							
carpal	*0*	*0.6*	*1.9*								
metatarsus	*0*	*6.1*	*7.5*	*5.0*							
astragalus	*0*	*1.7*	*0.6*								
calcaneum	*0*	*1.3*	*1.3*								
cuboid/centroquartal	*0*	*0.4*	*0*								
metapodial	*0*	*0.6*	*0.6*								
sesamoid	*0*	*0.4*	*0*								
phalanx 1	*0*	*2.9*	*3.1*								
phalanx 2	*6.3*	*0.8*	*0.6*								
phalanx 3	*0*	*1.1*	*0.6*								
atlas	*0*	*0.2*	*1.9*								
axis	*0*	*0.8*	*0*								

Table Animal Bone 21. Sheep ageing (toothwear) by phase

Maltby Stage	*1*		*2*		*3*		*4*		*5*		*6*		*7*	*total*
No of jaws	0	0	2	0	12	11	15	14	14	0	12	3	18	101
Ph 2	0	0	1	0	7	10	8	7	7	0	4	1	7	52
Ph 3	0	0	1	0	5	1	7	7	7	0	8	2	11	49

Maltby 1993

stages :	1	dp4 not in wear
	2	M1 not in wear, dp4 in wear
	3	M1 in wear, M2 not in wear
	4	M2 in wear, M3 not in wear
	5	M3 in wear, M1 not in heavy wear (Grant H)
	6	M1 in heavy wear, M2 not
	7	M1 and M2 in heavy wear



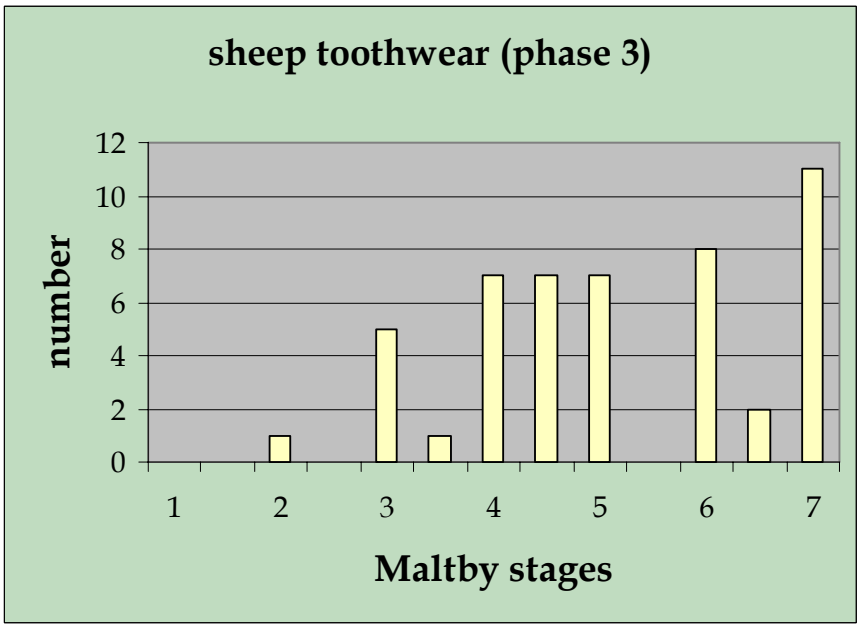


Table Animal Bone 22. Sheep ageing (bone fusion) by phase

		Ph 2		*Ph 3*	
		epiphysis state		*epiphysis state*	
	element	*fused*	*unfused*	*fused*	*unfused*
group 1	distal scapula	4	1	12	
	pelvis acetabulum	7	1	3	
	proximal radius	8		2	
	distal humerus	10		12	3
group 2	proximal phalanx	7	7	6	
group 3	distal metapodial	8	5	18	3
	proximal calcaneus	2	3	1	1
	distal tibia	6	5	9	2
group 4	femur	3	5	6	11
	proximal tibia		6		2
	distal radius		2	1	3
	proximal humerus			1	
	ulna				
	totals	55	35	71	25
	survival % sheep/goat age (months)				
group 1	6–10	*93.5*	*6.5*	*90.6*	*9.4*
group 2	12	*50.0*	*50.0*	*100*	*0*
group 3	15–30	*55.2*	*44.8*	*82.4*	*17.6*
group 4	30–42	*18.8*	*81.3*	*33.3*	*66.7*

Age classes adapted from Silver (1969) and Moran & O'Connor (1994)

Table Animal Bone 23. Sheep measurements

Ph 2	*radius*	*humerus*	*tibia*	*metatarsus*	*astragalus*
measurement (mm)	*Bp*	*BT*	*Bd*	*Bd*	*GLl*
value	27.3	23.8	23.9		24.8
	24.5	27.7	22.3	20.3	23.9
	26.4	22.9	23.4	20.3	25.4
	25.6	27.8	23.2	20.8	
	25.4	25.0	22.1		
			22.9		
			22.9		
			22.7		
			22.0		
			22.2		
MAX	27.3	27.8	23.9	20.8	25.4
MIN	24.5	22.9	22	20.3	23.9
N	5	5	10	3	3
MEAN	25.8	25.4	22.8	20.5	24.7
SD	*0.9*	*2*	*0.6*	*0.2*	*0.6*
Co. Var.	*3.5*	*7.9*	*2.6*	*1*	*2.4*

Ph 3	*radius*	*humerus*	*tibia*	*metatarsus*	*astragalus*
measurement (mm)	*Bp*	*BT*	*Bd*	*Bd*	*GLl*
value		29.8	24.9	24.4	23.7
		26.0	25.6	24.2	
		25.0	26.2	21.9	
			20.3	25.4	
			25.2		
			22.8		
			25.7		
			22.7		
			28.1		
			28.2		
MAX	0	29.8	28.2	25.4	23.7
MIN	0	25.0	20.3	21.9	23.7
N	0	3	10	4	1
MEAN		26.9	25.0	24.0	23.7
SD		*2.1*	*2.3*	*1.3*	*0*
Co. Var.		*7.8*	*9.2*	*5.4*	*0*

Measurement codes as per Von den Driesch (1976)

Table Animal Bone 24. Sheep withers heights

phase	*context*	*anatomy*	*measurement Gl (mm)*	*withers height (m)*		
0	2839	metacarpus	120.1	0.587		
2	2137	radius	143.0	0.575		
2	5209	metatarsus	128.4	0.583		
2	2914	metacarpus	108.8	0.532		
2	2838	metatarsus	129.9	0.590		
2	60256	metatarsus	112.0	0.508		
3	80190	humerus	129.0	0.552		
3	241	metatarsus	123.0	0.558		
3	2299	metatarsus	140.0	0.636		
3	80229	metatarsus	148.0	0.672		
	Total	*max wht*	*min wht*	*mean*	*sd*	*cv*
Ph 2	*5*	*0.590*	*0.508*	*0.558*	*0.032*	*5.7*
Ph 3	*4*	*0.672*	*0.552*	*0.605*	*0.051*	*8.4*
All	10	0.672	0.508	0.579	0.045	7.8

Table Animal Bone 25. Pig anatomy

NISP	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*	*Total*
skull		9	1		10
maxilla		7			7
mandible	1	23	4	1	29
lower premolar		1			1
lower molar	1	1			2
lower deciduous incisor		1			1
lower incisor	2	2	1		5
lower canine		2	1		3
upper molar		1			1
upper incisor		1	1		2
upper canine			1		1
tooth frag		1			1
humerus		2	3		5
radius		7			7
ulna		5			5
scapula		11			11
pelvis		4			4
sacrum		1			1
femur		2			2
tibia		3	1		4
fibula		2			2
metacarpus		1			1
metacarpal 4		1			1
lateral metacarpal		2			2
carpal		1			1
metatarsus		2			2
metatarsal 3		1			1
lateral metatarsal		1			1
astragalus		2			2
calcaneum		3	1		4
metapodial		1			1
lateral metapodial		2			2
phalanx 1		1			1
phalanx 2		2			2
phalanx 3		1			1

	Ph 2		*Ph 3*	
area	*Total*	*%*	*Total*	*%*
head & neck	47	*35.1*	40	*36.7*	5	*35.7*
teeth	17	*12.7*	10	*9.2*	4	*28.6*
shoulder	11	*8.2*	11	*10.1*	0	*0.0*
pelvis	5	*3.7*	5	*4.6*	0	*0.0*
foreleg	17	*12.7*	14	*12.8*	3	*21.4*
hindleg	8	*6.0*	7	*6.4*	1	*7.1*
feet	23	*17.2*	22	*20.2*	1	*7.1*
other	5	*3.7*	0	*0.0*	0	*0*

lateral phalanx 2		1			1							
lateral phalanx 3		1			1							
atlas		1			1							
limb shaft fragment	5				5							
						134	*99.3*	109	*100*	14	*99.9*	
Total	9	110	14	1	134							

%	*unphased*	*Ph 2*	*Ph 3*	*Ph 4*
skull		*8.2*	*7.1*	
maxilla		*6.4*		
mandible	*11.1*	*20.9*	*28.6*	*100*
lower premolar		*0.9*		
lower molar	*11.1*	*0.9*		
lower deciduous incisor		*0.9*		
lower incisor	*22.2*	*1.8*	*7.1*	
lower canine		*1.8*	*7.1*	
upper molar		*0.9*		
upper incisor		*0.9*	*7.1*	
upper canine		*0*	*7.1*	
tooth frag		*0.9*		
humerus		*1.8*	*21.4*	
radius		*6.4*		
ulna		*4.5*		
scapula		*10*		
pelvis		*3.6*		
sacrum		*0.9*		
femur		*1.8*		
tibia		*2.7*	*7.1*	
fibula		*1.8*		
metacarpus		*0.9*		
metacarpal 4		*0.9*		
lateral metacarpal		*1.8*		
carpal		*0.9*		
metatarsus		*1.8*		
metatarsal 3		*0.9*		
lateral metatarsal		*0.9*		
astragalus		*1.8*		
calcaneum		*2.7*	*7.1*	
metapodial		*0.9*		
lateral metapodial		*1.8*		

phalanx 1		*0.9*
phalanx 2		*1.8*
phalanx 3		*0.9*
lateral phalanx 2		*0.9*
lateral phalanx 3		*0.9*
atlas		*0.9*
limb shaft fragment	*55.6*	*0*

Table Animal Bone 26. Pig ageing (bone fusion)

		Ph 2 epiphysial state	
	element	*fused*	*unfused*
group 1	distal scapula	2	
	pelvis acetabulum	2	1
	proximal radius	4	
	distal humerus		
group 2	distal metapodial		2
	proximal calcaneus		2
	distal tibia	1	1
group 3	femur		1
	proximal tibia		
	distal radius		2
	proximal humerus		
	ulna		3
	totals	9	12
	survival percentages		
	pig		
	age (months)		
group 1	12	*88.9*	*11.1*
group 2	24-30	*16.7*	*83.3*
group 3	36-42	*0*	*100*

Age classes adapted from Silver (1969) and Moran & O'Connor (1994)

Table Animal Bone 27. Horse withers heights

phase	*context*	*anatomy*	*measurement Gl/Ll (mm)*	*withers height (m)*	
0	80206	metatarsus	244.0	1.301	
2	646	tibia	325.0	1.417	
2	5638	tibia	285.0	1.243	estimated
2	90401	metatarsus	224.0	1.194	
2	1654	metacarpus	190.0	1.218	
2	2849	metacarpus	187.0	1.199	
2	90206	metacarpus	185.0	1.186	
3	664	femur	335.0	1.176	
3	80391	tibia	320.0	1.395	estimated
3	5647	humerus	270.0	1.315	
3	2408	metacarpus	180.0	1.154	
3	2412	metacarpus	206.0	1.320	
		Total	*max wht*	*min wht*	*mean*
		12	*1.417*	*1.154*	*1.260*

Marine Shell

By Sarah F. Wyles

An assemblage of 79 shells (MNI) was recovered from 53 contexts across seven sites at Cambourne (**Table Marine shell 1**), with 63% coming from Lower Cambourne. The majority of the shells (95%) are oyster, *Ostrea edulis*, with the remainder being mussel, *Mytilus edulis*. The shells were recorded by species, and also measurable and unmeasurable left and right oyster valves, by context. This data is available in archive.

Most of the shells were retrieved from Romano-British contexts (64%), while the rest came from later Iron Age (17%) or undated (19%) contexts. The average number of shells recovered from each context was around 1.5.

The shells vary in size and condition, with a few being rather large. Some are weathered and fragmented, possibly an indication of redeposited midden material. Some shells have notches on them, as a result of opening. A single shell from the Romano-British period has a round hole through the heel of the shell. These holes have been seen at Carisbrooke Castle, Isle of Wight, Fulston Manor, Kent, and Tolpuddle Ball, Dorset, and may be a result of depositional processes.

Traces of the infesting polychaetic worm *Polydora ciliata* were recorded on about a quarter of the shells and of the boring sponge *Cliona celata* on a single shell from the Romano-British period. Both these infestors are common and widespread on both the south and east coasts of England.

The small quantity of shell recovered from the sites is an indication that shellfish was not a significant part of the diet during any period at Cambourne.

Table Marine Shell 1. Marine shell by species and phase

Phase	*No. of sites*	*No of contexts*	*Oyster (mni)*	*Mussel*	*Total shell*
Later Iron Age	2	9	10	1	11
Romano-British	5	34	52	0	52
Undated	4	10	13	3	16
Total	7	53	75	4	79

Twelve excavations were carried out by Wessex Archaeology within the Cambourne Development Area. Situated on the clay uplands west of Cambridge, which have seen little previous archaeological investigation, the results presented here are important in demonstrating the ebb and flow of occupation according to population or agricultural pressure.

Short-lived Bronze Age occupation was followed in the Middle Iron Age by small farming communities with an economy based on stock-raising and some arable cultivation. The Late Iron Age seems to have seen a recession, perhaps partly due to increased waterlogging making farming less viable.

From the mid-1st century AD new settlements began to emerge, possibly partly stimulated by the presence of Ermine Street, and within a century the area was relatively densely occupied. Several farmsteads were remodelled in the later Romano-British period, though none seems to have been very prosperous.

Dispersed occupation may have continued into the early 5th century at least, followed by a hiatus until the 12th/13th century when the entire area was taken into arable cultivation, leaving the ubiquitous traces of medieval ridge and furrow agriculture.

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CAMBOURNE
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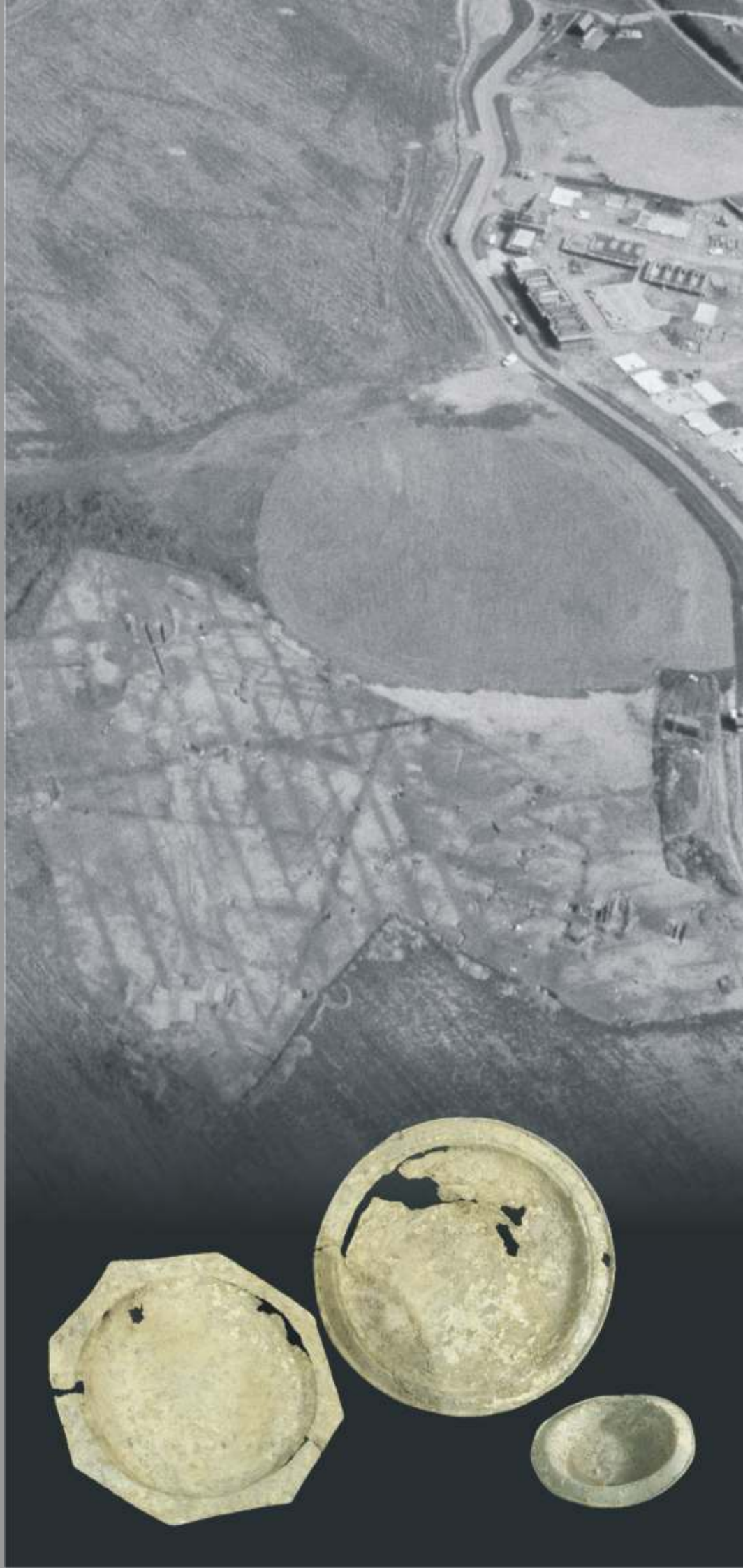
BOVIS HOMES



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