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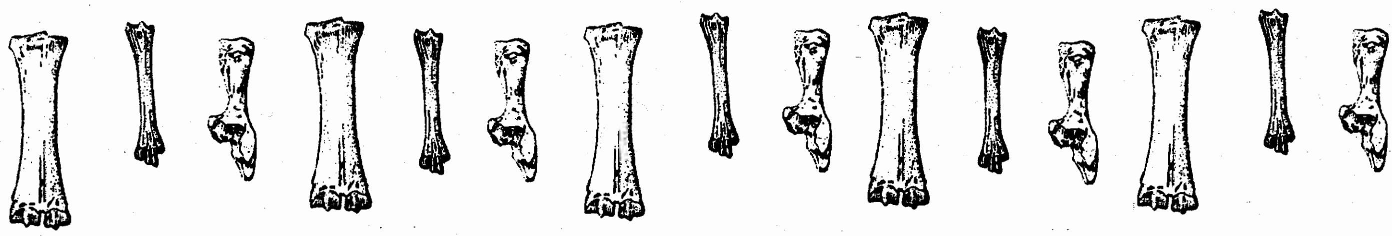
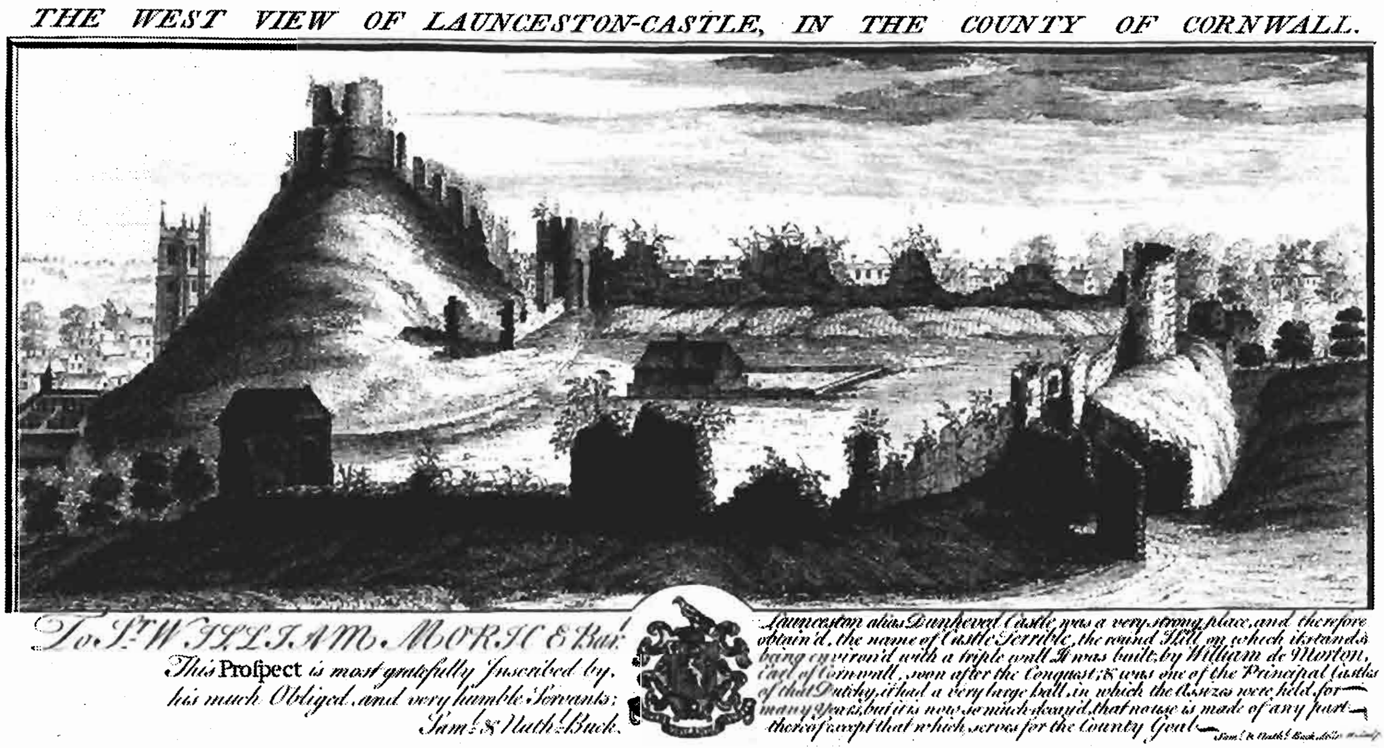
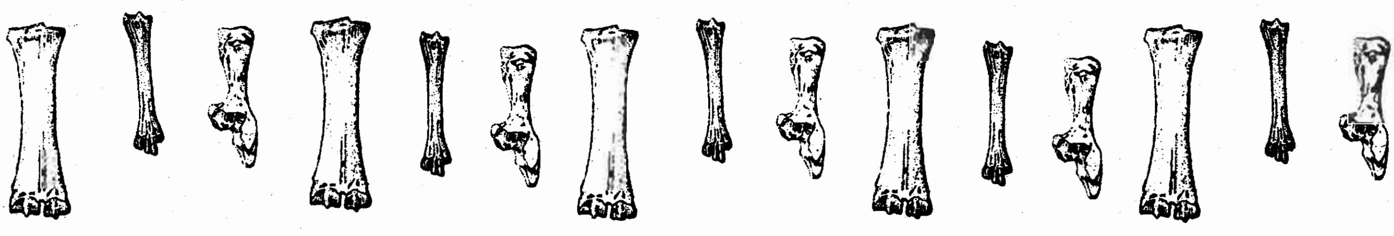
Circaea







The Journal of the Association for Environmental Archaeology

Circaea

Circaea is the Journal (formerly Bulletin) of the Association for Environmental Archaeology (AEA) and—as from Volume 4—it is published twice a year. It contains short articles and reviews as well as more substantial papers and notices of forthcoming publications.

The *Newsletter* of the Association, produced four times a year, carries news about conferences and the business of the Association. It is edited by Wendy Carruthers (Sawmills House, Castellau, Pontyclun, Llantrisant, Mid Glamorgan CF7 8LP, U.K.) and Vanessa Straker (Department of Geography, University of Bristol, Bristol BS8 1SS, U.K.), to whom copy should be sent (on 5.25- or 3.5-inch floppy disk in IBM-PC format as *WordPerfect*, *Word* or ASCII files to Wendy, or by e-mail or as hard copy, to Vanessa).

Editorial policy for *Circaea* is to include material of a controversial nature where important issues are involved. Although a high standard will be required in scientific contributions, the Editors will be happy to consider material the importance or relevance of which might not be apparent to the editors of scientific and archaeological journals—for example, papers which consider in detail methodological problems such as the identification of difficult bioarchaeological remains.

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Mammals and birds from Launceston Castle, Cornwall: decline in status and the rise of agriculture

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'In number of dishes and change of meate the nobilitie of Englande doe most exceede, sith there is no daye in manner that passeth over their heades wherein they have not onely beefe, mutton, veale, lamb, kidde, porke, conie, capon, pigge, or so many of these as the season yieldeth: but also some portion of the redde or fallow deere, beside great varietie of fishe and wildefowle, and thereto sundrie other delicates ...' (William Harrison 1577 An historicall description of the Islande of Britayne... *Book III, ch. 1, p. 94).*

Summary

Over 9,000 hand-recovered animal bones and teeth were identified and recorded from excavations at Launceston Castle, Cornwall, U.K. Most were recorded from deposits assigned to four periods: 6 (late 13th century), 8 (15th century), 9 (16th century-1650) and 10+11 (1660-1840) and belong to cattle, sheep and pig, as well as a wide spectrum of other mammals and birds. Some are species known to have been highly esteemed by medieval gourmands and, together with the prevalence of hind-limb bones of deer, presumably from haunches, attest to the high status of the diners at Launceston. Considered with other castle, urban and village sites in England, the vertebrate assemblages from Periods 6 and 8 are like those from other castles, while the assemblage from Period 10+11 is more 'urban' in character, and the one from Period 9 is intermediate. The decline of the high status aspects of the fauna in the upper levels correlates with historical references to the castle's decline. Like most vertebrate assemblages from English archaeological sites, the pig declined in importance relative to cattle and sheep in later medieval times. The numbers of juvenile cattle increase while there was little change in the ages of sheep culled in the Launceston succession. The sheep, pig and cattle remains showed an increase in size by Period 9. For the cattle this size increase was accompanied by a change of shape of the metatarsals and astragali and the reduced frequency of a dental anomaly. All these changes probably reflect improvements in husbandry and the possible import of livestock. A contemporaneous increase in size of cattle and sheep bones is reported from some other sites in England and is probably linked with the Agricultural Revolution. We argue that these changes support the notion that English agricultural improvements began in Elizabethan rather than Georgian times.

Introduction

Launceston, on the River Kensey, is in north-eastern Cornwall, in the far south-west of England (OS 1:50,000 Map 201; National Grid Ref. SX 330846) and is 14 miles (22 km) 'as the crow flies' from the Cornish coast (Fig. 1). The castle there was first built in the early years of the Norman conquest (late 11th century) and remained in use until the 1840s when it was converted into a public park. It was excavated by Andrew Saunders between 1961 and 1982 (Saunders 1973). This report describes the mammal and bird remains, over 9,500 identified specimens, from Saunders' excavation and compares them to vertebrate remains from other English medieval sites.

The occupation of Launceston Castle spans a period of great economic and social development in England. Perhaps the most important change, and one of great zoo-archaeological interest, was the Agricultural Revolution. The Launceston animal bones provide an excellent opportunity to study the effects and timing of this revolution.

Brief historical outline (from Saunders (1984) and pers. comm.)

c. 1067: probable date of construction to put down a revolt against William the Conqueror. Launceston as a town was also established and remained the centre of Cornish government until 1840.

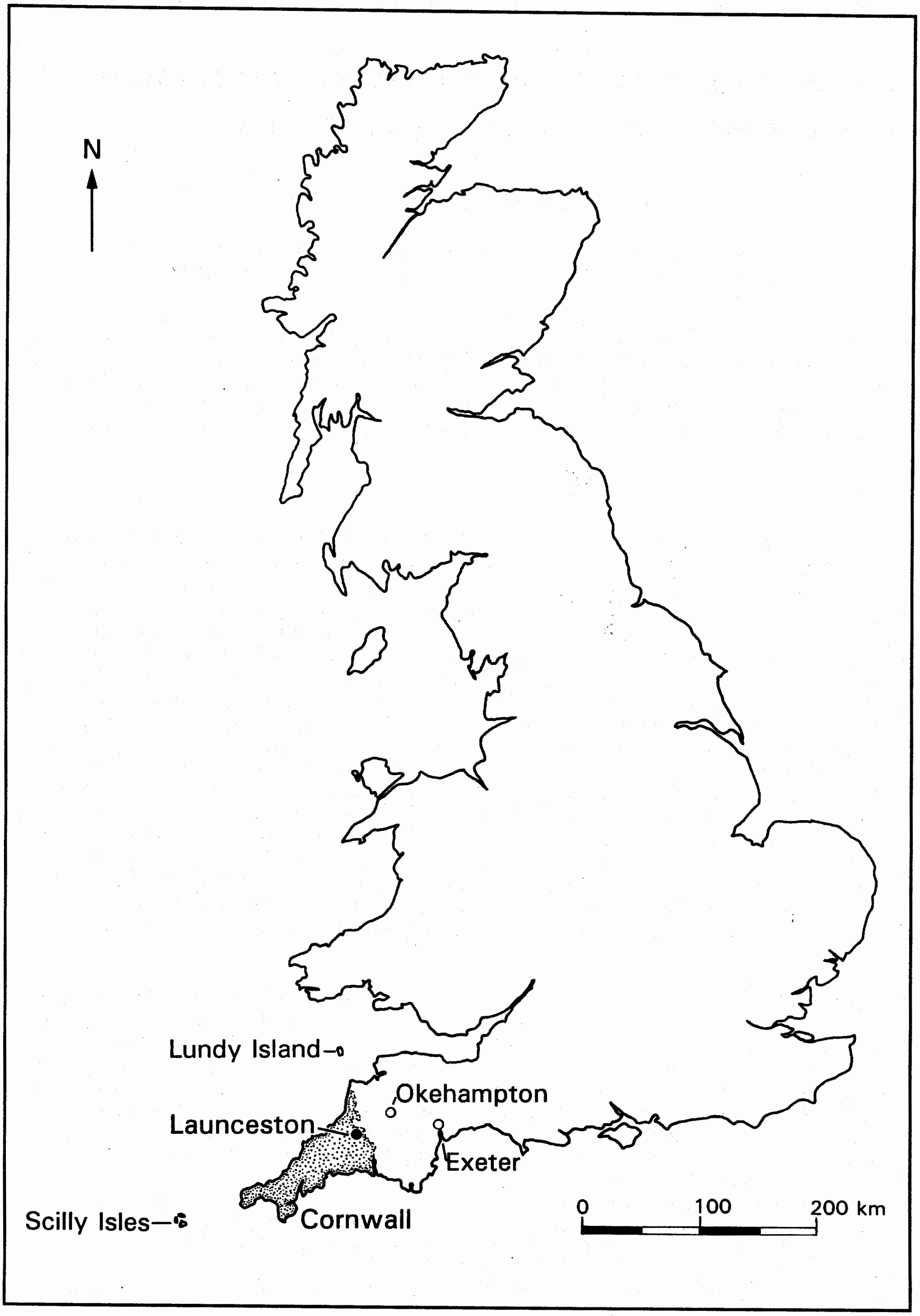


Figure 1. Location of Launceston.

Late 11th-12th centuries: probably a period of stable and intensive occupation, consolidation and building. The internal structures, initially built of timber, were reconstructed using stone foundations. Local culture was being fused with new fashions brought in by an alien military aristocracy.

1227-72: Richard of Cornwall was granted the earldom of Cornwall by his elder brother King Henry III. This marks the high point in the castle's history. Richard was among the wealthiest and most powerful men in the kingdom. He reorganised and rebuilt the castle, and constructed a new great hall.

1272: Death of Richard of Cornwall. His son Edmund moved the earldom's administration to Lostwithiel, closer to the regions of tin production, marking a decline in the importance of Launceston. In 1337 it was noted that the castle walls were in ruins, and the buildings in a state of neglect.

1341: repairs of the castle initiated which appear to have continued throughout the 15th century. The castle increasingly takes on a function of administering justice.

1539: Visit of Leland who mentions the 'hall for syses and sessions'.

1642-49 (Civil War): Town and castle held for the King except for two occasions, and finally captured by Fairfax's army in 1646. Despite some repair of the castle defences, a 1650 Parliamentary survey indicates that only a small part of the castle remained habitable, that the defences were in a state of decay and buildings had disappeared.

18th century: the constable's lodgings, the north gatehouse, were demolished in 1764, and at about this time much of the area was landscaped. The prison remained in use until its demolition in 1842. It consisted of three cells for women and four for men, with an apartment for the governor. Within the castle there were pigsties and cabbage plots. Hangings were carried out in the bailey, the last of which was in 1821.

1840s-1939: The transfer of the assizes to Bodmin led to the demolition of the gaol and the conversion of the castle into a park.

Excavation

Excavation revealed the following phases of occupation (Andrew Saunders, pers. comm.):

Period	*Date*
12	1944 and since
11	1840s-1939
10	1660-1840
9	16th century-1650
8	15th century
7	14th century
6	late 13th century
5	mid 13th century
4	*c.* 1175-*c.* 1227
3	*c.* 1104-*c.* 1175
2	*c.* 1075-*c.* 1104
1	*c.* 1068-*c.* 1075

Almost all bones came from the bailey and data from Periods 10 and 11 have been combined since bones from Period 11 are presumed to be residual from Period 10 (Trevor Miles, pers. comm.).

Change in the character of occupation of Launceston Castle (Andrew Saunders, pers. comm.)

In general terms the castle underwent a substantial decline in status between Periods 1 and 12. Up to and including Period 4, it was densely occupied as a castle with probable regular residential use by people of both high and low status; i.e. the earl and some degree of permanent garrison and administrative staff were frequently present. Periods 5-8 saw the castle being used only intermittently as a high status residence. The garrison and administrative staff began to be depleted after Period 6, and Periods 7 and 8 saw the declining status of the residential constable. During Periods 8 and 9 high status residential use of the castle was episodic and probably limited to the justices' circuit. The residential keeper of the castle was probably now of relatively low status. Finally, in Periods 10 and 11, occupation of the castle was limited to the gaoler, his family, and the prisoners. The castle fell into ruins and much rubbish accumulated. It may even have served as a town tip, with cabbage plots and pigsties being leased out.

Methods

For a full description of the methods used see Davis (1992a). In brief, all mandibular teeth and a restricted suite of 'parts of the skeleton always recorded' (i.e. a predetermined set of articular ends/epiphyses and metaphyses of girdle, limb and foot bones) was recorded and used in counts. In order to avoid multiple counting of very fragmented bones, at least 50% of a given part had to be present for it to be counted. Broken, and therefore single, metapodial condyles of caprines, cattle and

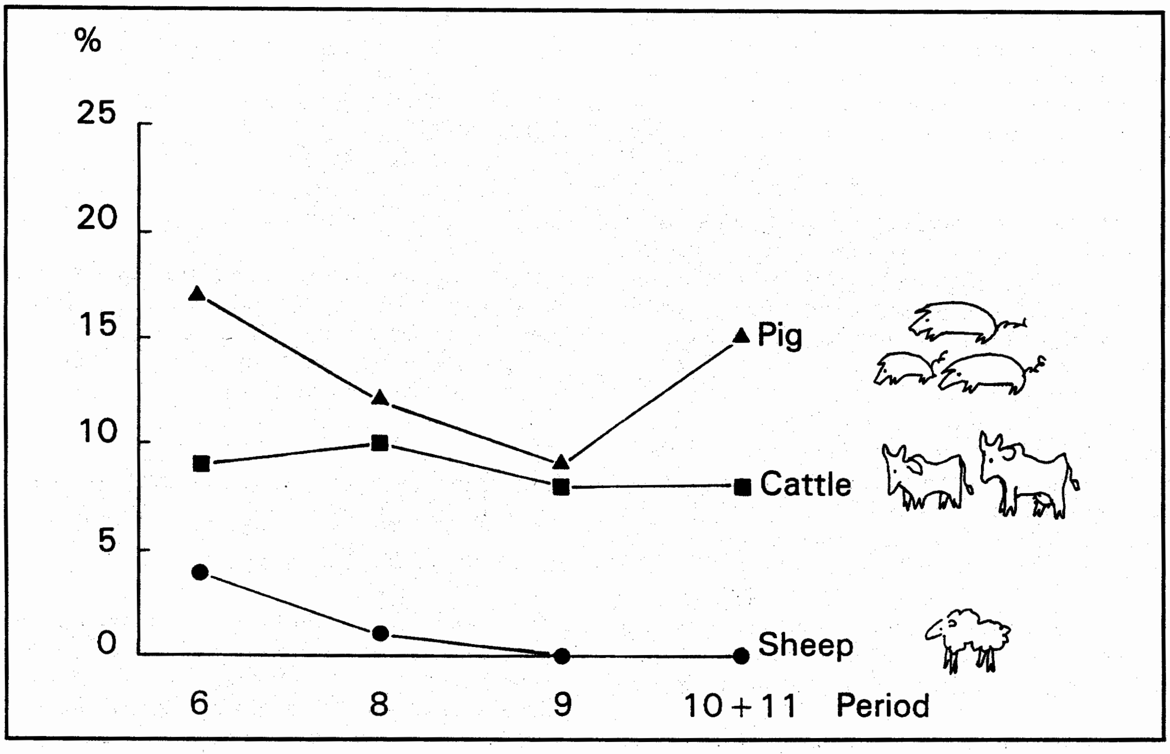


Figure 2. Percentage of isolated incisors for cattle, sheep and pig, calculated by [(MNI of isolated incisors)/(MNI incisors + MNI dP_4/P_4 + MNI M_1/M_2 + MNI M_3)] x 100.

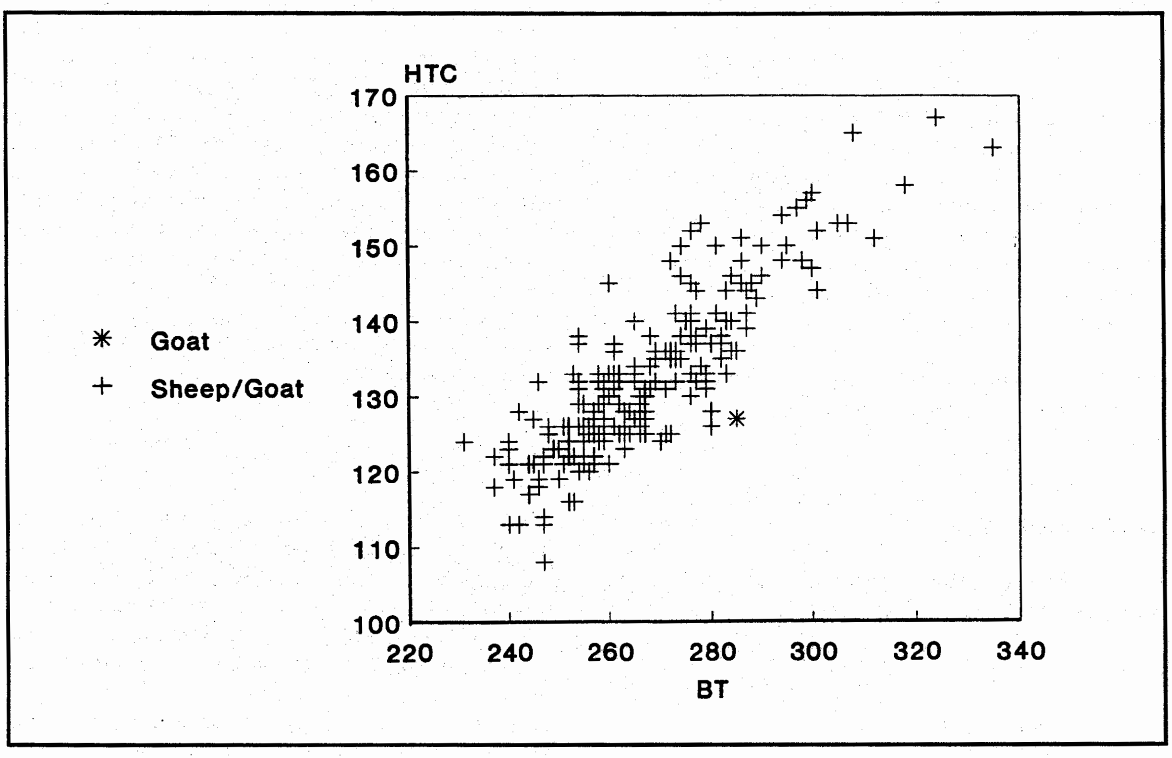


Figure 3. Scatter plot of HTC versus BT measurements for goat and sheep/goat humeri (only fused and fusing specimens).

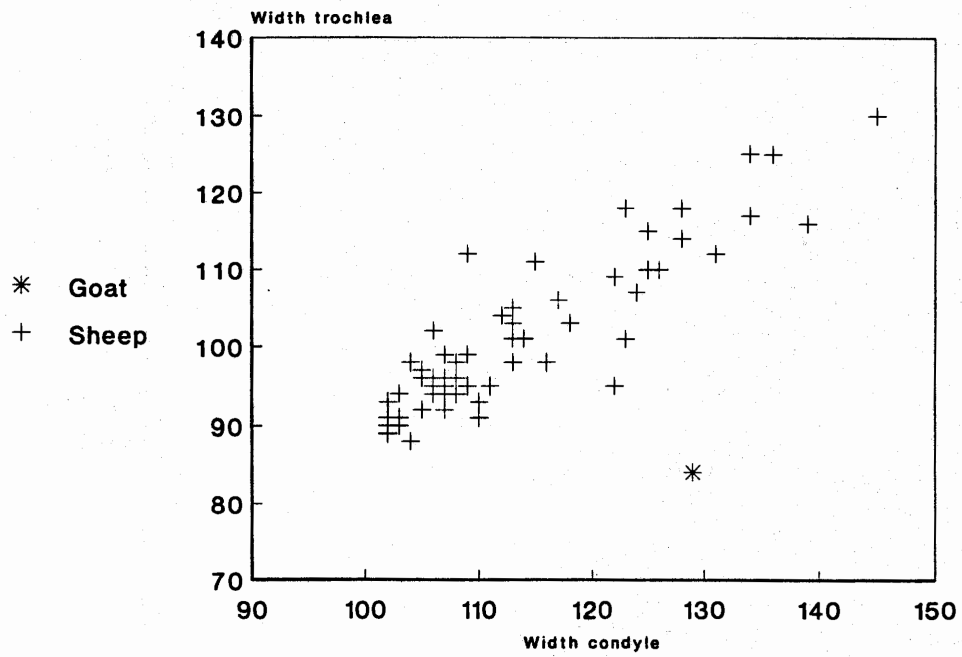


Figure 4. Scatter plot for measurements of condyle width against trochlea width for goat and sheep metacarpals (only fused and fusing medial condyles).

cervids were counted as halves, as were each of the two central pig metapodials. The following bird bones were recorded: scapula (glenoid articulation), distal humerus, distal femur, distal tibio-tarsus, and distal tarso-metatarsus.

A mammal-bone epiphysis is described as 'fusing' once spicules of bone have formed across the epiphysial plate joining epiphysis to metaphysis and while some open areas are still visible between epiphysis and diaphysis. An epiphysis is described as 'fused' when this line of fusion is closed. Bird bones with 'spongy' (i.e. incompletely ossified or growing) ends are recorded as 'juvenile'. Caprine teeth were assigned to the eruption and wear stages of Payne (1987), pig and cattle teeth were assigned to the eruption and wear stages of Grant (1982). Cattle and pig mandibles were also assigned to the five age stages of O'Connor (1988); caprine mandibles were assigned to the age stages of Payne (1973) and isolated teeth considered with their counterparts in mandibles as by Payne (1988).

Measurements taken on the humerus and cattle metapodials are illustrated by Davis (1992a, figs. 1 and 2), while those taken on equid mandibular cheek teeth follow Davis (1987a) and those for pig teeth follow Payne and Bull (1988). In general, other measurements taken are among those suggested by von den Driesch (1976).

The Launceston Castle vertebrate remains, together with the excavation archive, will be stored at the Royal Cornwall Museum, Truro.

Results

Condition and recovery

The Launceston bones were generally well preserved and most of them had been recovered by hand (Table 1; note, all tables are presented at the end of the text, on pp. 65-156). While some sieving was undertaken (see Table 2), the sieved samples were not 'whole earth', so we were unable to estimate what

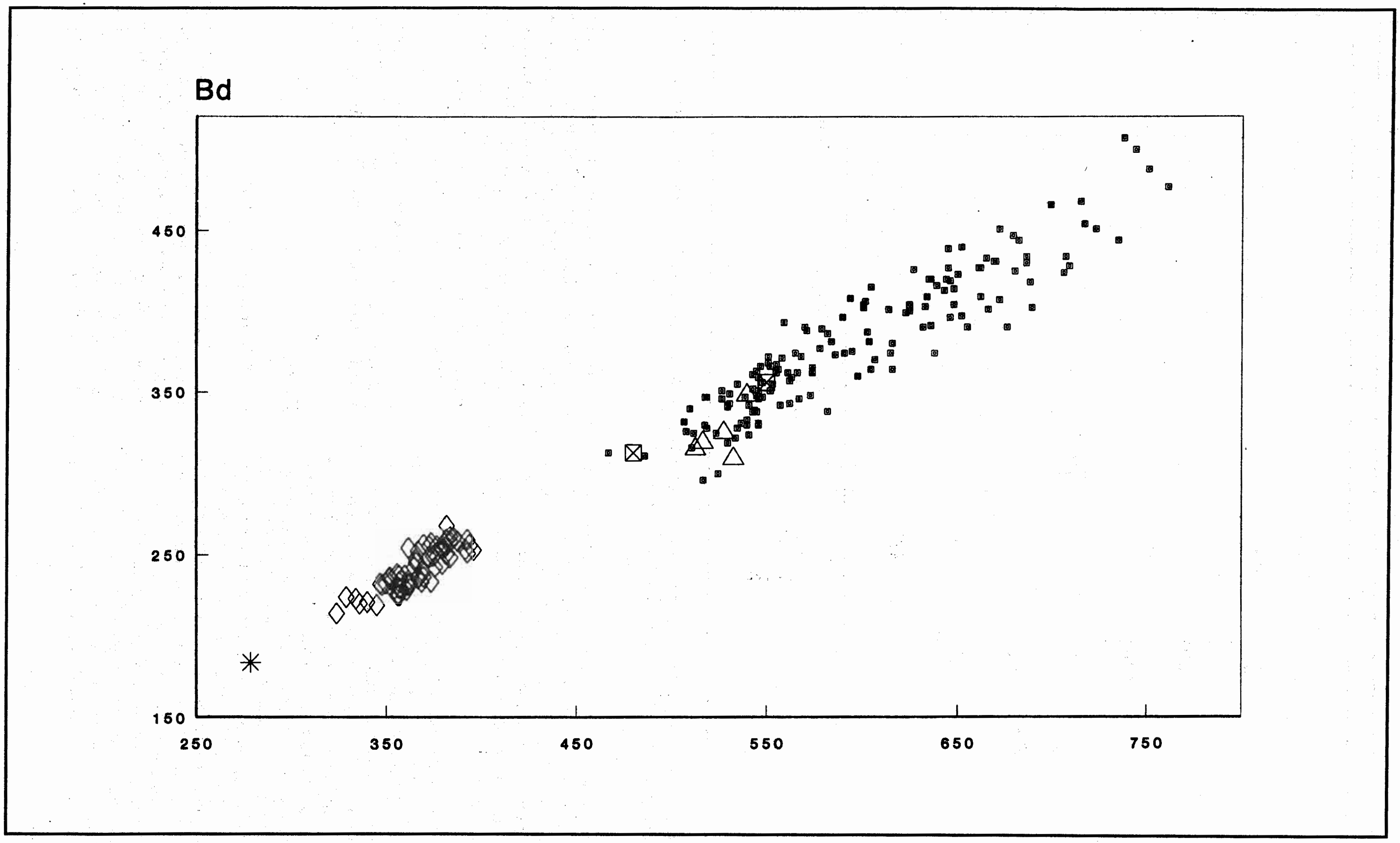


Figure 5. Scatter plot of measurements of GLl and Bd for astragali of deer and cattle, for all periods.

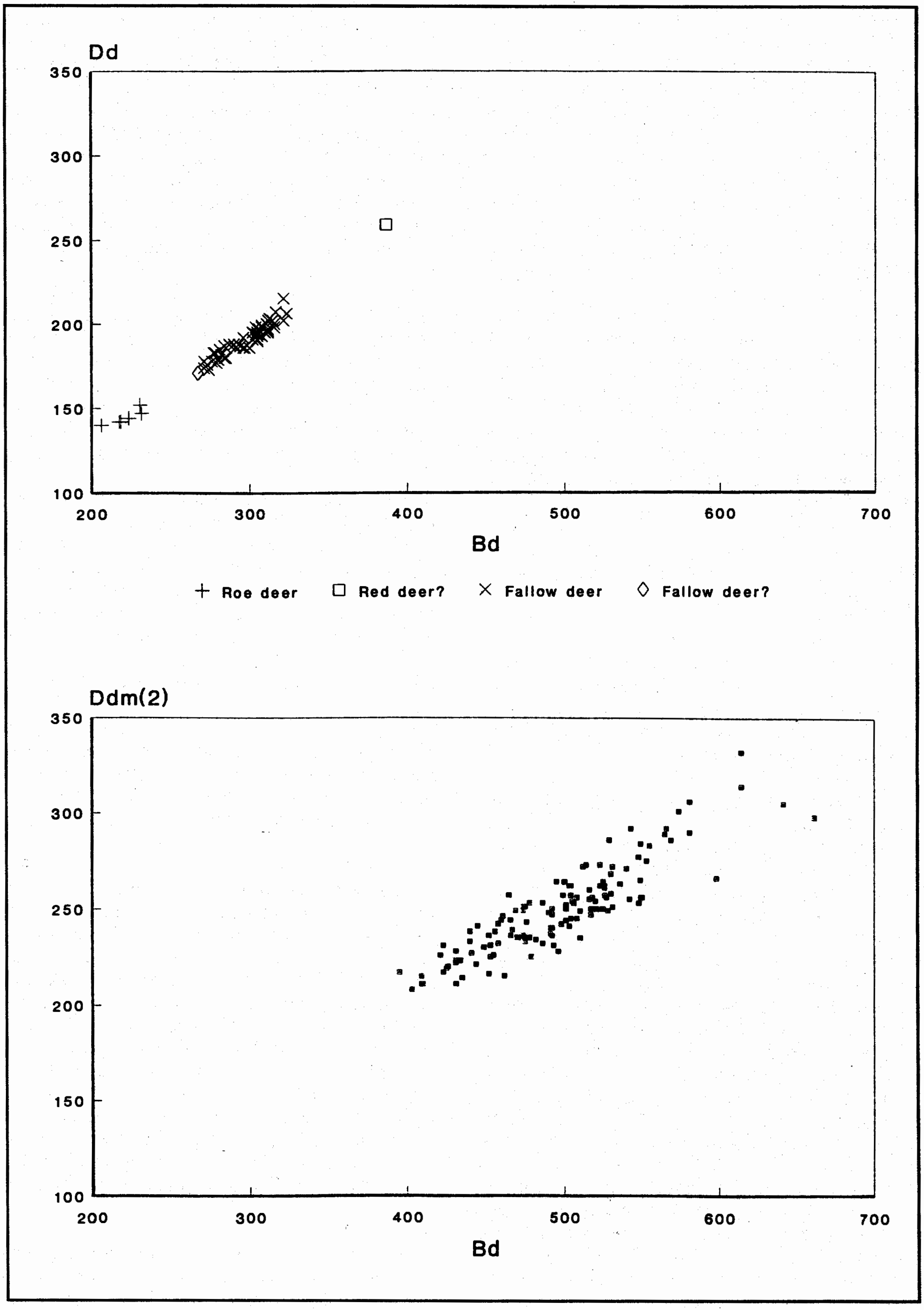


Figure 6. Above: scatter plot of measurements of Bd against Dd for metatarsals of cervids for all periods; below: plot of equivalent parameters for cattle, for all periods (Ddm(2) is almost equivalent to Dd).

proportion of, say, the smaller parts of the skeleton and smaller species might have been lost during excavation. However, in the sieved samples (Table 2), there does appear to be a relatively larger number of small vertebrates, especially birds. These animals were undoubtedly much more common than Table 1 indicates. While it is difficult to estimate what was lost, we have been able to test whether the degree of loss varied with respect to period. Put another way, was recovery better/worse in any period? The answer appears to be that the standard of recovery remained roughly similar throughout: the proportion of isolated incisor teeth (these are small and therefore easily missed) versus numbers of all teeth for sheep, pig and cattle (Fig. 2) appears to have remained similar throughout the Launceston succession. Note also the very low recovery of sheep incisors and relatively higher recovery of the larger pig and cattle ones.

Identification and species found (Tables 1 and 2)

Like most hand-recovered archaeological vertebrate assemblages from England, well over 60% of the bones belonged to sheep, cattle and pig. Their frequencies and size variation are discussed below.

Most, but not all, caprine (sheep and goat) bones are difficult to identify to species and are referred to as sheep/goat. Deciduous cheek teeth (dP_3 and dP_4), metacarpals, astragali, and metatarsals are relatively easy to identify (see for example the criteria described by Boessneck 1969; and Payne 1985) and these elements are the ones we recorded as sheep or goat. Occasionally other caprine bones could be identified to species and although recorded, were not included in our calculations of the sheep:goat ratios. Of the caprine bones which could be identified, the overwhelming majority were sheep. A small number, however, were identified as goats, of which most belonged to kids (Tables 3 and 4; Plates 1a and 1b). One distal humerus (with its epiphysis fused), identified on morphological grounds as goat, is metrically on the periphery of the scatter of plots of the majority of sheep/goat distal humeri (Fig. 3). Likewise, the adult goat metacarpal, when plotted using Payne's (1969) method for metrically separating sheep from goat metacarpals, plots out quite distinctly from the sheep metacarpals (Fig. 4).

Numerous cervid bones were identified (Tables 1 and 5). Occasionally we were unsure of our ability to distinguish between, for example, cattle and red deer, and red, fallow and roe deer bones. Two such examples are shown in the plots of astragali and metatarsal measurements (Figs. 5 and 6). These show that red deer and cattle overlap, but that once identified as cervid, measurements can reasonably securely confirm identification (note the tight clustering of plots in Figs. 5 and 6).

A small number of leporid bones were found at Launceston. In Britain hare is easily distinguished from rabbit on size. However, apart from the distal humerus, we did not feel sufficiently confident in our ability to distinguish between brown hare, *Lepus europaeus*, and blue hare, *L. timidus*. Most *Lepus* bones are therefore merely recorded as 'hare'.

Horse, *Equus caballus* and ass, *E. asinus* bones are also difficult to separate, although their cheek teeth are relatively easy to distinguish on the basis of the enamel folds (Eisenmann 1981). The few equid cheek teeth found at Launceston were horse-like. Since no definite asinine characters were recognised in any of the equid teeth, we assume that the Launceston equid bones belonged to horse.

Not surprisingly, given the large size of the vertebrate assemblage at Launceston, bones from a wide spectrum of other mammal species were found. These include badger, cat, fox, dog, hedgehog, and rat (probably black rat).

A small number of cetacean bones (these fall into two size classes) occurred in most periods, but especially 6 and 8. A mandible with teeth in Period 8 was identified as common dolphin, *Delphinus delphis* (Plate 2a) and several fragments of very large vertebrae are of a size equivalent to *Balaena/Balaenoptera/Physeter* (Plate 2b). (We have been unable to identify these vertebrae to species. Large cetacean vertebrae finds were as follows: one each in Periods 3 and 5, seven in Period 6, six in Period 8, two in Period 9 and one in Period 10+11. Small cetacean vertebrae finds (Plate 2c) are as follows: five in Period 6 and nine in Period 8).

The most common bird at Launceston belongs to the *Gallus/Numida/Phasianus* group of closely-related galliformes. Most bones of these three birds are difficult to distinguish (see for example MacDonald 1992), although in a number of cases such as spurred tarso-metatarsi lacking the 'posterior continuous keel' we were able to make a definite identification of *Gallus*, the chicken. No definite guinea fowl or pheasant could be identified, and we assume that most of the fowl-like bones belonged to chicken. The presence or absence of an air-sac foramen on the proximal end of the femur was used to distinguish between chicken/guinea fowl and pheasant. MacDonald's criteria for the scapula and carpo-metacarpus were used to distinguish chicken/pheasant from guinea fowl. The carpo-metacarpus was not a 'counted' element, but was recorded merely to ascertain the identification of these three birds.

We were unsure of the correct identification of a small galliform tibio-tarsus from Period 8. It is too small for chicken, is morphologically slightly different from partridge and has a relatively small Dd. The question of whether it is a slightly anomalous partridge or another species remains open.

A number of goose bones were also found. These belonged to one of the larger species of *Anser*, but we were unable to determine whether they belonged to wild or domestic goose—these are difficult to distinguish. No bones of any of the smaller species of goose were found.

Bones of the golden and grey plovers, *Pluvialis apricaria* and *P. squatarola*, are morphologically similar, but some, such as the humerus and tarso-metatarsus, are sufficiently different in relative length to permit a distinction between the two species and, referring to the bird collections of the Natural History Museum at Tring, we were able to identify some plover bones to species.

The most common wild birds were woodcock, *Scolopax rusticola*; grey partridge, *Perdix*; and golden and grey plovers, *Pluvialis apricaria* and *P. squatarola*. Other bird finds of interest included a turkey, *Meleagris gallopavo*, humerus from Period 11; a crane, *Grus*, tibio-tarsus from Period 6 and two proximal tarso-metatarsi from Period 8; two gannet, *Morus (=Sula) bassanus*, tarso-metatarsi from Period 8; 13 tibio-tarsi (this includes 1 in the sieved sample and 2 proximal ends) and 1 femur of Manx shearwater, *Puffinus puffinus*, all but one from Period 6; heron, *Ardea cinerea*, from Period 8; and swan, *Cygnus* cf. *olor* from Period 4.

Many fish bones were also recovered, both by hand and sieving. They are being studied by Pippa Smith of the Faunal Remains Unit, University of Southampton, and will be the subject of a separate report.

Frequencies of species through time

While bones were found in all eleven periods, only four contained quantitatively meaningful samples: Periods 6, 8, 9 and 10+11.

Tables 1, 3, 5, 6 and 7 and Figs. 7 and 8 show:

(1) an increase in importance of mammals relative to birds and fish;

(2) a steady relative decline of **pig** between Periods 6 and 10+11;

(3) a marked relative increase of **cattle** between Periods 6 and 10+11; and

(4) a small relative increase of **sheep** between Periods 8 and 10+11;

(5) up to and including Period 8 (15th century) **goat** makes up approximately 10% of the securely identified goat and sheep bones; subsequently the proportion of goat drops to almost nil;

(6) **fallow deer** may (samples are extremely small from the first five periods) become more common than red deer after Period 5 (mid 13th century); it shows a slight increase from Periods 6 to 8 when it contributes 8% of the vertebrate assemblage, but after Period 8 its numbers appear to decline;

(7) the relative frequencies of **goose** and **chicken** decline after Period 8 (15th century);

(8) **horse** is relatively more common in Period 9;

(9) **rabbit** becomes more common than **hare** in Period 9.

Butchery/cut marks

Most of the artiodactyl and bird bones had cut and/or chop marks on them. Several cattle bones—a distal femur, a distal metacarpal, a distal metatarsal, and a distal half metapodial, all from Period 11 and a proximal metacarpal from Period 10—had been sawn. Cut marks, presumably made while skinning, were observed on some cattle phalanges. A cat mandible from Period 8 (Plate 3a) and a dog

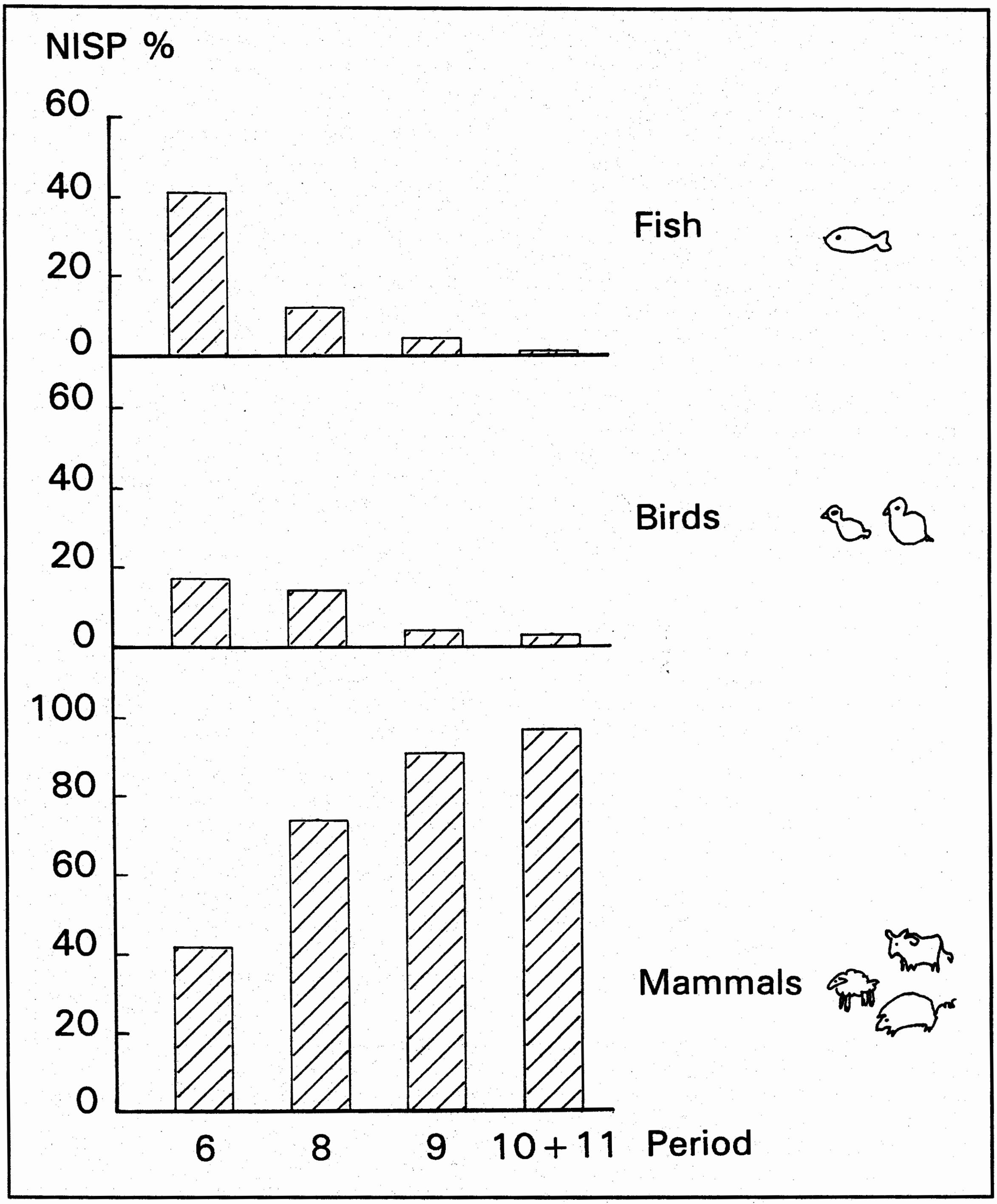


Figure 7. Frequency of mammals, birds and fish at Launceston Castle.

femur from Period 10 (Plate 3b) also had cut marks: the mandible on the buccal side and the femur on the major trochanter. Three horse bones had butchery/cut marks. Two—a distal tibia from Period 3 (Plate 3c) and a metacarpal from Period 8—had very distinct cut marks, and one (a distal metapodial from Period 8) had probable cut marks on its condyle. One crane proximal tarso-metatarsus (Plate 3d) had several cut marks. Several of the large cetacean vertebrae had deep incisions on the articular surfaces of their centra (Plate 2b).

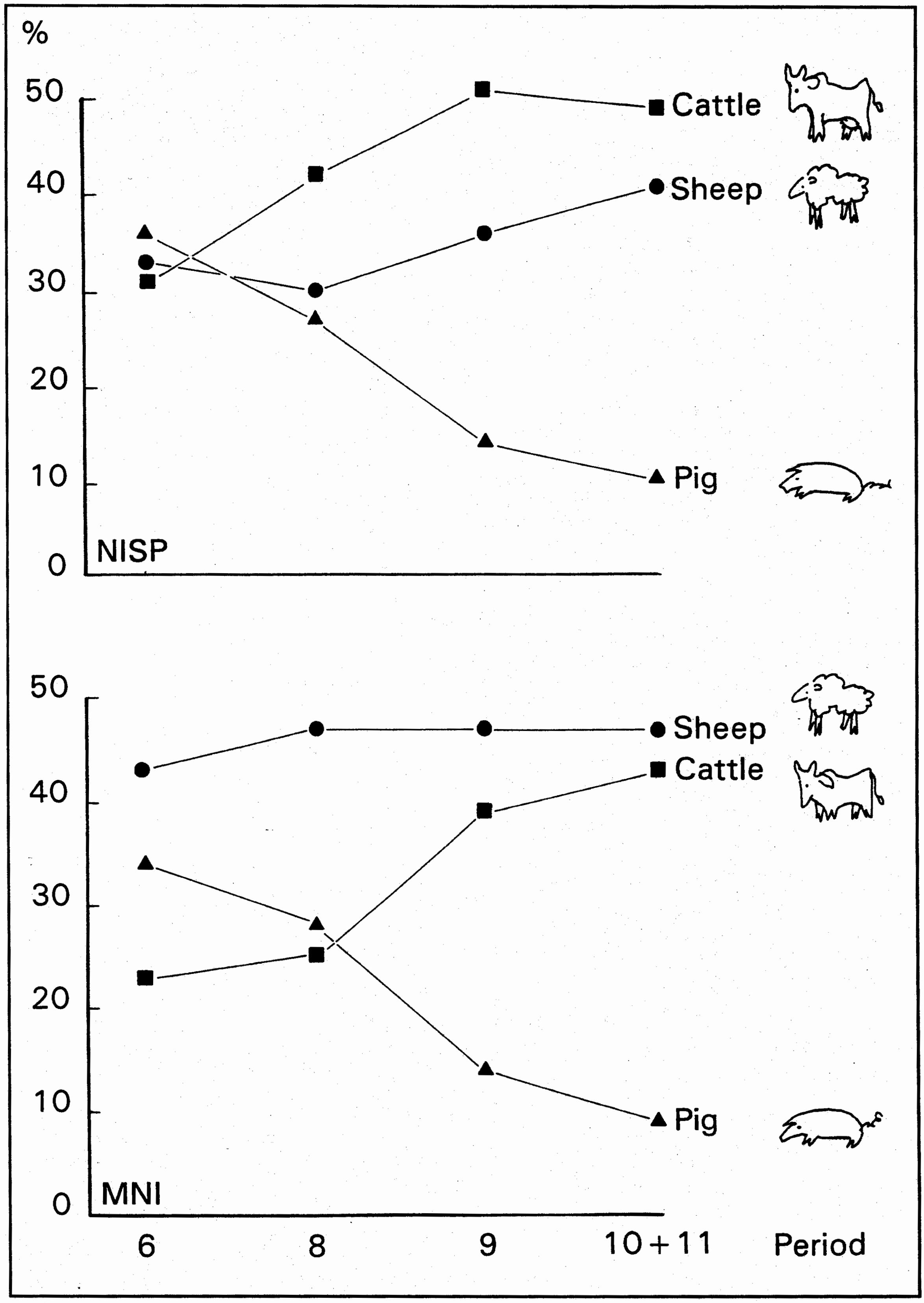


Figure 8. Frequency of main domestic taxa at Launceston Castle calculated from NISP (above) and MNI (below).

Parts of the skeleton represented

Since little sieving was undertaken at Launceston, all taxa show an under-representation of smaller parts of the skeleton, especially phalanges and isolated teeth. Despite recovery biases, there are some interesting differences (Tables 8 to 13 and Figs. 9 to 12).

(1) **Cattle**: there is a change between Period 8 and 9. In Periods 6 and 8, numbers of cattle teeth (which we presume signify heads) and fore-limb bones are more-or-less as common as hind-limb bones. But in Periods 9 and 10, teeth, and perhaps fore-limb bones also, are relatively poorly represented (Fig. 9).

(2) **Sheep**: there is little change in body-part frequencies in the course of the Launceston succession (Fig. 10), although humerus replaces tibia as the most common bone after Period 9. In all periods, extremities of limbs are under-represented relative to the meat-bearing bones, such as humerus and tibia.

(3) **Pig**: as for sheep, pig body-part frequencies appear to be similar in all the periods at Launceston. It is worth noting, however, that throughout the sequence pig bones are hugely under-represented compared with teeth.

(4) **Fallow deer**: hind limb elements, especially the distal tibia, astragalus, and metatarsal, are over-represented (Fig. 11); first phalanges are also well represented. We did not attempt to separate fore- from hind-limb phalanges and, given the large numbers of hind-limb bones, we assume the phalanges also derive mainly from the hind foot. Although pelves were not recorded, we do not recollect observing any fallow deer pelvic girdle elements at Launceston. Fallow deer femora too are only present in extremely low numbers.

(5) **Fowl**: There is no discernible change in body-part frequencies in the course of the Launceston succession.

(6) **Manx shearwater**: All the bones of this bird derive from the hind-limb (1 femur and 10 tibio-tarsi in Period 6, and one tibio-tarsus in Period 8). There is also another tibio-tarsus from Period 6 recovered by sieving.

Age at slaughter

Cattle. Our initial examination of mandibles which could be assigned to O'Connor's (1988) age stages (Fig. 13) did not show any substantial change in the ages of cattle slaughtered at Launceston. However, once isolated teeth were considered, the picture became quite different. By including these, the cattle show evidence for a marked change in the age-groups culled—probably between Periods 8 and 9—from a low juvenile:adult ratio in Periods 6 and 8 to one with a much greater proportion of juveniles in Periods 9-11 (Fig. 14). Hence, consideration of mandibles *with* teeth *in situ* alone can be misleading as our data from Launceston Castle clearly show. We assume that this is because teeth of certain ages, especially the deciduous ones, drop out of the mandibular ramus more easily. (For example, >90% of the cattle dP_4s recorded at Launceston Castle were isolated, while only about 45-65% of the P_4s were isolated, cf. Fig. 14). Note, for example, the rise in numbers of dP_4s from about 15% to about 60% between Periods 8 and 9, indicating a substantial increase of beeves aged under 3 years (cattle shed their dP_4 at around 36 months). This change, though not so obvious, is also apparent in the long-bone epiphyses (Table 14, Fig. 15), a greater proportion being fused or fusing in Periods 9-11. The relatively low proportion of fused calcanea is strange since it does not seem to agree with the supposed fusion sequence (see, for example, Barone 1986, 76).

Although the samples are rather small, especially in the earlier periods, the peaking of dP_4 wear stages in Periods 9-11 (and especially Period 10+11, Table 15) in stage 'c' indicates animals only a few weeks old.

Caprines. When assigning caprine mandibles to the wear stages of Payne (1973), we first considered only mandibles which had retained either a dP_4 or P_4 as suggested by Payne. Taking Period 8 as an example, this considerably reduced our sample size (to 38). We also tried two other methods: (1) assigning age to mandibles which had retained at least two teeth (i.e. any two cheek teeth from dP_4/P_4 to M_3; when sample size increased to 57) and (2) assigning age to mandibles which had retained dP_4 or P_4 and also isolated dP_4s or P_4s (when sample size was 56). All methods gave very similar results, and we decided to use method (2), which not only provides a reasonably large sample, but also avoids a bias against younger animals with their more fragile anterior mandibles. (We were initially cautious since we suspected preservation and recovery may create differences between these methods, and therefore decided to apply all three methods, and then try to explain any resulting differences.)

The results for the caprine mandibles at Launceston show that there appears to have been a preference for sheep aged between 2 and 6 years (i.e. in Payne's (1973) mandible wear stages E, F and G), while very few animals were slaughtered either very young or very old. There is a slight decrease in the numbers of very young animals culled in Period 10+11. Apart from this, there is little other evidence within the Launceston sequence for a change in the ages when caprines were culled (Tables 16 and 17 and Fig. 16). Variations in the overall age-profile are more probably a result of chance. For example, a Kolmogorov-Smirnov test to compare data for Periods 8 and 9 indicates that there is no significant difference (χ^2 = 2.10), and comparing data for Periods 9 and 10+11 (χ^2 = 2.7) also indicates that there is little difference between these periods.

The results obtained by including loose teeth and calculating the dP_4/P_4 ratio and the different M_3 (both isolated and in mandibles) wear stages, as suggested by Payne (1988) indicate that in all periods at least 45% of slaughtered animals were aged between 2 and 5 years (Table 17). This confirms the results obtained from our consideration of the mandible wear stages.

The counts of wear stages of individual teeth (Table 16) is consistent with the results obtained using the other methods—suggesting no apparent change with time.

Table 18 and Fig. 17 also indicate that no significant change occurred in the proportion of unfused versus fused sheep long-bone epiphyses between, on the one hand, Periods 6 and 8, and on the other, Periods 9-11.

The goat bones provide an interesting contrast to those of the sheep. Most of the caprine remains that we were able to identify as 'definitely goat' are from very young animals (8 out of 9 metapodials had unfused distal epiphyses; one metacarpal was longitudinally unfused; 5 dP_4s showed no wear and many of the other dP_4s indicated animals aged a few weeks or less; see Tables 3 and 4). However, this does not preclude the possibility that some of the adult caprine mandibles also belonged to goats since we were only able to distinguish sheep and goat mandibles with milk teeth. Nevertheless, the proportion of adult goats was definitely very low, as attested by the numbers of fused metapodials and astragali, which in most cases we were able to identify to species (Tables 3 and 4).

Pig. Throughout the Launceston Castle sequence the pigs are represented primarily by immature and sub-adult animals (Tables 19 and 20 and Fig. 18), though the small numbers of pig teeth in the later periods, makes drawing conclusions for those somewhat tenuous.

Fallow deer. Most appear to have been adults. For example, approximately 70% of calcanea and metatarsals and almost 100% of tibiae in Periods 6 and 8 were fused (Table 21).

Chicken and **goose** (Figs. 19 and 20). There are insufficient remains of these birds in the later periods at Launceston Castle (i.e. Periods 9-11) to discern any long-term change in their age-structure. In Periods 6 and 8, however, some 20-30% of the chicken bones and only 10-15% of the goose bones belonged to juveniles.

Sex

Pig canine teeth are easily recognised as male or female because of the distinctive shape and greater size of the former. The pig canines from Launceston (Table 22) indicate a female:male ratio of approximately 1:2 in Periods 6 and 10+11, 1:3 in Period 9, and 1:5 in Period 8.

Sheep and probably **cattle** bones do not show sufficient sexual size-dimorphism to permit clear separation of sexes (see, for example, fig. 95b of Davis 1984). In **fallow deer**, however, the males are considerably larger than the females, and although there is probably some overlap of sexes (large females and small males), given a large sample, a scatter plot of distal metapodial measurements should show whether one sex is more common than the other—see for example Bosold (1968), and the scatter diagrams of large samples of Near Eastern fallow deer given by Davis (1984, fig. 96). A scatter diagram (Fig. 21) of fallow deer distal metatarsal measurements (Bd against Dd) shows that in Period 8 there were approximately equal numbers of 'large' (presumed male) and 'small' (presumed female) specimens. The pattern of distribution of plots in Period 9, however, is different and we speculate that these may derive in the main from males (we emphasise *speculate*, since we are assuming that the kind of separation of sexes Bosold gives for metacarpals is similar for metatarsals).

Measurements of fully ossified (adult) **chicken** tarso-metatarsi (Fig. 22) indicate that spurred (i.e. probably male) ones are considerably larger

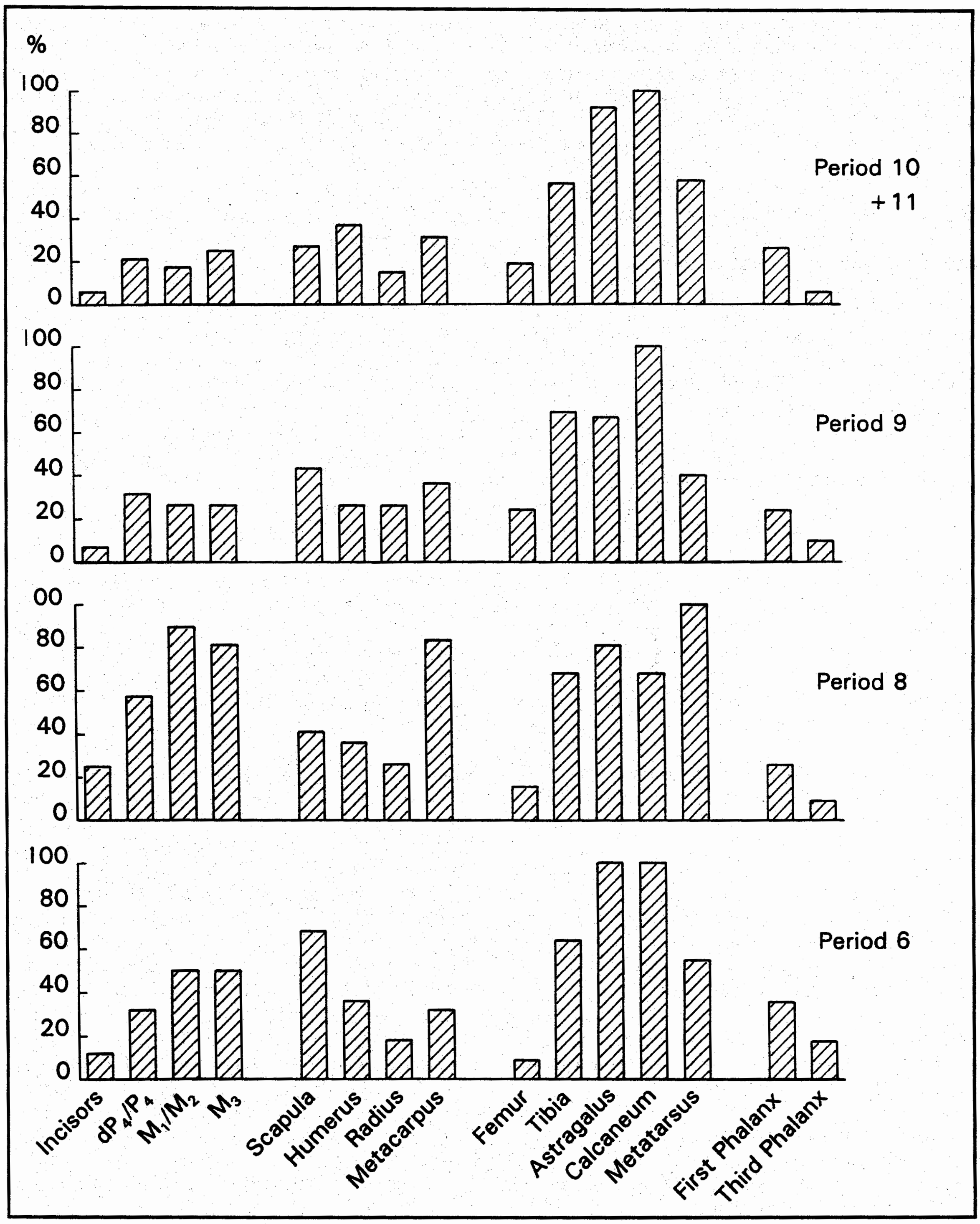


Figure 9. Cattle: MNI by anatomical element (see Table 8 for data)

than unspurred (probably female) ones. In Periods 6 and 8 (the two periods for which there are sufficient numbers of chicken bones) there are more females than males, the ratio probably being approximately 3 ♀♀ to 1 ♂. One spurred specimen plots out in the smaller group. This is not altogether surprising, since females occasionally develop spurs (West 1982).

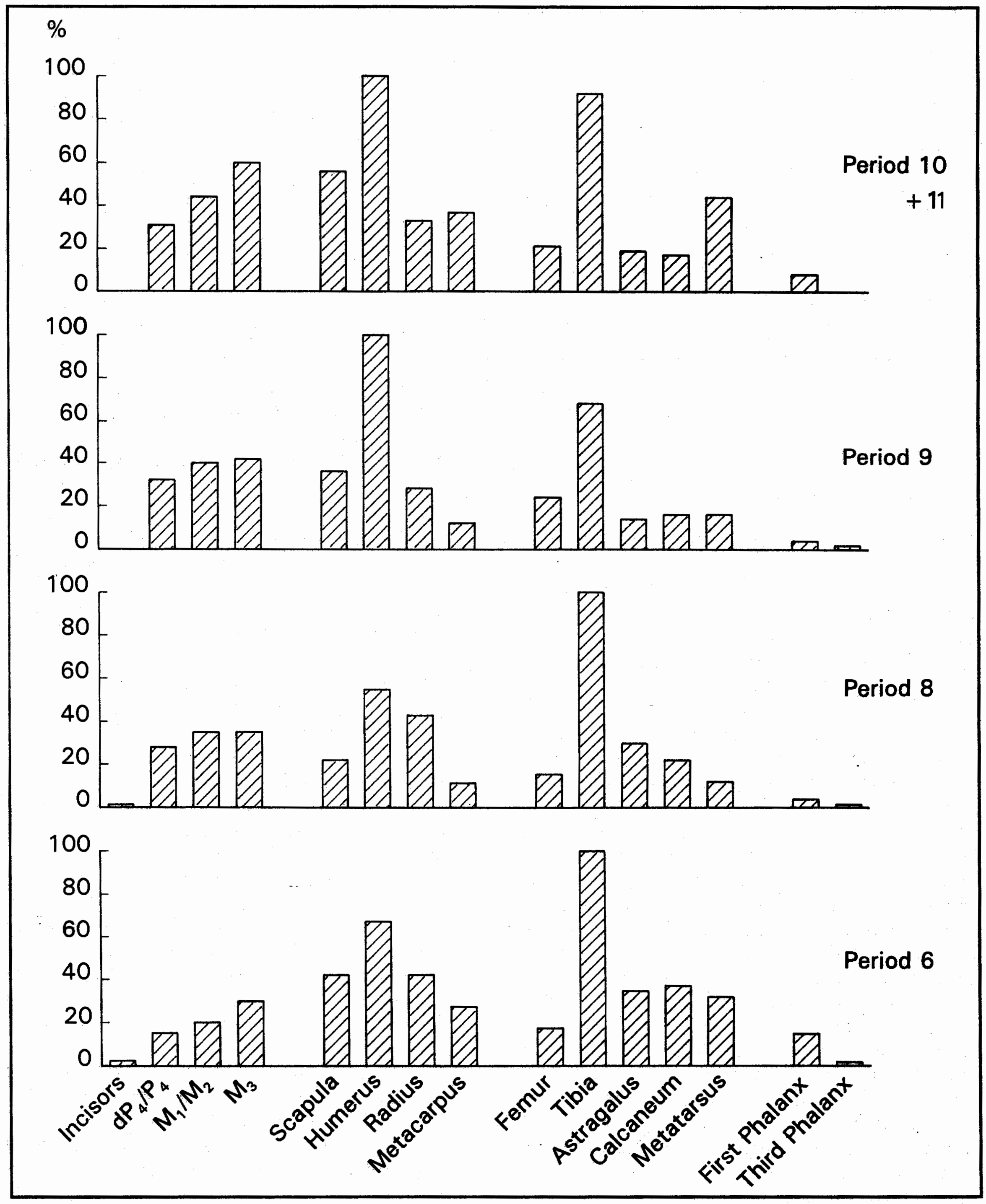


Figure 10. Sheep: MNI by anatomical element (see Table 9 for data).

Aberrant and pathological conditions

In artiodactyls the lower third molar tooth is characterised by having three pillars. The third pillar, the hypoconulid, is somewhat smaller, and occasionally fails to develop. At Launceston we recorded a number of cattle M_3s with reduced or missing hypoconulids. The numbers are as follows: 4 out of 22 in Period 6, 10 out of 86 in Period 8, none of 21 in Period 9 and 1 out of 26 in Period 10+11. It appears, then, that this condition became less common after Period 8. A comparison of the frequencies of M_3s with missing hypoconulids

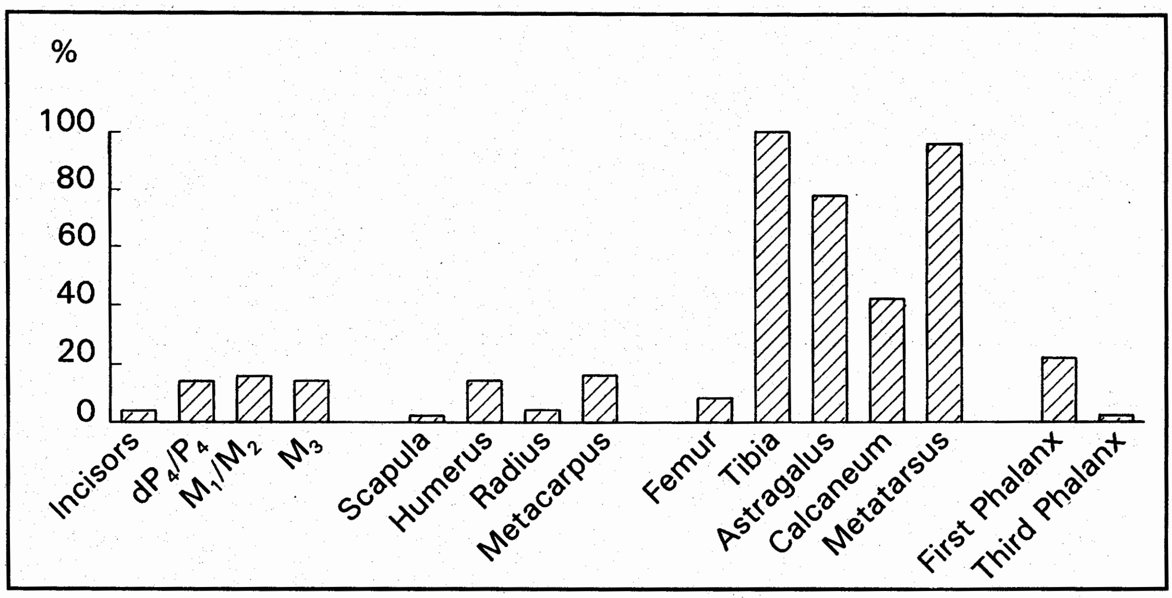


Figure 11. Fallow deer: MNI by anatomical element (all periods; see Table 11 for data).

in Periods 6 and 8 with those for Periods 9, 10 and 11 indicates that the probability the change was a chance occurrence lies between 2.5% and 5% ($\chi^2 = 4.4$).

Another aberration, probably an arthropathy, sometimes encountered in cattle metapodials, especially metatarsals, is the excessive growth of the medial condyle relative to the lateral one. At Launceston a small proportion of the cattle metatarsals have an aberrant medial extension of the medial condyle. This gives the whole metatarsal bone an 'asymmetric' appearance and measurement 'a' is unusually and considerably greater than 'b' (in a normal metatarsal 'a' almost equals 'b'). The question we asked was: does the frequency of this metatarsal aberration change with respect to time at Launceston? According to the number of times this condition was so obvious that it was recorded in our notes (Table 23), it became less frequent after Period 8. We expected such a change in frequency to be reflected (1) in the index of measurement 'a' expressed as a proportion of 'a' + 'b' and (2) in the value of the coefficients of correlation between these two measurements. While the results in Figure 23 and Table 23 do show a very slight decrease, the change is too small to have statistical significance (Table 23).

Morphometry

Tables 24-8 give means, coefficients of variation, ranges and sample sizes for the cattle, sheep, pig, fallow deer and chicken bones in the four main periods.

Cattle: between Periods 8 and 9 and 10+11 a substantial size increase occurred in all the cattle measurements (see Table 29 for the statistical significance of differences of means). The size increase is noticeable in the plots of the widths of the lower third molar teeth (Fig. 24). Although experimental evidence is not available, artiodactyl teeth tend to show less sexual size-dimorphism than do some of the post-cranial bones. Therefore, the change in the third molar teeth measurements at Launceston is unlikely to reflect a shift in the sexual composition of the samples—from females to males. The inherent, i.e. genotypic, size of the cattle must thus have changed. The size increase is particularly noticeable in the plots of tibiae and astragali measurements (Figs. 25 and 26): note, for example, the presence in Period 9 of astragali whose distal widths (Bd) are greater than 45 mm. Figure 27 compares the percentage difference in mean measurements of all bones measured, with those of Period 8 representing a 'standard'. Note how many of the bone measurements show a greater percentage increase in size over teeth, and the greatest average size increase appears to have occurred between Periods 8 and 9.

Figure 28 is a plot of the metatarsal indices of robustness—the distal and shaft widths expressed as a proportion of metatarsal length. The indices are therefore independent of size.

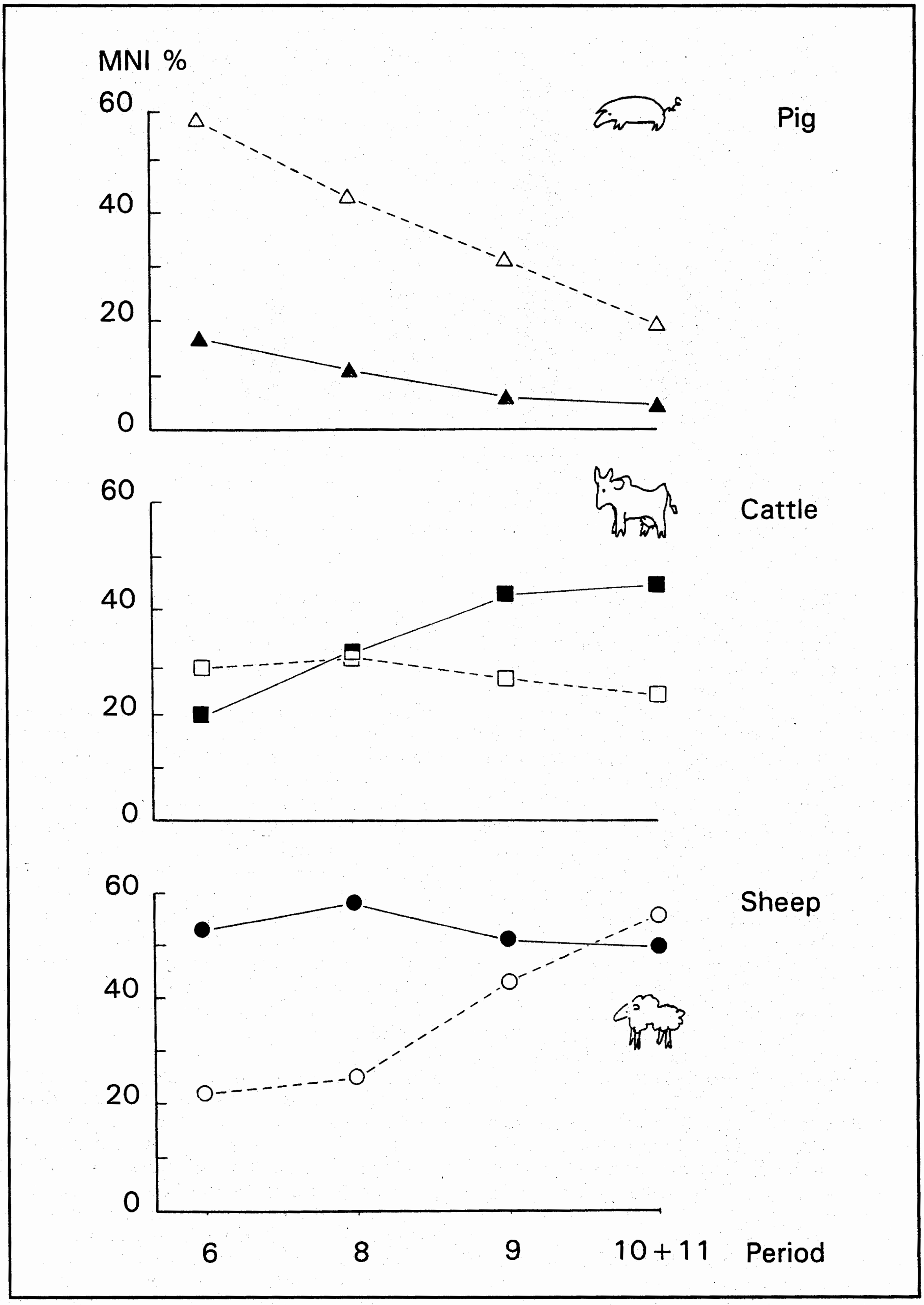


Figure 12. Frequencies of the three main taxa calculated from MNIs separately for teeth (open symbols) and bones (closed symbols).

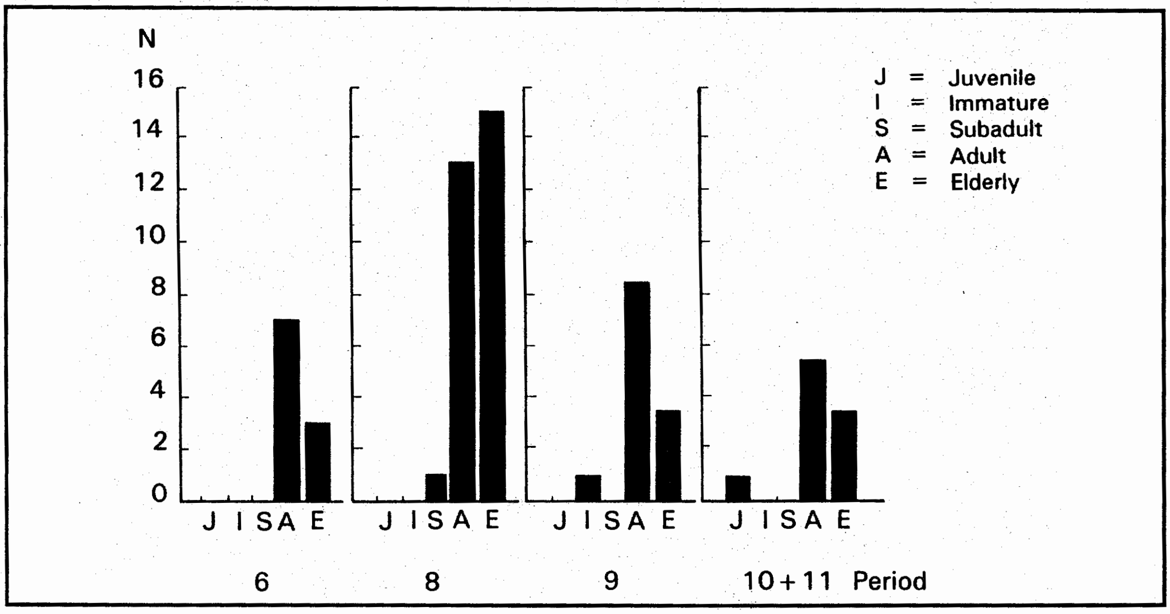


Figure 13. Cattle: number of mandibles by age stage (stages from O'Connor 1988).

(The outline sketches give an approximate and exaggerated idea of the kind of shape variation represented by the specimens plotted in this figure.) The figure shows that between Periods 8 and 9 (i.e. between the 15th century and the 16th-17th centuries) the metatarsals became narrower at their distal ends while the shaft width in relation to length remained constant. This change of metatarsal shape between Periods 8 and 9 may have parallels elsewhere. Thus, for example, the same indices calculated for the 17th century cattle metatarsals from Dorchester in Dorset (Davis 1987b) mostly lie among those from the later periods at Launceston. Moreover, note another kind of change in metatarsal shape in English and German cattle in more recent times: the plots of mean values (from Fock 1966) of breeds like the Deutsche Braunvieh, Schwarzbunte, Fleckvieh and Angler Rind indicate that not only are their distal ends more robust, but also their shafts.

The plots of width versus depth indexes of the cattle astragalus (Fig. 29) also show a change of shape between Periods 8 and 9, though the results are much less striking than for the metatarsal.

Sheep: a small but statistically significant increase in size occurred between Periods 8 and 9 (see Table 29 and Figs. 25-6 and 30). However, a greater size increase occurred between Periods 9 and 10 (i.e. between the 16th century-1650 and 1660-1840). Sheep therefore underwent their 'major' size increase one or two centuries after cattle; moreover, size increase of the sheep appears to have been gradual while that of the cattle was relatively sudden.

Comparison of the Launceston cattle and sheep measurements with those from Exeter and Okehampton, Devon (Maltby 1979; 1982), and Prudhoe, Northumberland (Davis 1987c, Figs. 31-3) shows that cattle probably increased in size throughout England at some time during the 15th-16th centuries; and sheep increased in size some time during the 17th-18th centuries (Fig. 33; the differences between sites are quite large and may to some extent reflect the different ways measurements are taken, as well as regional differences of the cattle and sheep in Britain; however, by considering each site separately, these size increases are quite marked).

Pig: the mensural data for pigs at Launceston are intriguing (Figs. 34-6). The dental measurements show both anterior widths of M_1 and M_2 did not change between Periods 6 and 8, and a small (but statistically significant *decrease* (Table 29) in size between Period 8 and 9. A rather larger size change, this time an increase, occurred in nearly all the dental measurements between Periods 9 and 10+11. Since tooth widths in pig show very little sex and age variability (Payne and Bull 1988; Albarella and Payne, in prep.) any size change they show needs to be explained as a genotypic difference between populations.

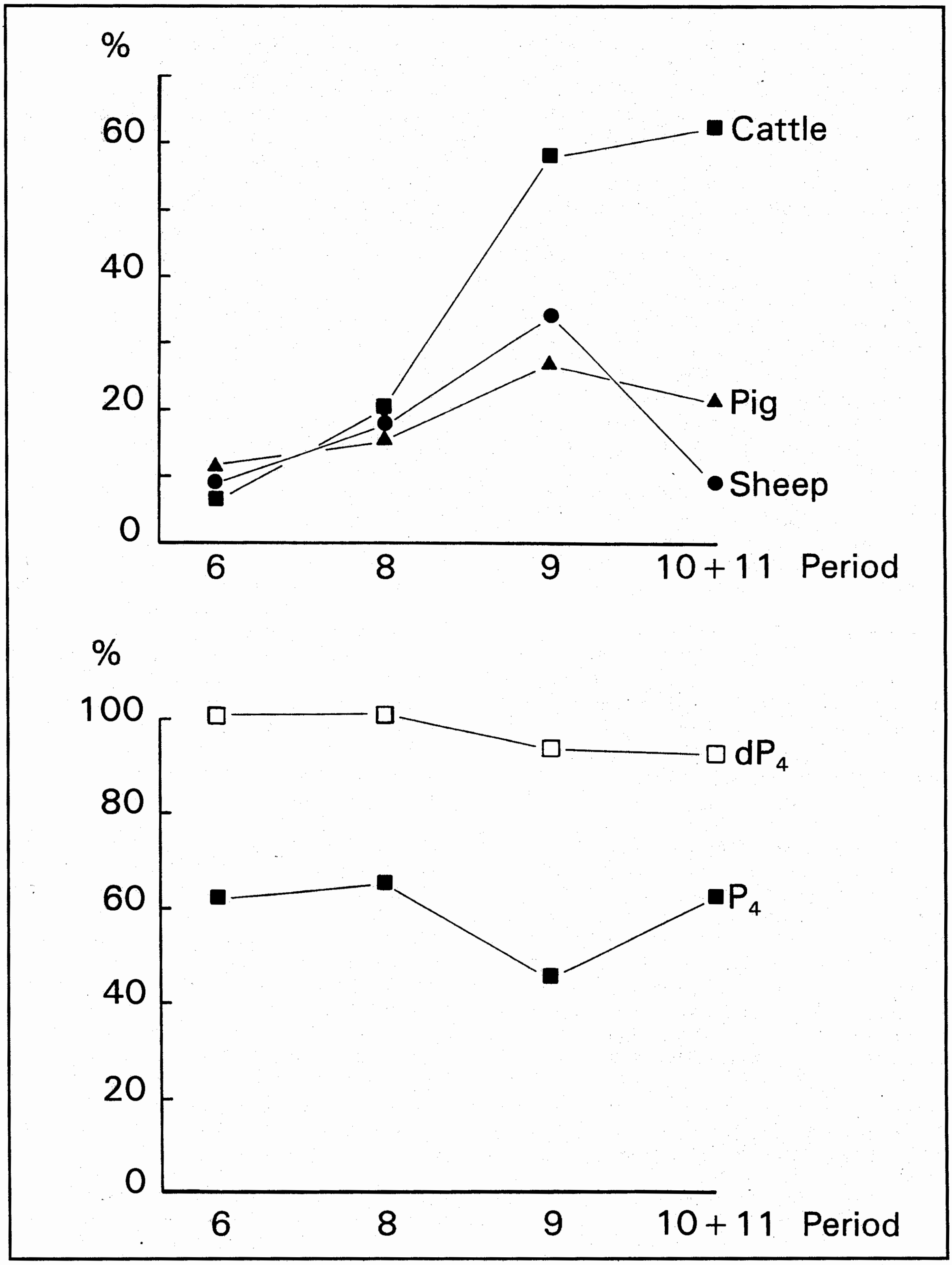


Figure 14. Cattle teeth from Launceston Castle: (above) percentages of isolated dP_4s and P_4s, where percentage of isolated dP_4 = [number of isolated dP_4/(number of isolated dP_4 + number of dP_4 in mandible)] x 100 and percentage of isolated P_4 = [number of isolated P_4/(number of isolated P_4 + number of dP_4 in mandible)] x 100; (below) percentages of dP_4s of cattle, pig and sheep; percentage of dP_4 = [number of dP_4/(number of dP_4 + number of P_4)] x 100.

The size changes of the few post-cranial bones are, in some cases, more marked. However, the samples are often small, and the results must be viewed with caution. On balance, it appears that between Period 6 and Period 10+11 pig bone-size gradually increased.

Figure 35 also shows that the core of the distribution of most measurements is well within that expected for a population of domestic pigs, but some outliers are present both on the left and on the right of the distribution. In order to test the level of variability of the Launceston population we have compared (in Table 30) the coefficients of variation of the Launceston Castle pigs with coefficients of variation from other archaeological populations. Note that in general the values for the Launceston Castle pigs range from 5-10, more being in the 5-6 range—not inconsistent with the sort of variation expected in a single population, and not higher, on average, than the coefficients of variation of the Durrington Walls, Mikulčice and Khirokitia pigs, which probably derive from single populations.

Horse: Multiplying the lengths of the 12 complete metapodials (see data appendix) by Kiesewalter's index (von den Driesch and Boessneck 1974) gives withers heights ranging between 12 hands 2 inches and 14 hands 2 inches—the latter being the upper limit for a pony (Sue Browne, pers. comm.).

Dog: The dog bones at Launceston seem to show a very large degree of variation (Fig. 37). One humerus from Period 9 is longer than any other measured by Harcourt (1974) from material of Neolithic to Anglo-Saxon date in Britain, and also larger, but less robust, than a wolf humerus in the Ancient Monuments Laboratory comparative collection. However, measurements of a humerus and a radius from Period 10+11 are at the small end of Harcourt's range of measurements.

Chicken: this bird shows little evidence for any size change at Launceston between Periods 6 and 8 (Figs. 22 and 38). Unfortunately there are insufficient remains from Periods 9-11 to discern any post-medieval size change.

Discussion

Species present and their frequencies

The progressive narrowing of the species spectrum at Launceston and relative decline of birds and fish compared with mammals are both interesting trends and almost certainly reflect the decreasing status of the residents of the castle and increasing extent to which the castle precincts came to be used as a town rubbish tip. Thus, while the early assemblages at Launceston are essentially castle ones, the later ones are urban, Period 9 being somewhat 'intermediate' in this respect. Put another way, the zoo-archaeology chronicles a 'decline' from castle to town.

The relatively high frequency of sheep, cattle and pig at Launceston is typical of almost all English vertebrate assemblages. However, this predominance of just three species means that we are dealing with a 'closed' system—a fall in the frequency of one species will lead automatically to a rise in the other two. Thus, did pig really decline in importance, or did cattle and sheep become the preferred sources of meat (see Fig. 8)?

The frequencies of the three main domestic food animals on medieval and post-medieval sites countrywide (data from Table 31; Fig. 39) show that by the post-medieval period nearly all sites had low proportions of pig (in earlier times a significant proportion of sites had over 30% pig), a change which Grant (1977; 1988) attributes to a reduction of woodland (the traditional source of pigs' 'pannage') as timber became more widely exploited. In this respect Launceston conforms with the countrywide trend.

Figure 40 compares towns, villages and castles (data again from Table 31). Although not apparent at first glance, castles tend to have more pig remains than do towns, and villages are intermediate. Drawing a line separating sites with more than 20% pig from those with less than 20% pig shows that 58% of castles, 33% of villages, and only 15% of towns fall into the former category (in the lower left part of the triangle). The high frequency of pig remains on high status sites may reflect higher meat consumption on these sites, the highly fecund pig being primarily a 'meat animal'.

Figure 40 also shows that villages tend to have more sheep while towns tend to have more cattle. Note also that in Periods 6 and 8 Launceston is, in this respect, a typical castle site with more than 25% pig and that as time progresses the Launceston bone assemblage becomes more urban-like in its pig-cattle-sheep composition with the plots moving from lower left to upper right.

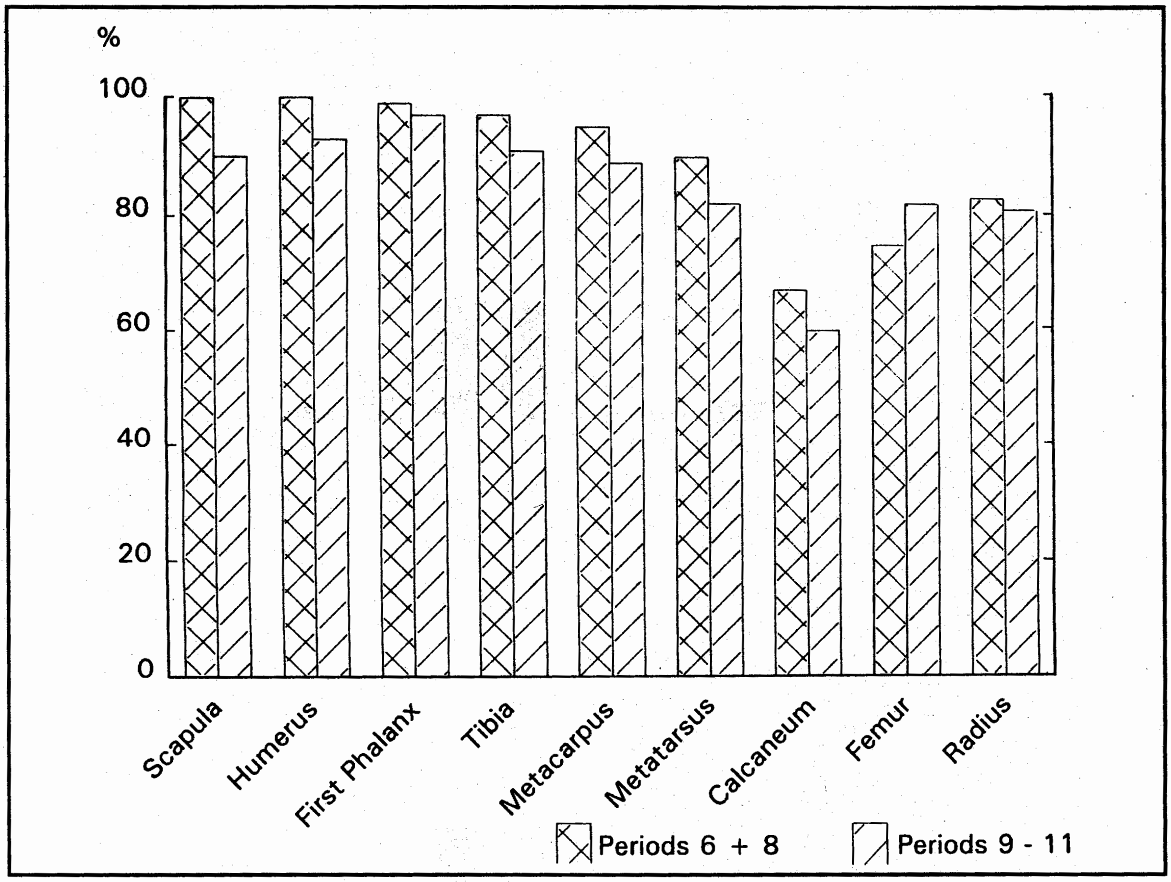


Figure 15. Cattle: percentage of fused and fusing diaphyses (epiphyses excluded).

It is interesting that the Launceston vertebrate assemblage not only fits into the general pattern of castle assemblages, but it is especially similar to that at Okehampton, not very far away. Okehampton also has an associated deer park. At Okehampton (Maltby 1982)—as at Launceston—pig, fallow deer and wild birds (woodcock and partridge) were very common and deer were imported mainly as haunches. At Okehampton several of the taxa also increase in size in the later periods (see below).

Figure 41 includes deer in a comparison of castle, urban and village sites by plotting the percentage of deer against pig. Castles tend to have a much higher proportion of deer, while towns have relatively fewer deer. Since Norman times, deer hunting has been the pursuit of the aristocracy. Hence, the large numbers of deer bones almost certainly reflect the high status of the people eating at Launceston. However, it is also interesting to notice that the Launceston animal bone assemblage from Period 9 (the Launceston plot on the left) is on the 'urban edge' of the plots from castles and towns—in other words, with a cervid percentage within the 5-20% region, the Launceston animal bones could almost typify an urban assemblage. This, along with the trend shown in Figure 40, supports Saunders' suggestion that after Period 8 the castle came to be used increasingly as the town's refuse dump.

In some respects, the rare species are of no less interest than the abundant ones, and as early cookery books indicate, suggest a diet more typical of the privileged classes.

Typical 'high status' species like deer and some of the large rarer birds continue to be present throughout the Launceston sequence. We can only surmise that while the status of Launceston's permanent residents declined, the occasional visitors and diners in Periods 8 and 9 (perhaps the justices) continued to be well fed. This is corroborated by the published lists of provisions purchased at Launceston Castle for the judges of assize riding the western circuit between 1596 and 1601 (this would be Period 9). It includes numerous

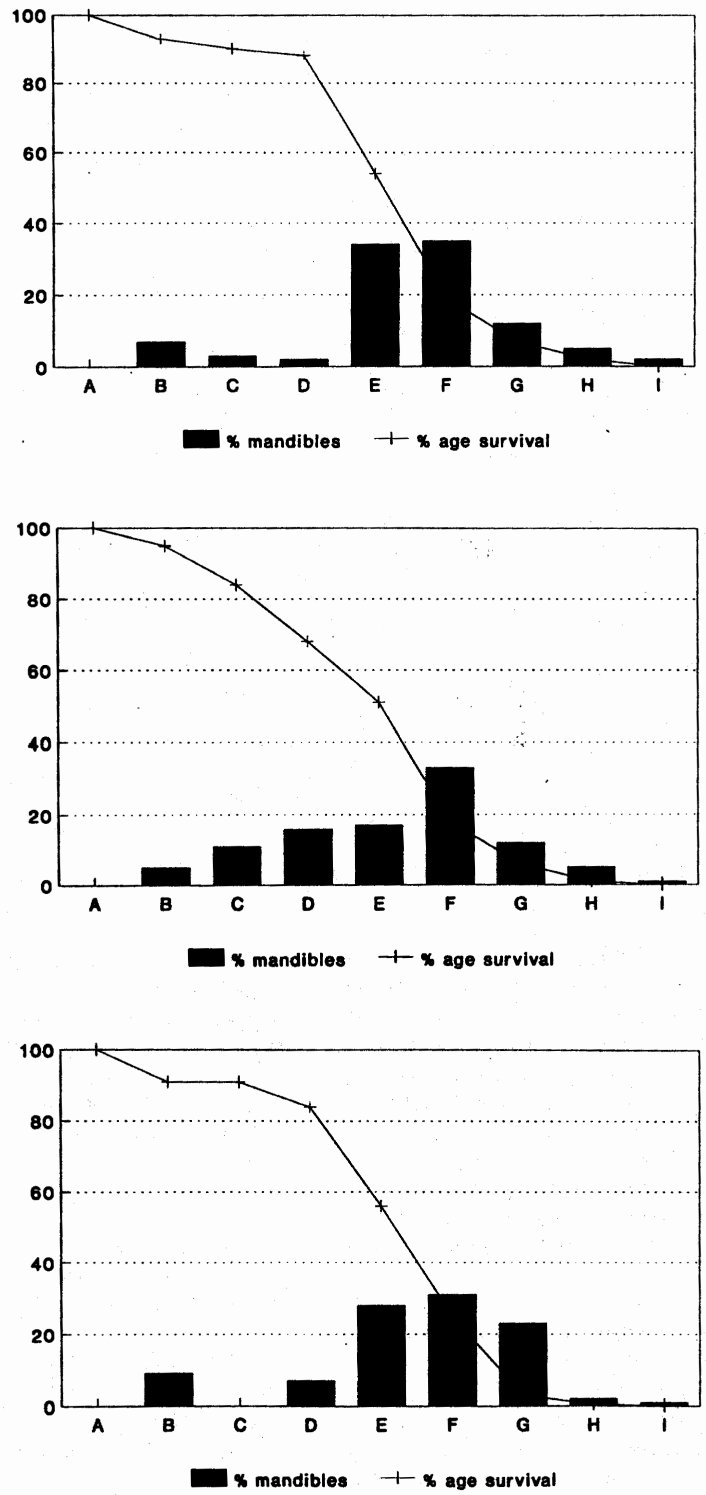


Figure 16. Sheep: kill-off patterns for Periods 8 (bottom, n = 56), 9 (middle, n = 31) and 10+11 (top, n = 31). Only mandibles with dP_4/P_4 and loose dP_4/P_4 are considered. The continuous lines indicate cumulative frequencies of percentage age survival.

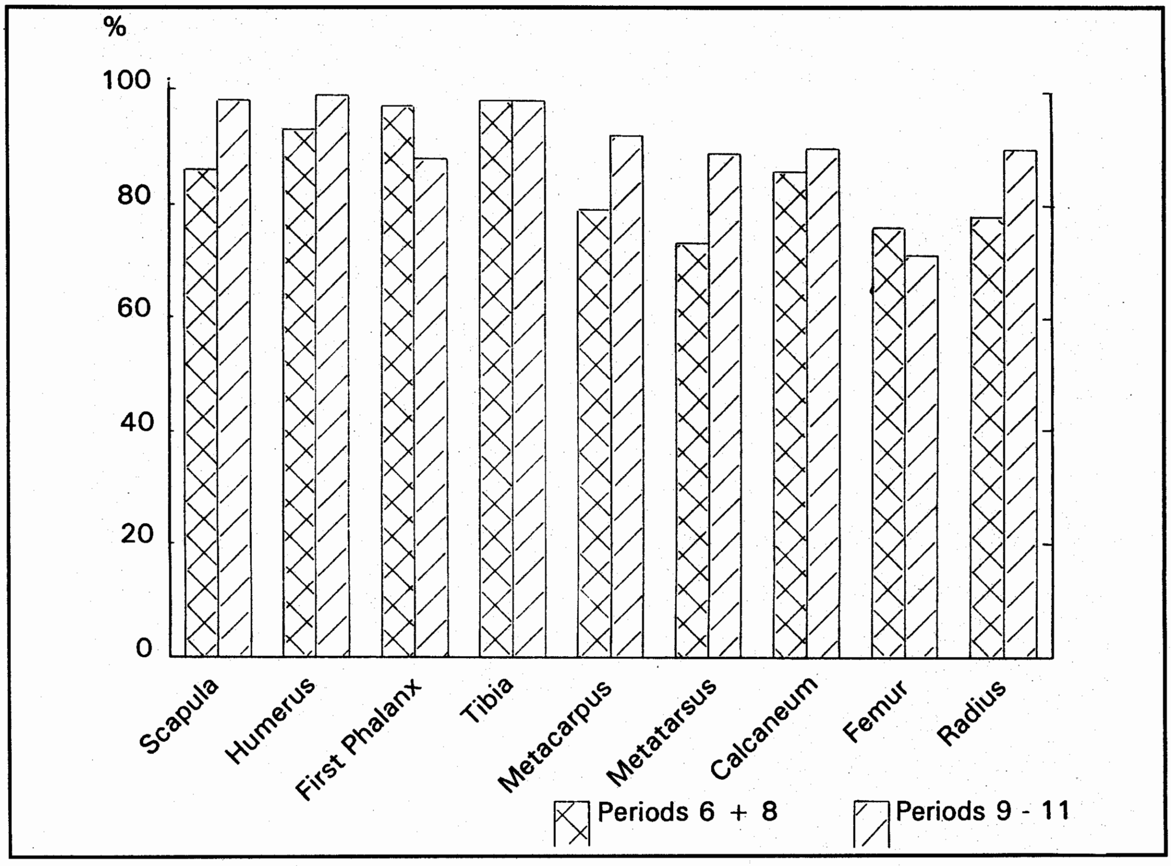


Figure 17. Sheep: percentage of fused + fusing diaphyses (epiphyses excluded).

items of luxury food such as marine fish, buck, haunch of venison, veale, goat, kid, rabbit, gulls, 'puffins', porpoise, teal, plovers, heron, etc., besides chickens, pigs, mutton and lamb (Cooper 1859, 21-39).

The small collection of *Capra* bones and teeth (Tables 3 and 4)—most, though not all, from very young animals—is evidence for the consumption of kid flesh, and presumably the mother's milk was used too. Note also that goat declined in importance after Period 8. Goat milking may well have been widespread in earlier times in this country, but recognition of goat-keeping has probably been, and probably still is, handicapped by the difficulty in distinguishing between goat and sheep remains. Consider two other medieval sites as an example: Closegate, Tyne and Wear (Davis 1991a) and King's Lynn, Norfolk (Noddle 1977). The two goat bones from Closegate (dated to AD 1300-1350) were an unfused metacarpal and a deciduous fourth premolar from an animal only a few weeks old. At King's Lynn, Noddle noted a predominance of female goat horn cores which she took as evidence for goat dairying.

Early husbandry books appear to confirm the erstwhile popularity of kid meat as well as its subsequent decline as at Launceston. Austin (1888) has published the menus of a number of great medieval banquets; many of them include kid. The 1598 edition of Fitzherbert's book of husbandry (Skeat 1882, 139) has a chapter on goats which mentions this 'kinde of Catell which albe heere in England we estimate not to his worth'. The chapter goes on to praise the abundant milk yield of this animal: '... three times the quantity a sheepe doth ...'. A little later Markham (1614) wrote that '... Goates are not of any generall use in our kingdome, but only nourished in some wilde and barraine places, ... as in the mountainous parts of Wales, in the barrainest parts of Cornwall and Devonshire, ...'. But he goes on to praise the 'restorative' power of goat milk and likens kid meat to 'daintie venison'. Harrison (1577) suggests that the milk of goat is 'next in estimation to that of the woman.' According to Burke (1834) goats were *formerly* kept in large flocks in the mountainous parts of Wales and other hilly districts of Britain. Much cheese was made from goat milk and its flesh 'appeared upon many a wealthy person's table'. He also explains (vol. II, 505) that the enclosure of land was an important reason for the decline of goat in Britain: 'The enclosure of land has ... banished them from the soil, as they nip the hedges, and bound over the highest common fences'. (Thus, the quest to enclose land for sheep, which we discuss below, led to the decline of this destroyer of hedgerows!) Wilson (1973), too, mentions that young kids, roasted or stewed, were a favourite springtime dish and that kid was still popular in Tudor times (i.e. the 16th century), but was going out of fashion (except in Wales where it lingered on) in lowland Britain by the 17th century. Clearly in medieval England kid meat and goats' milk were quite widely exploited, and the decline in numbers of goats after Period 8 at Launceston would therefore seem to bear out these historical references. Both Burke (*op. cit.*) and the author of the chapter on goats in the later edition of Fitzherbert's book note the English prejudice against goat meat, and make the comparison with southern European countries like Spain and Portugal where this meat is much esteemed.

Most striking and indicative of the high status of the diners at Launceston Castle is the abundance of cervid bones (see also the discussion of body parts below). Andrew Borde (in Furnivall 1868, 94) writing about deer, has this to say about venison: 'it is a meate for great men. And great men do not set so moche by the meate, as they doth by the pastyme of kyllynge of it.'

The rise in numbers of horse bones in Period 9 could be interpreted in terms of the increased use of this animal for ploughing and transport.

Perhaps most unusual among the mammal bones from Launceston were the cetaceans which, like the fish and sea birds, indicate a maritime connection. However, it is difficult to understand why vertebrae of a whale as large as *Balaena/Balaenoptera* which can weigh up to 150 tonnes (Corbet and Harris 1991) were brought to Launceston from a distance of at least 14 miles (22 km). Several, with their deep incisions, could have been used as 'chopping boards'. Large whales are beached from time to time, and the bones eventually wash out of their decaying carcasses. Are the Launceston cetacean bones evidence for the actual carriage of whales or whale joints inland for consumption, or are they merely seaside curios picked up and brought back for use as 'chopping boards'? Whale-bone was used for making many domestic items, like chess pieces and struts for womens' dresses, so the possibility of some kind of local whalebone industry has also to be considered. (Almost all parts of the whale have been and are used for industrial and domestic purposes.) Whale bones have been reported from a few medieval sites such as Lurk Lane, Beverley, North Humberside, where 13 whale bones were found in 13th-14th century contexts (Scott 1991). The dolphin bones and mandible from Periods 6 and 8 are also interesting. It is quite likely that dolphins were occasionally netted and eaten as fish, though small cetacean remains are rare in the medieval zoo-archaeological record: Marples (1976) mentions a 'porpoise' vertebra from a 13th-14th century deposit at Oxford Castle. The expenses of the judges of assize riding the western and Oxford circuits between 1596 and 1601 include references to 'pieces of porpoise' and dolphin among the fish they purchased (Cooper 1859, 15-41). Muffet (1655, 173) describes whale flesh as the 'hardest of all other, and unusuall to be eaten of our Countrymen .... yet the livers of Whales, ... and Dolphins smell like violets, taste most pleasantly being salted, and give competent nourishment...' Drummond and Wilbraham (1939, 66) mention whale, porpoise and seal meat as being an interesting feature of medieval and early Tudor menus. Such dishes, they suggest, were not uncommon but went out of fashion in the late 16th century.

The finds of rabbit bones from Period 6 onwards is no surprise. Hinton (1912-13) identified rabbit bones at Rayleigh Castle, Essex, a castle built soon after the Conquest and which was no longer in use after 1220. Rabbit bones were also found in 12th century levels at Exeter (Maltby 1979). Rabbits are said to have been introduced to England from Spain or southern France in the 12th century. The King in 1235 presented as a gift *decem cuninos vivos* from his park at Guildford (Veale 1957). Peter des Roches, Bishop of Winchester from 1205 to 1238, accustomed to eating them in his native Poitou, is thought to have encouraged their establishment here (Veale 1957). The decrease in importance of hare compared with rabbit after the medieval period may reflect a country-wide trend as rabbit breeding became more commonplace.

The presence in Period 11 of a New World bird, the turkey, *Meleagris gallopavo*, is not surprising—the first concrete date for its presence in England is 1541 (Crawford 1984). According to a well-known old English rhyme

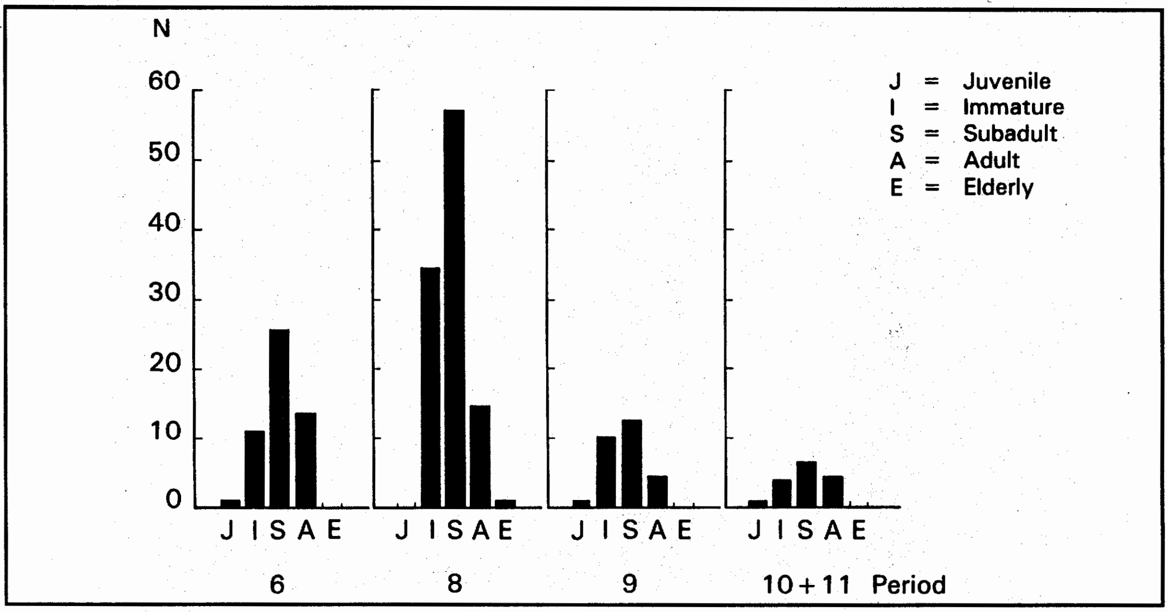
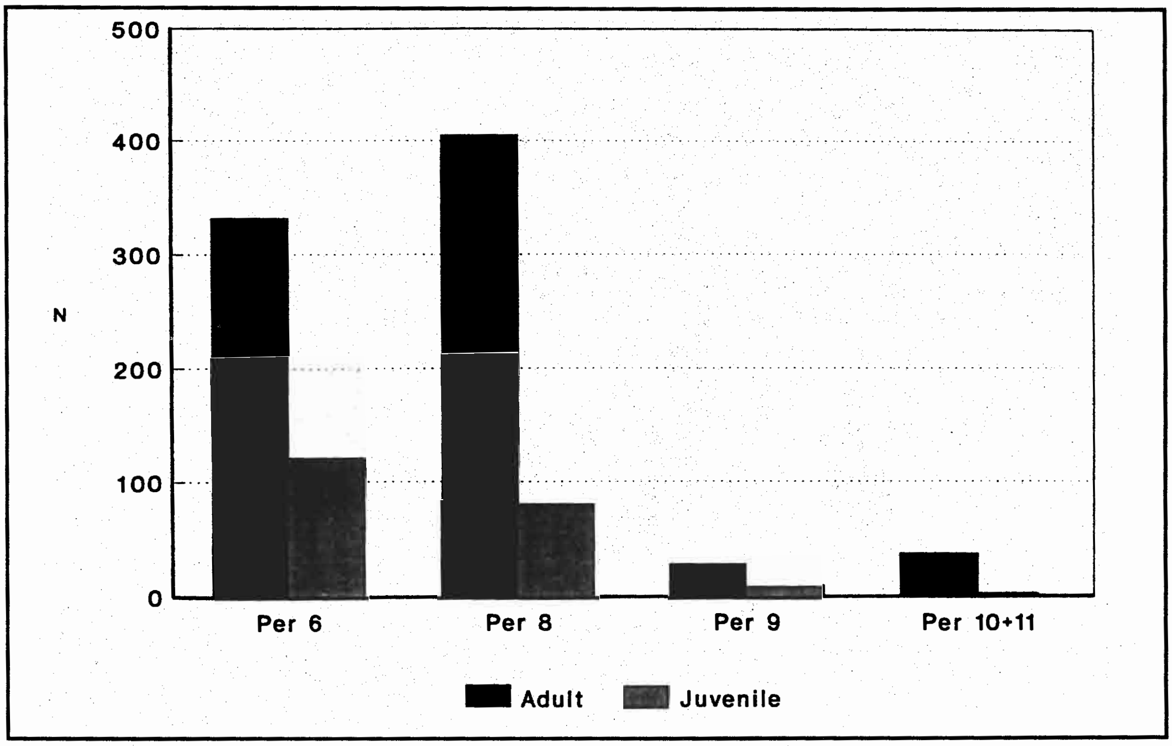


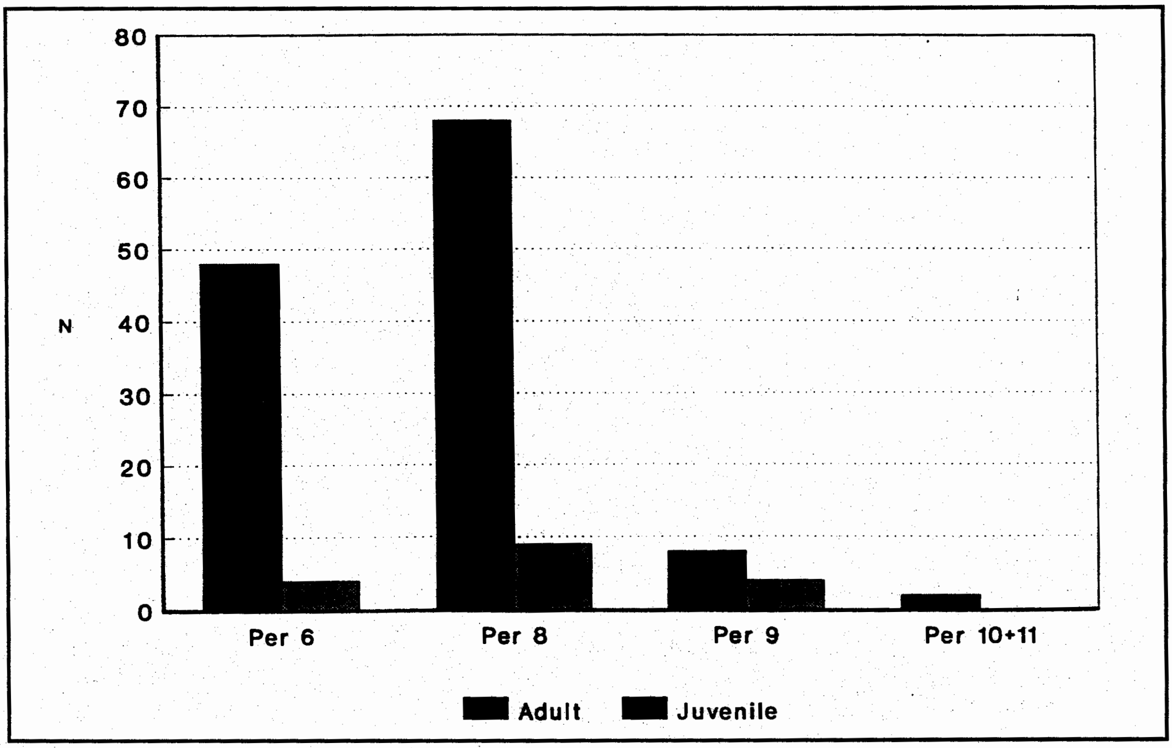
Figure 18. Pig: number of mandibles by age stage (stages from O'Connor 1988).

'turkies, carps, hoppes, piccarell, and beere, came into England all in one yeare.'

The crane, *Grus*, is only a scarce vagrant today in Britain, which makes the crane bones in Periods 6 and 8 of some interest. Other medieval sites where cranes have been reported include: St Peter's Street, Northampton, where they are described as having been 'quite common' and one bone had butchery marks (Bramwell 1979), Okehampton Castle (Maltby 1982), Aylesbury, Buckinghamshire (Jones 1983), Flaxengate, Lincoln (O'Connor 1982), Lurk Lane, Beverley (Scott 1991), King's Lynn (Bramwell 1977), Barnard Castle, Co. Durham (Jones *et al.* 1985b) and possibly at Gorhambury, Hertfordshire (Locker 1990). (Maltby (1979) also found crane in Roman Exeter, and Bramwell (1980) found it in Saxon North Elmham Park, Norfolk.) Undoubtedly this graceful bird was once more common in England. Simon (1944) even believes that it was once bred near Norwich and, although no longer considered fit for human consumption, had its admirers in the past among kings and their courtiers. He quotes some early 16th century prices ranging from 2 to 6 shillings. Wynkyn de Worde's 1413 *Boke of Kervynge* (in Furnivall 1868, 162) gives instructions on displaying and cooking the crane as follows: 'Take a crane, and unfolde his legges, and cut of his wynges by the Ioyntes: than take up hys wynges and his legges, and sauce hym with poudres of gynger, mustarde, vynegre, and salte.' Muffett (1655, 91-2) recommends young cranes should be hung for two to three days, and then eaten with hot galantine [a kind of sauce] and 'drowned in Sack'! He was not very complimentary about the adults, suggesting they are tough, gross, sinewy and engender 'melancholique bloud.'

The gannet, or solan goose, is a large 'strictly maritime' bird (Peterson *et al.* 1983) and is not often reported on archaeological sites. The two gannet bones from Period 8 (15th century) at Launceston are therefore of some interest. And, like the fish, cetaceans and shearwater, the presence of gannet indicates a clear connection between Launceston and the coast. Gannet has also been reported in medieval levels at Okehampton Castle (Maltby 1982) and Exeter (Maltby 1979). Simon (1944) writes that gannets were greatly esteemed as an article of food and, until the end of the 19th century, gannets were sent to London and many Midland towns where they were eaten in the commoner restaurants (they were also eaten at Buckingham Palace). Taylor, writing in 1618, (quoted by Simon 1944) describes this bird as a 'most delicate fowle, which has very good flesh, but it is eaten ... unsanctified without garlic; and after ... it must be well liquered with two or three rowsers of sherrie or canarie sacke.' It is still a great delicacy in the Outer Hebrides, where 2000 are harvested each year on Sula Sgeir (see Beatty 1992).





Figures 19 and 20. Numbers of adult versus juvenile bones of chicken (Fig. 19, above) and goose (Fig. 20) from Launceston Castle. In each case, the bones included are scapula, humerus, femur, tibio-tarsus and tarso-metatarsus.

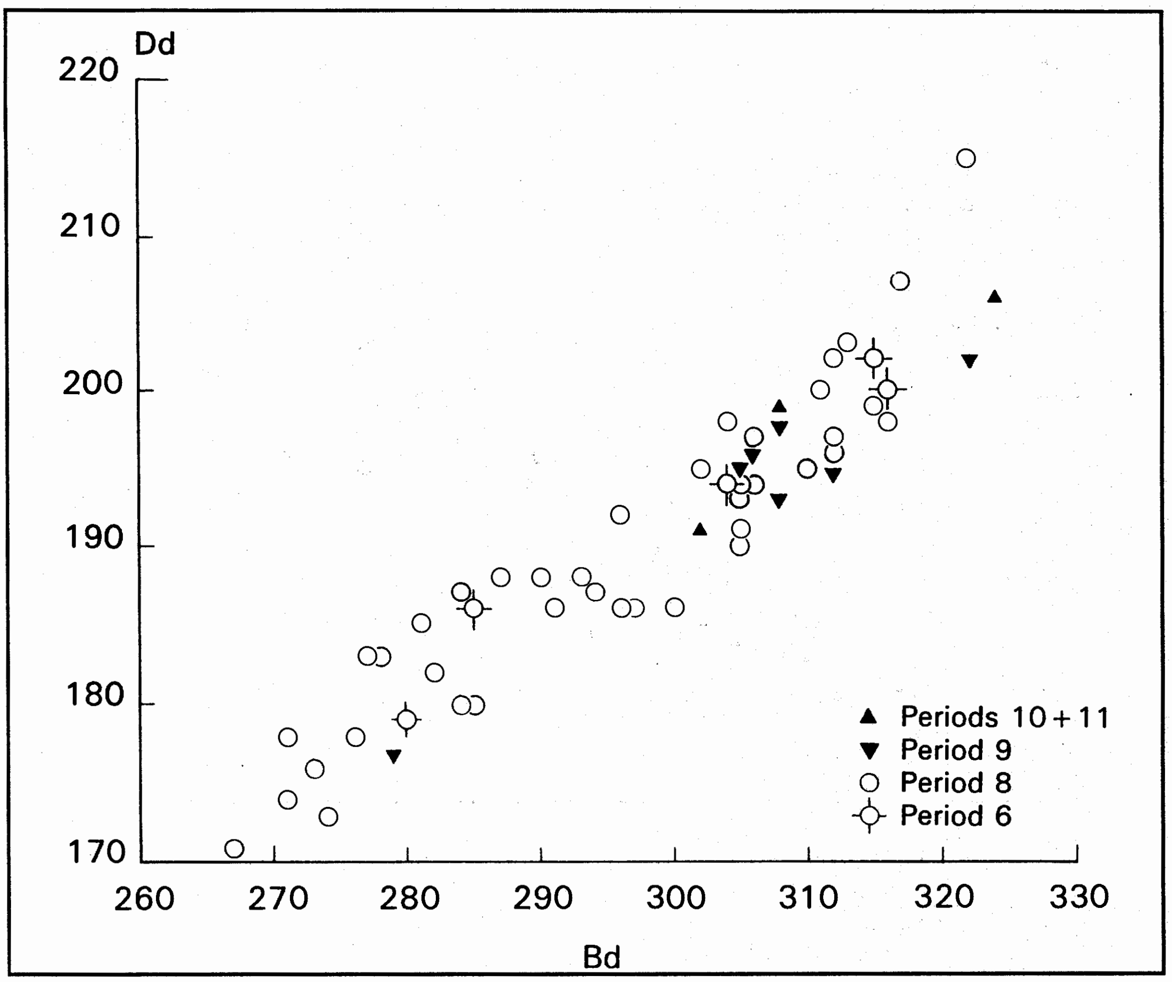


Figure 21. Fallow deer distal metatarsals (fused specimens only): scatter plot of measurements Bd against Dd.

The shearwater bones (mostly found in Period 6; late 13th century), represented entirely by hind-limb elements, are intriguing. Shearwaters nest mainly on islands. Where did the Launceston ones come from? Two likely candidates are the islands of Scilly and the island of Lundy (Fig. 1). The following relevant information was kindly conveyed to us by Steven Parry who, quoting *Inquisitions P.M. IX.100, 22 Edward III* for the year 1337, suggests that the Launceston specimens could have come from Scilly because of a special interest of the then King in the 'pouffons' (almost certainly, Parry suggests, shearwaters rather than Atlantic puffin) of the Isles of Scilly. Edward III, as Earl of Cornwall, leased these islands to the Abbot of Blancminster for 'half a mark or ccc pouffons' per annum. Lundy Island was primarily regarded for its gannets.

Brooke (1990, 13) also mentions early 14th century accounts of the Scilly Isles, which were a major source of young shearwaters known as *puffins*. They were apparently hauled by an iron hook from their burrows in August when fat and heavy and salted and barrelled, to be later boiled and eaten. This possible origin of these birds is not altogether surprising since the Scillies formed part of the Earldom of Cornwall which meant that there was a 'manorial link' with Launceston. The earls and dukes of Cornwall, however, had no control over Lundy (Andrew Saunders, pers. comm.). Cooper (1859) mentions a number of 'puffins' purchased by the judges on the western and Oxford circuit between 1596 and 1601.

The heron bones from Period 8 (15th century) are also worth mentioning. Like the crane, grey heron was once a much favoured item on the menu. Wynkyn de Worde (1413; in Furnivall 1868) recommends treating the heron like a crane, i.e. with ginger, mustard, vinegar and salt. Its price in the 16th and early 17th centuries ranged between 3s 4d and 5s, and

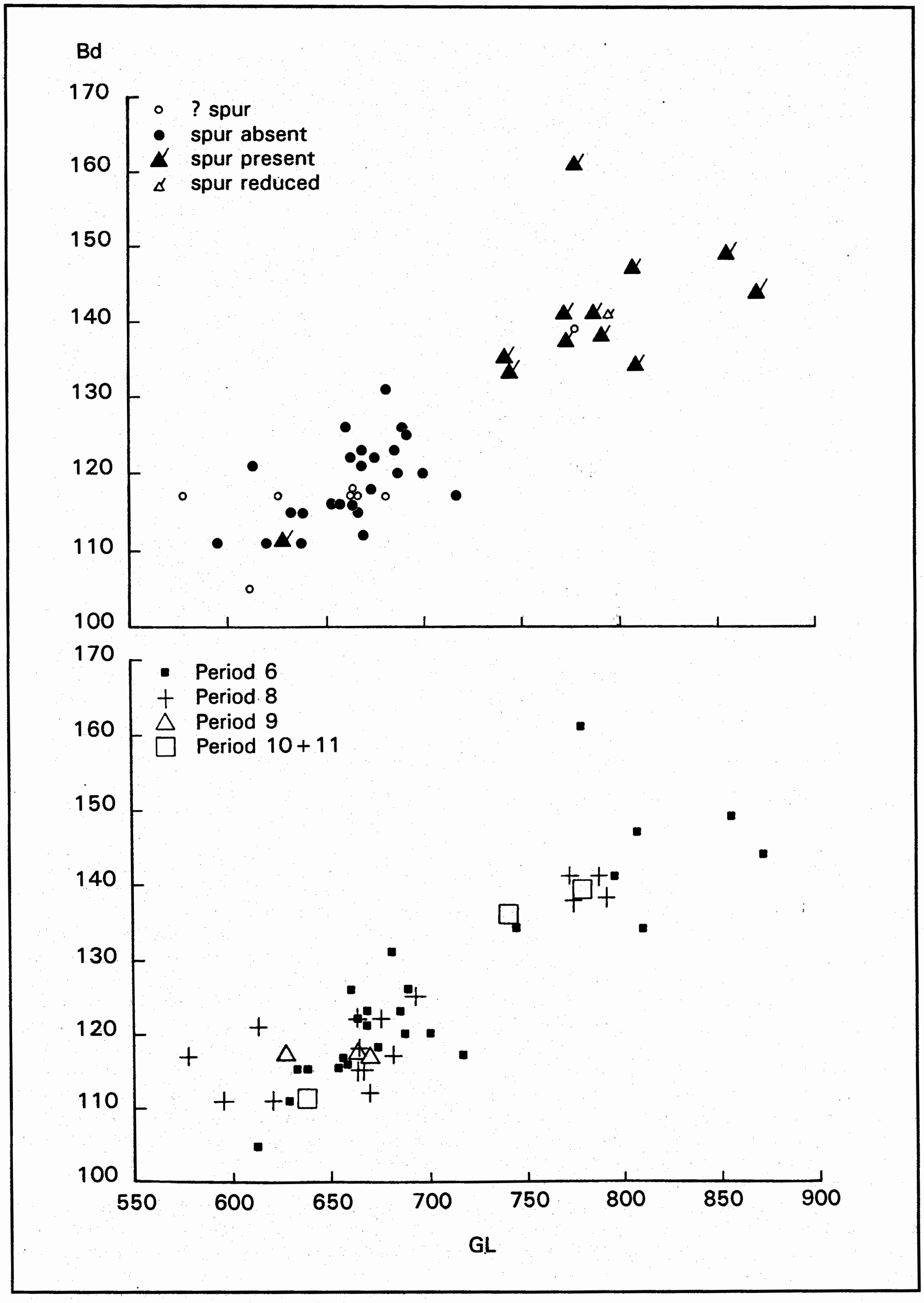


Figure 22. Chicken tarso-metatarsus: scatter plots of measurements of distal width (Bd) against length (GL) for specimens from all periods (below), and showing nature of spur (above).

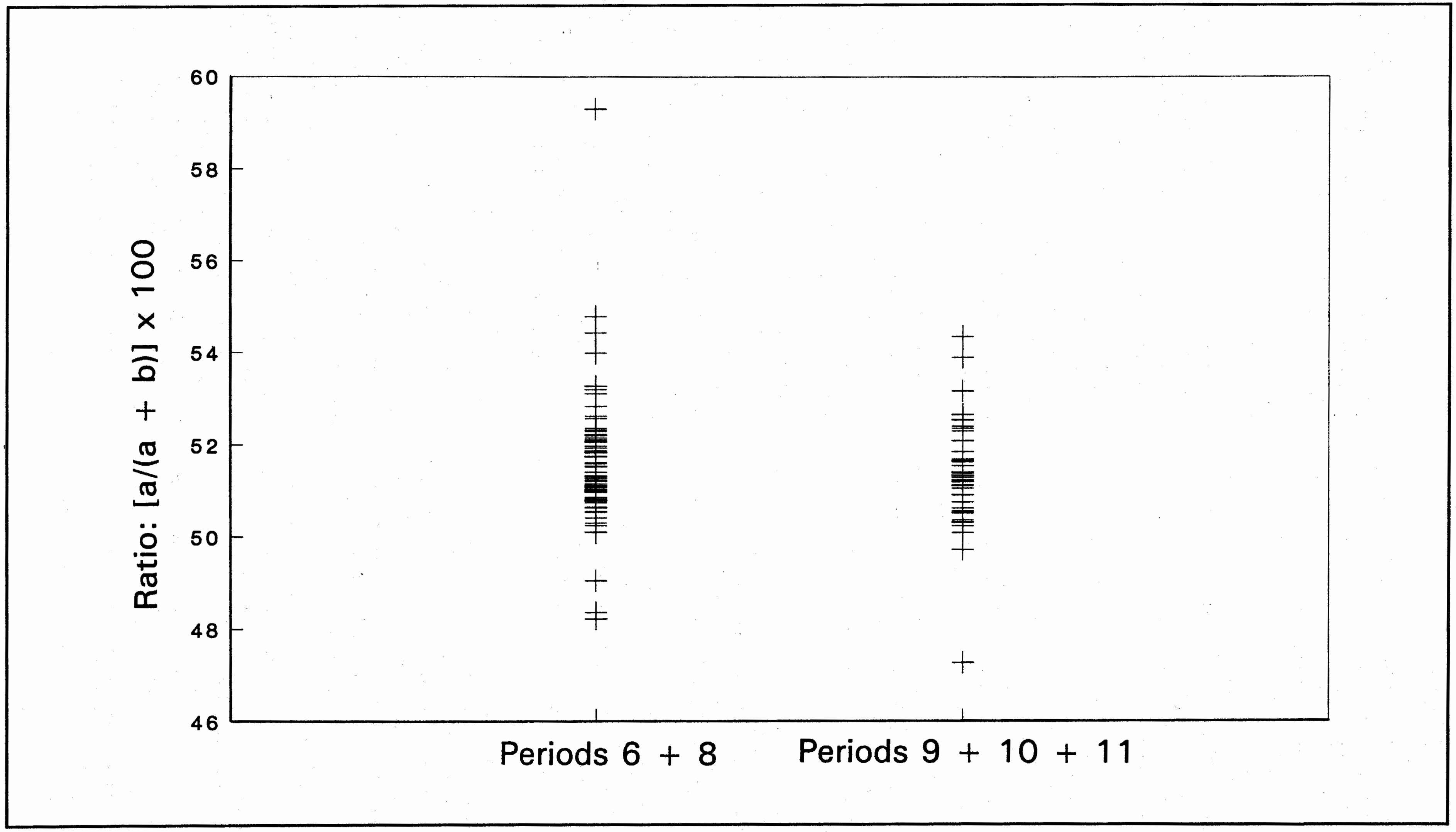


Figure 23. Cattle metatarsals: asymmetry of condyles.

16th century writers on food advised drinking plenty of good, strong, old wine with this bird (Simon 1944). Again, Cooper (1859) refers to a number of 'herneshawe' (= heron; *Oxford English Dictionary*) purchased by the judges on the western circuit between 1596 and 1601.

The swan bone from Period 4 again indicates high status. This graceful bird was often served at regal banquets, and cygnets are still eaten once a year at the Vintners' Hall in London (Simon 1944).

Partridge is described by Simon (1944) as 'delicate and exquisite' and this bird was highly prized in England for many centuries. It cost as much as 3s. 8d. in the 17th century and was usually hunted by trained hawks (Simon 1944). Perhaps its abundance in Periods 6 and 8 reflects the especially high status of diners at Launceston in those times. The subsequent absence of partridge could perhaps reflect a change in the status of visitors to Launceston after the 15th century, and/or the increased extent to which the Launceston Castle bones came from the town.

The abundant remains of woodcock, a greatly-prized bird which has long enjoyed a high reputation (Simon 1944), must surely point to the high status of the diners at Launceston Castle. This bird was provided on many occasions to the Lords of the Star Chamber in the 16th to early 17th centuries at prices from 1s to 2s per bird. Simon (1944) gives several traditional recipes for cooking woodcock. Both woodcock and grey partridge were very common at nearby Okehampton Castle (Maltby 1982).

Plovers, curlew, snipe and lapwing are all said to have been much favoured eating and again suggest high status. Plovers cost 2d to 4d in the 16th century, but rose to as much as 10d at the turn of the 17th century (Simon 1944). Muffet (1655, 98) has a very complimentary description of plovers and writes that they are taken when fat in winter. Markham (1614, 133) describes grey-plovers and curlews (and godwits and knots), as the 'daintiest and deerest' of all fowl. He also gives instructions on cramming them, from which we may infer that they were reared in captivity.

Pigeon too is interesting. In medieval times this bird was an important standby during winter when fresh meat was scarce. Pigeons also provided valuable manure (Drummond and Wilbraham 1939, 119) and many old country houses had their pigeon-cotes. Mortimer (1707, 91) recommends sowing pigeon dung by hand after the seed and harrowing it in: 'For one crop, this often makes a very good increase.'

Butchery

The presence of cut and chop marks on the artiodactyl and bird bones is reasonable evidence that these animals were prepared for consumption—we presume by the inhabitants of Launceston. The cut mark on the cat mandible, however, is probably best interpreted as a skinning mark. Cat pelts were probably used for clothing. Archaeological cat bones are occasionally reported with cut marks: an example is the cat pelvis from the medieval manor house Faccombe Netherton (Sadler 1990).

Of greater significance, however, are the three horse bones with butchery marks. Such marks on equid bones are not uncommon on English medieval sites. Some examples include Dorchester-on-Thames (Grant 1981) and Middleton Stoney (Levitan 1984a), both in Oxfordshire, Winchcombe, Gloucestershire (Levitan 1985), Droitwich, Worcestershire (Locker 1992), Gorhambury, Hertfordshire (Locker 1990), Lurk Lane, Beverley (where 7% of the equid bones had been butchered; Scott 1991), Kingston-upon-Thames, Surrey (Serjeantson *et al.* 1992), Banbury Castle, Oxfordshire (Wilson 1976), Langham Road, Northamptonshire (Davis 1992b) and George Street, Aylesbury (where 'chopping' marks on a metacarpal and first phalanx were interpreted as evidence for skinning; Jones 1983).

In many European countries until quite recent times horse-flesh has been taboo. In France, hippophagy commenced in the late 19th century as a result of the combination of Geoffroy St Hilaire's propaganda and the siege of Paris. The taboo still exists in England. However, archaeological horse bones are occasionally found with cut marks. Were horses eaten? The paucity of equid remains must surely mean that they were at least only rarely consumed, if at all. Moreover, we suspect that these cut marks were inflicted while horse carcasses were processed not for human consumption but, as often today, for feeding dogs. And, not surprisingly, bones given to dogs would have been scattered away from the area of human habitation to become archaeologically invisible. Markham (1633, 17) recommends feeding 'horse-flesh newly slaine,

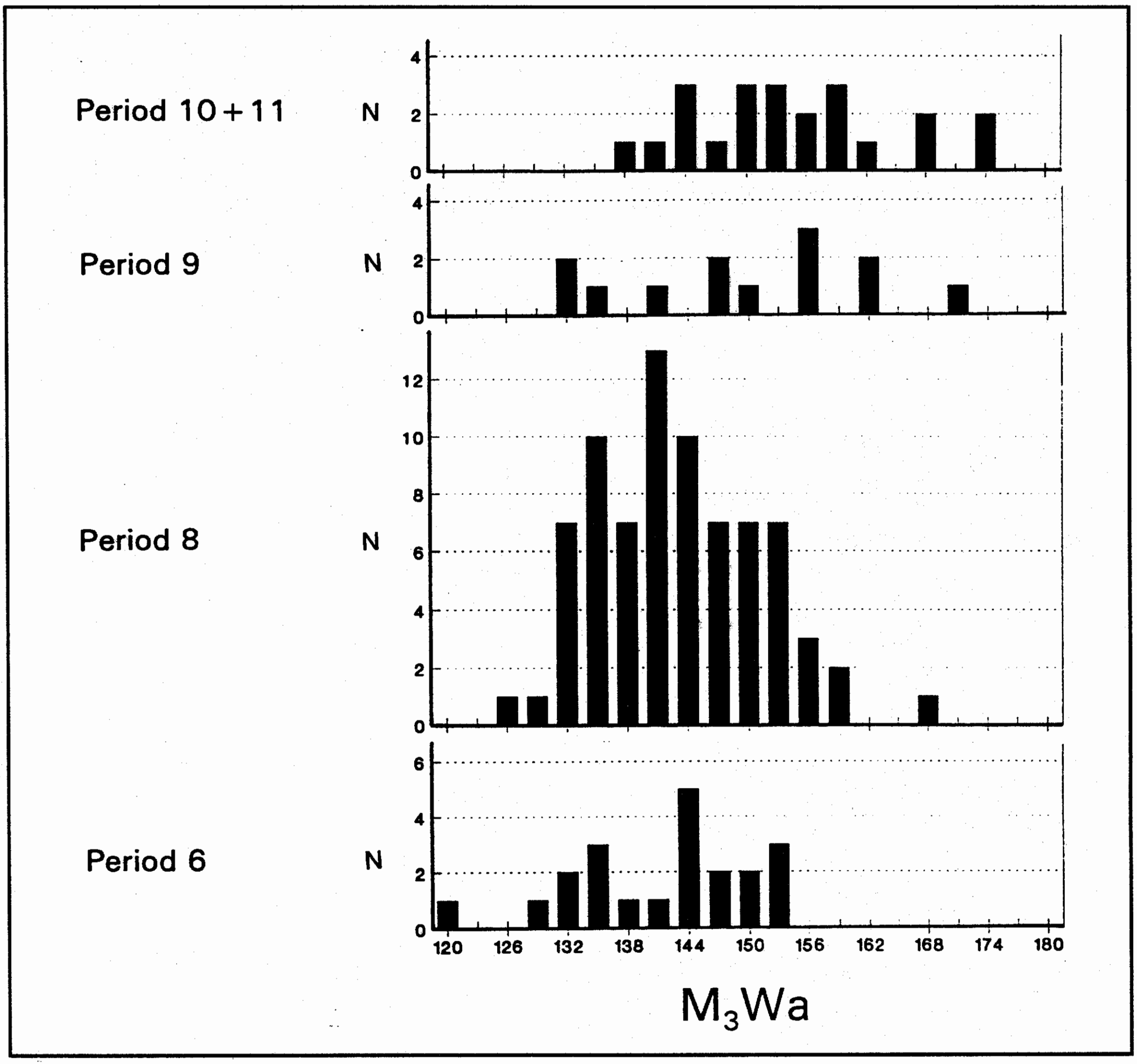


Figure 24. Cattle: histograms showing distribution of measurements of width of lower third molar.

and warm at the feeding,' to hunting hounds on their rest days. This being '... the strongest and lustiest meat you can give them ....' It should be interesting, in the light of what Markham wrote, to investigate gnawing marks on equid bones. A gnawed horse metatarsal, for example, was noted by Maltby (1983) at Gloucester.

Body part frequencies

Cattle: the relatively small number of teeth in Periods 9 and 10 (Figs. 9 and 12) is, we feel, significant and therefore warrants some discussion. Could this decrease of teeth reflect a smaller number of heads being brought into Launceston? We suggest that, towards the 16th/17th century, instead of whole beeves being brought into Launceston, a greater proportion (but by no means all) of the imported beef was butchered and did not include the heads. In other words, we are witnessing a greater amount of off-site butchery in the later periods. We wonder whether this represents a change of procurement strategy in which, for example, up to Period 8 whole carcasses or even live animals were brought into the castle, whilst from Period 9 onwards meat was purchased from a butcher or some middleman. Note how (in Fig. 12) the ratio of teeth to bones is lower in Periods 9-11. This difference may also reflect the change in origin of the animal-bone refuse as the castle precinct was increasingly used by the townspeople as a dump. Hence

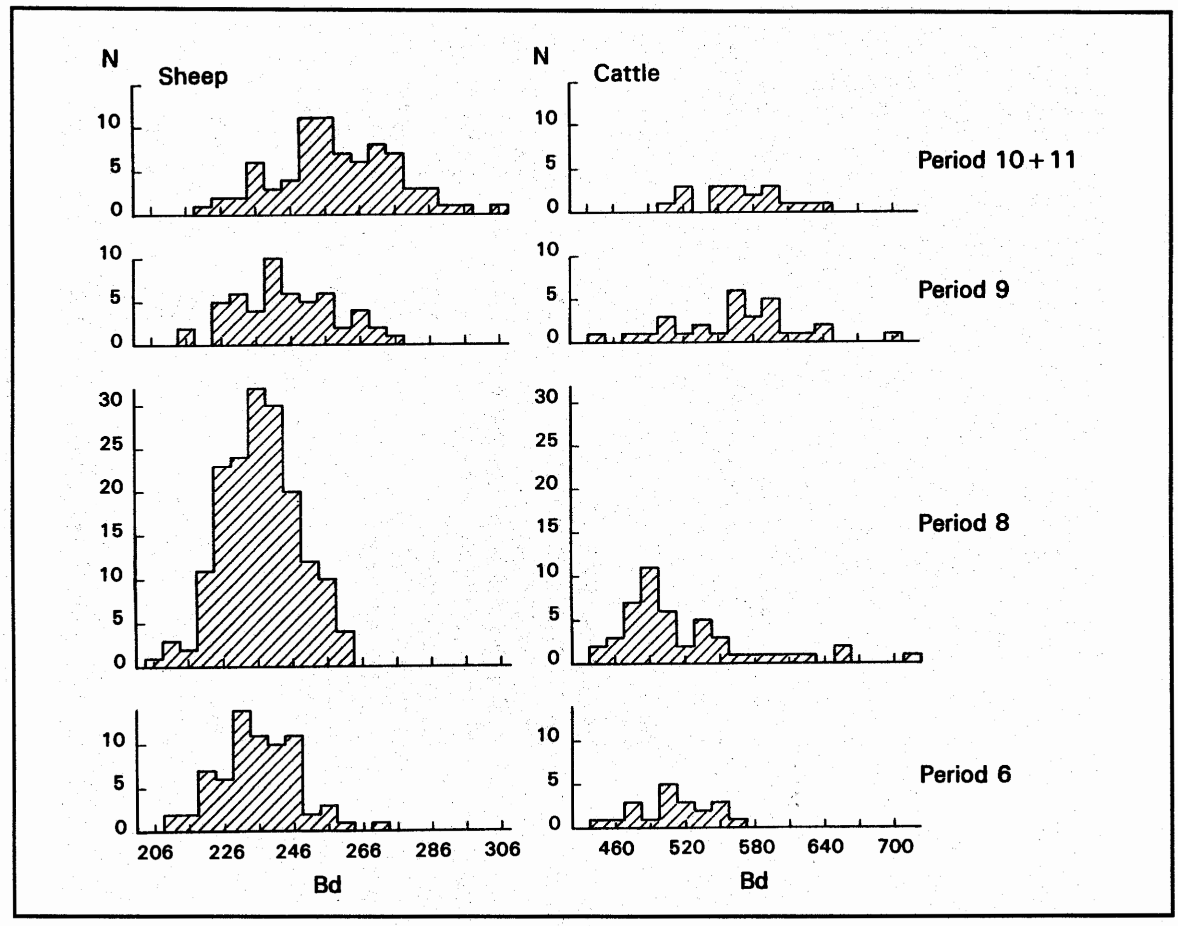


Figure 25. Sheep and cattle: histograms of measurements of width of distal tibiae (fused specimens only).

beeves destined for the town tended to be butchered and minus their heads, whereas those for the castle arrived as whole carcasses.

Sheep: The higher counts of humeri and tibiae relative to most other parts of the skeleton probably reflect these bones' higher density and hence better ability to be preserved. However, their higher number relative to metapodials cannot be explained in this way. Thus we are inclined to think that the high number of humeri and tibiae may indicate a prevalence of dressed carcasses in the assemblage. The shift from tibia to humerus being the best represented bone in post-medieval times was also noticed at Exeter (Maltby 1979). Since the humerus carries more meat than the tibia, the significance of this change might lie in changes in procurement and butchery practices, perhaps in a way similar to that discussed for cattle.

Pig: the abundance of pig teeth compared with pig bones probably reflects (a) the young age at which most pigs are slaughtered, the bone being still very soft, and (b) the greasy nature of pig bone, making them more attractive to the local dogs. These have suffered a greater degree of post-mortem destruction than have the post-cranial bones of sheep and cattle. The high proportion of pig teeth on archaeological sites is quite common and was noted at Prudhoe (Davis 1987c), for example. Perhaps too, much of the pig meat was consumed as boned-out pork, ham, bacon, etc. Note also (from Fig. 12) that, unlike the teeth and bones of sheep and cattle, teeth and bones of pig decreased 'in parallel'.

Fallow and red deer: the prevalence of hind-limb bones of fallow deer is most interesting. Most of the hind-limbs of fallow deer appear to have been brought into the site already detached from the pelvis. Perhaps for every whole deer carcass brought to Launceston, some 8-10 haunches were imported (see Table 11 and Fig. 11). It is tempting to speculate that the complete skeletons were those of deer

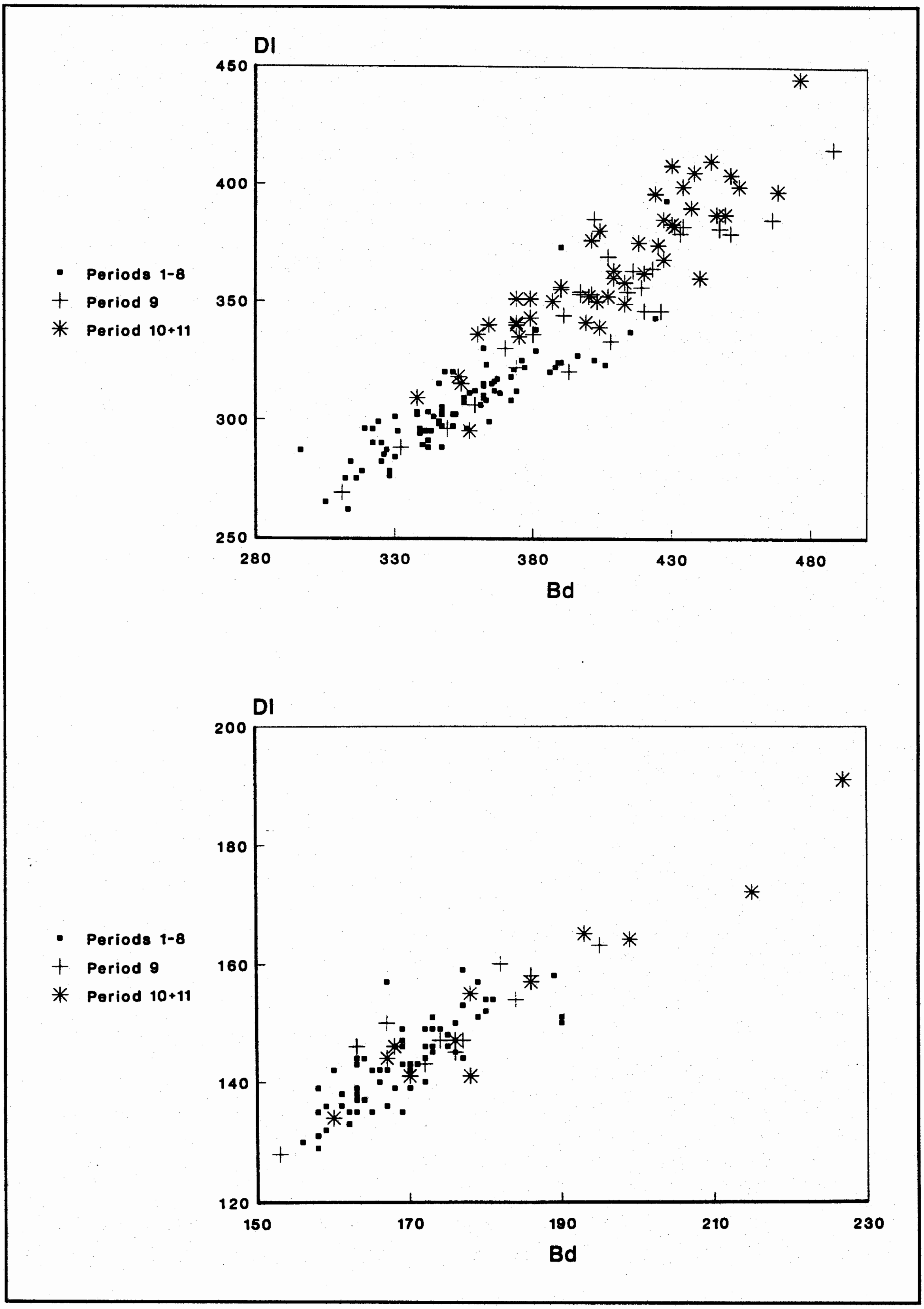


Figure 26. Cattle (above) and sheep (below) astragali: scatter plots of measurements of Bd against Dl for all periods.

hunted in the nearby deerpark, while haunches came from further afield. Similar discrepancies in the representation of cervid hind-limb bones have been observed at the following castles: Barnard Castle (Jones *et al.* 1985b), Sandal Castle, West Yorkshire (Griffith *et al.* 1983), Okehampton, Devon (Maltby, 1982) and Prudhoe (Davis 1987c) as follows:

Barnard Castle: Fallow deer—the most common bone is the metatarsal; also common are tibiae, phalanges, metacarpals, calcanea and astragali but metacarpals are more common than calcanea and astragali. For red deer there is no clear evidence for the selection of haunches, but metatarsals are definitely the most common element.

Sandal Castle: Fallow deer—the ratio of metatarsals to metacarpals is approximately 3:1 but metacarpals are about as common as tibiae. (There are no data for astragali, calcanea and phalanges.)

Okehampton Castle: Fallow deer—the pattern resembles that found at Launceston, i.e. with a lot of tibiae and metatarsals. (The data for tarsal bones are unclear.)

Prudhoe Castle: Both fallow and red deer, while present in small numbers, show a pattern similar to that at Launceston with an over-representation of tibiae, calcanea, astragali and metatarsals. (There are no data for phalanges.)

The preference for hind-quarters of large deer seems therefore to characterise high status sites: perhaps an example of what William Harrison meant when he wrote of the English nobility's predilection for '...*some portion* of the redde or fallow deere...' [italics ours] cited at the beginning of this report.

Age at slaughter

Cattle. The increase between Periods 8 and 9 of juvenile cattle brought into Launceston is, we suggest, of great interest and appears to coincide with (a) the reduced number of heads on the beeves and (b) the increase in size of the cattle. What, however, does the increase of juvenile cattle signify? We suggest that the situation in Periods 6 and 8 with <20% juvenile cattle indicates that beeves were mainly from retired dairy/breeding and work animals. The situation after Period 8 is entirely different—a change which may reflect a revolution in local farming practices towards greater degree of specialisation, at least in the cattle husbandry, with an emphasis upon the production of beef with many of the cattle slaughtered before the age of 3 years.

The increase of juvenile cattle at this time at Launceston appears to be part of a countrywide phenomenon of increased specialisation. Grant (1988, 156) mentions an '...increase in the percentage of young animals in later deposits at some sites'—a change which she attributes to the increasing importance of cattle as meat suppliers. Trow-Smith (1957; and see below) also suggests that during the 16th and 17th centuries the cow shifted in importance from a beast of traction to become a breeder of meat and supplier of milk. Maltby (1979, 32) notes an increase of young cattle in the 16th century and onwards at Exeter; Griffith *et al.* (1983, 343) note many more young cattle jaws in the 17th century at Sandal Castle; and in his summary of animal remains from monastic sites, O'Connor (1993, 109) notes that at St Andrew's Priory '... the 15th and 16th centuries seem to have seen an increase in ... the exploitation of newly-weaned cattle for veal.'

The dP_4 wear stage data at Launceston suggest veal production. If so, milk too would undoubtedly have been an important 'by-product'. This increase of veal as suggested by the dP_4 wear-stage data supports O'Connor's (1993) suggestion. Whether local farmers at Launceston were primarily interested in the veal or the dairy by-product (or both equally) remains an open question. Perhaps also retired draught oxen became less common in the west country simply because horses were more often used for ploughing etc. At Prudhoe Castle a decline in the occurrence of a probably stress-induced arthropathy (see below) was observed after the early post-medieval period (Davis 1987b) and has led to the speculation that oxen were replaced by horses as a source of power.

Recent studies by historians appear to confirm the zoo-archaeological data. In their study of manorial accounts and probate inventories, Campbell and Overton (1992; 1993) discovered that the ratio of immature to adult cattle increased during the 17th century. The ratios (with dates) which they calculated are as follows: 0.72 (1250-1349), 0.47 (1350-1449), 0.78 (1584-1640), and 1.63 (1660-1739). Campbell and Overton also suggest that, at some time between medieval and post-medieval times, stocking densities almost doubled and that by the early modern period there was a general

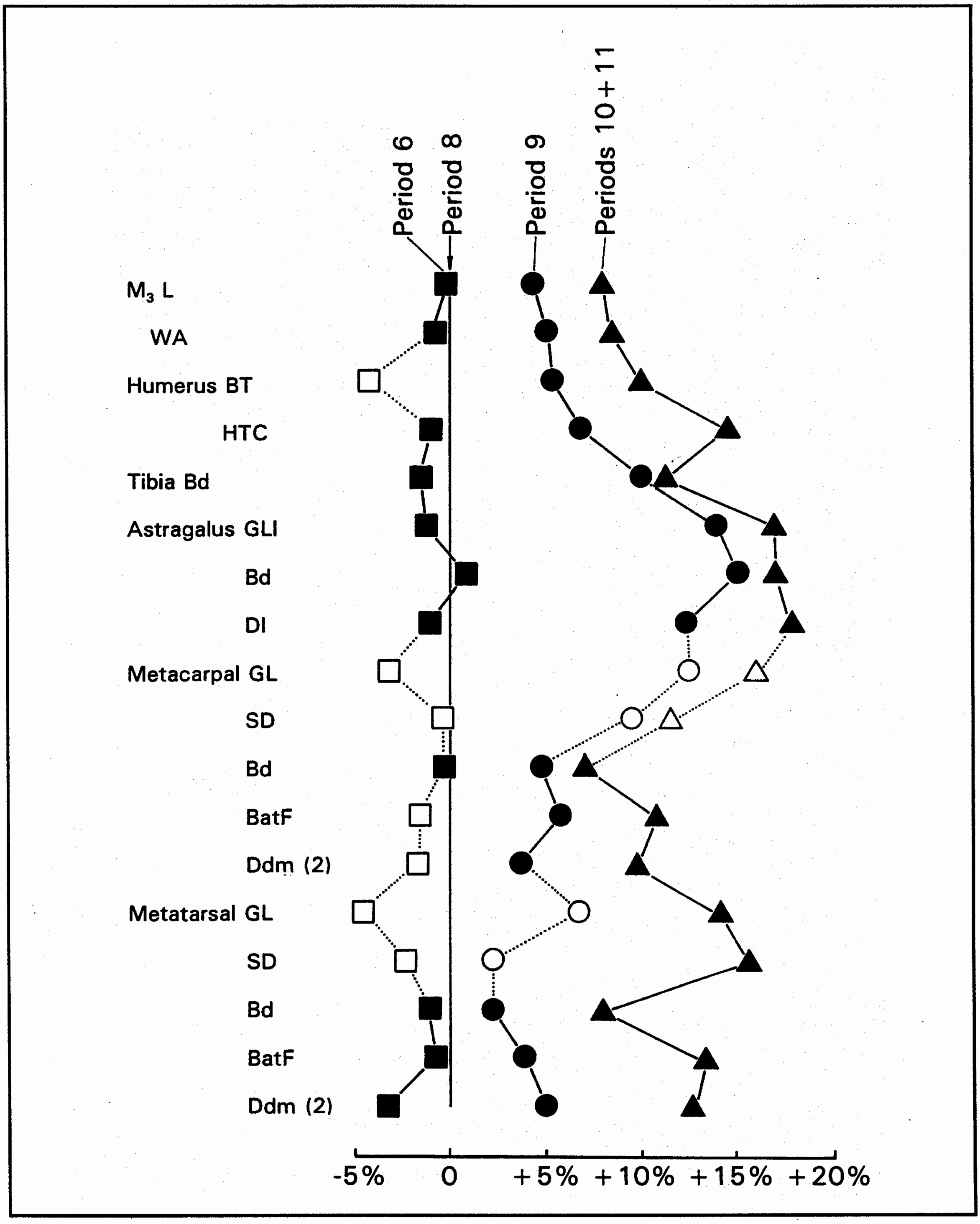


Figure 27. Cattle: percentage differences from Period 8 mean values for selected measurements and selected elements; samples where n<10 are shown as open symbols.

move away from dairying towards fattening younger cattle for meat.

McCormick (1992) argues against the hypothetical link between culling of young calves and cattle-dairying. One of his points is that there is abundant historical evidence in Early Christian Ireland indicating the need for the calf to be present during milking. However, as McCormick himself suggests, this

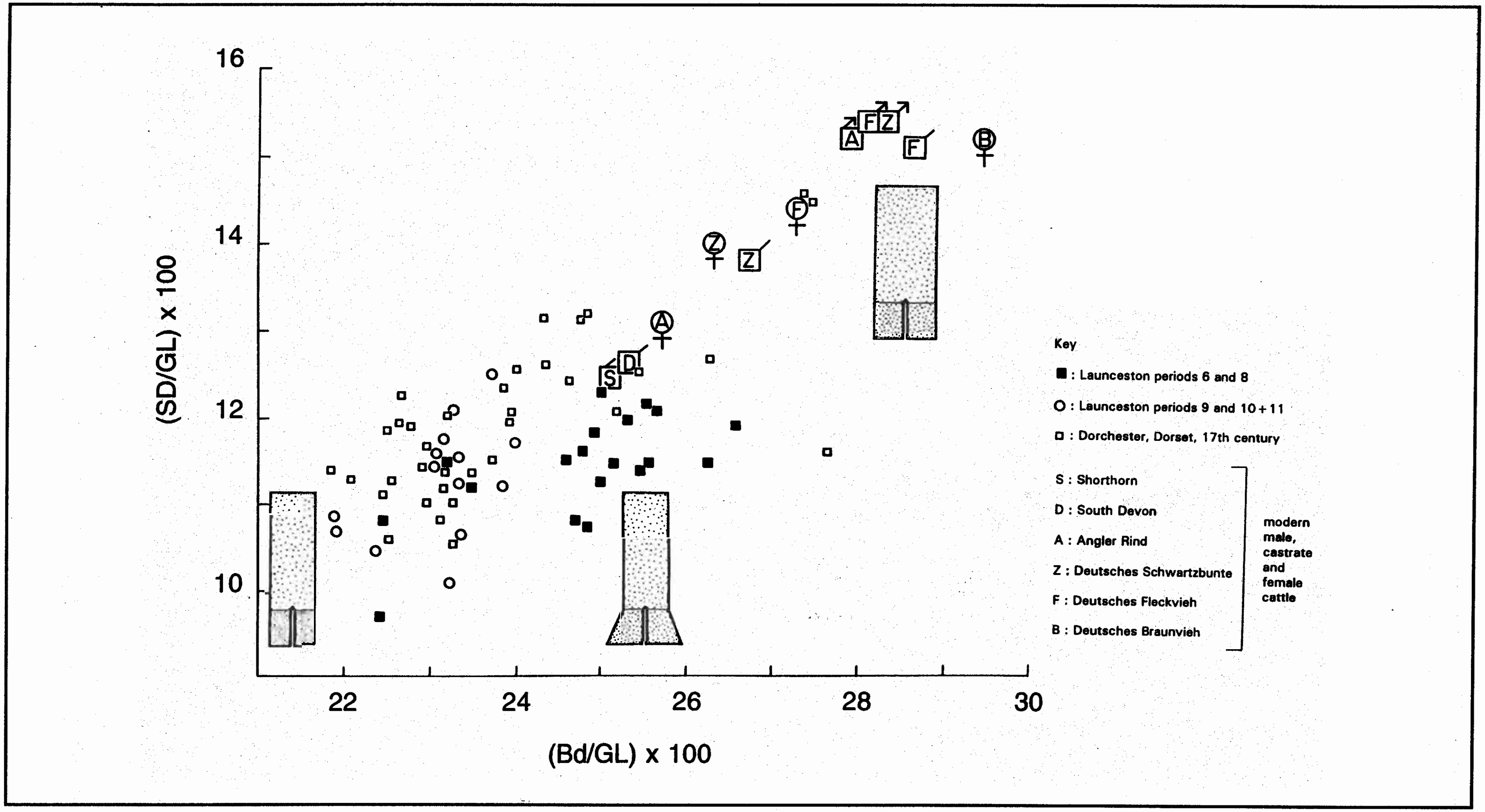


Figure 28. Variation of cattle metatarsal shape at Launceston Castle, Dorchester, and in some modern breeds. A plot of minimum shaft width index (SD expressed as a proportion of metatarsal length GL) against distal width index (Bd as a proportion of GL). The data from Dorchester are from Davis (1987b), and the modern data are means of samples from Fock (1966).

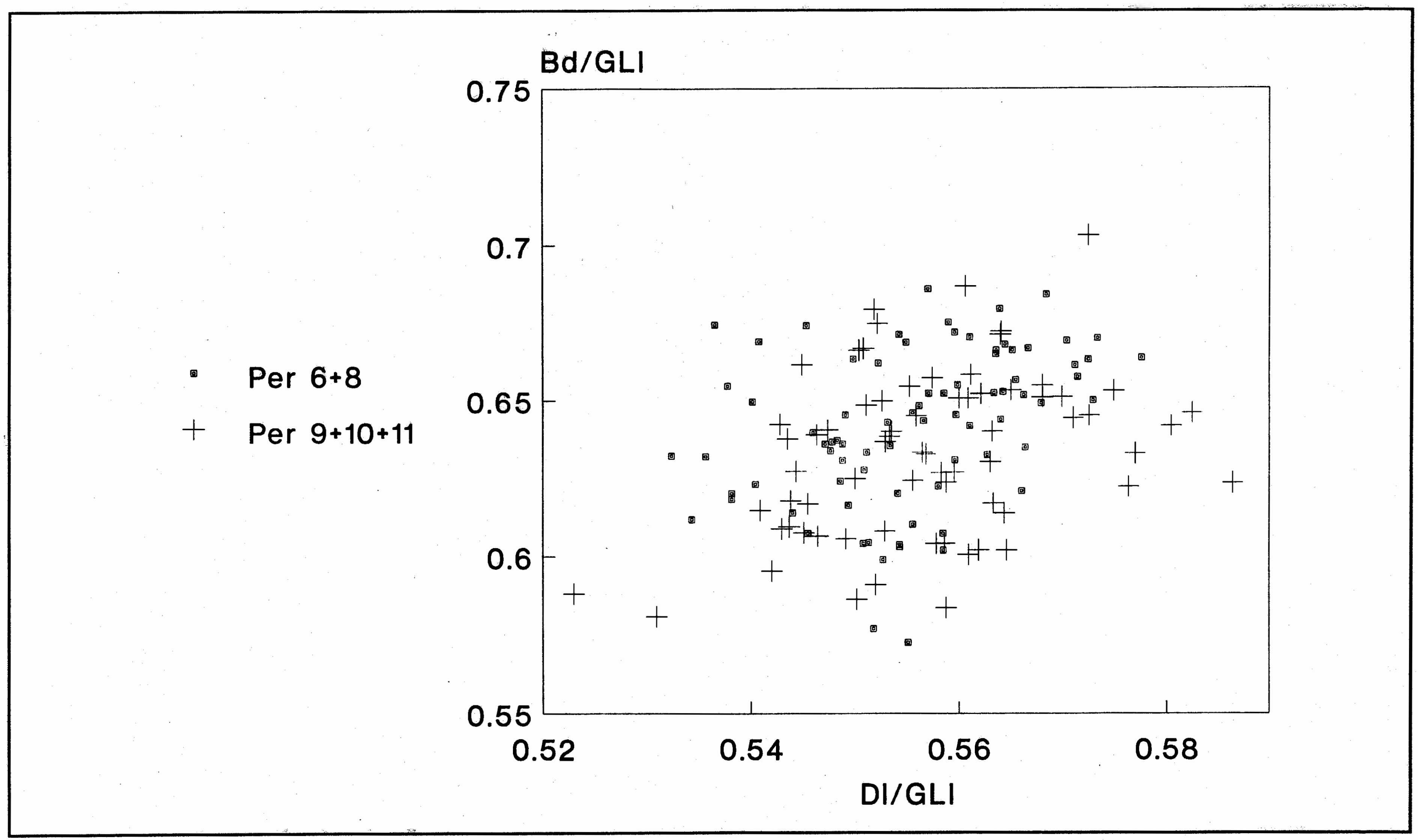


Figure 29. Cattle: scatter plot of measurements Dl/GLl against Bd/GLl for medieval and post-medieval astragali.

seems to be a primitive trait in cows. We feel that it is quite possible that by post-medieval times cows no longer needed their calves to be present during milking. Hence milk and veal production can be considered to be associated.

Sheep. The lack of very young sheep and apparent preference for middle-aged animals (dental wear stages E, F and G; about 2-6 years old) suggests the consumption of mutton from sheep kept for wool and no doubt milk too. The mutton brought into the castle probably derived from animals shorn of two or several fleeces.

According to Muffett (1655, 63) the best mutton is not above four years old and 'mutton [= an obsolete term for wether; *OED*] is to be preferred to rams or ewes flesh'. Trow-Smith (1957, 247) suggests that the 16th and 17th century flock was similar to the medieval one. Wethers were run on for several seasons to give wool instead of being fattened for the butcher at the earliest opportunity. Although the demand for mutton was growing, it had not yet overwhelmed the importance of wool. On balance, sheep were still valued more for their wool, milk and offspring than for their meat. Since the beginning of the 13th century Britain grew the finest and the most wool in Europe (Trow-Smith 1957).

Goat. The goats however, being predominantly juvenile, indicate a different kind of emphasis—one in which kid meat (and perhaps dairying too) was the prime objective. (Kid is still a great delicacy in France.) Here again Muffett (1655, 64) has some interesting things to say and praises kids the younger they are but above a fortnight old. Their flesh, he writes, 'is soon and quickly digested, of excellent nourishment, and restorative after a great sickness.' Simon (1945) recommends kid some 3-4 months old, but when 3-4 *weeks* old, before it leaves its mother, kid is a great delicacy anywhere.

Pig. It is not surprising that most of the pigs at Launceston, as in most zoo-archaeological assemblages, are young. Apart from its offspring, this most fecund of farm animals is not exploited for any secondary products such as milk or hair. As Markham (1614, 88-9) puts it: 'The use and profit of Swine is onely ... for the roose, which is Bacon, for the spit which is Porke, Sowse [= pickle, *OED*] and Puddings, and for breede, which is their Pigs onely.' He also recommends pigs of 9-12 months as providing the 'daintiest Porke' and Mortimer (1707, 185) recommends pigs aged 12-18 months as good for bacon.

Chicken and **goose**. The discrepancy in numbers of juvenile chicken and geese in Periods 6 and 8 may indicate that chicken, represented by 20-30% juveniles, was to a larger extent exploited for its flesh. Since most of the goose remains were adult, this bird may have been a source of secondary products such as down feathers for quilts, primaries for writing quills, and eggs, with adults fattened for festive occasions. Goose was traditional Christmas fayre, being replaced by the turkey in the time of Queen Anne (Simon 1944).

Sex

Cattle. While sex can have some effect on size variation, we do not believe that it is sufficient to explain the changes observed at Launceston.

Pig. The high male:female sex ratio in Period 8 is puzzling and we wonder whether it might be linked to the (admittedly tenuous) rise in the number of young pigs in this period (Fig. 18). It is usual to slaughter slightly more males when young are sent off for culling. Since we have suggested that recovery remained fairly constant (see above), this difference in the sex ratio between different periods is probably real. The higher number of males in all periods is also not a consequence of a recovery bias, because it is confirmed by considering only teeth in mandibles (Table 22) where there is no reason to suspect recovery should affect sex ratio.

Fallow deer. Our interpretation of Figure 21 is that, while in Period 8 approximately equal numbers of male and female fallow deer were consumed at Launceston, in Period 9 most of the fallow deer were males. A preference for bucks over does is apparent when their numbers are counted in the lists of provisions purchased by the judges on the western and Oxford circuits between 1596 and 1601 (Cooper 1859, 15-43). These mention 81 'buck' but only two 'doe'.

Chicken. The prevalence of female chickens is not surprising and may reflect an interest in eggs. The larger specimens could be either entire males or capons, which develop even larger spurs (West 1982). Since capons are generally killed when juvenile before full development of the spur (Sadler 1991) they would not be visible in the archaeological

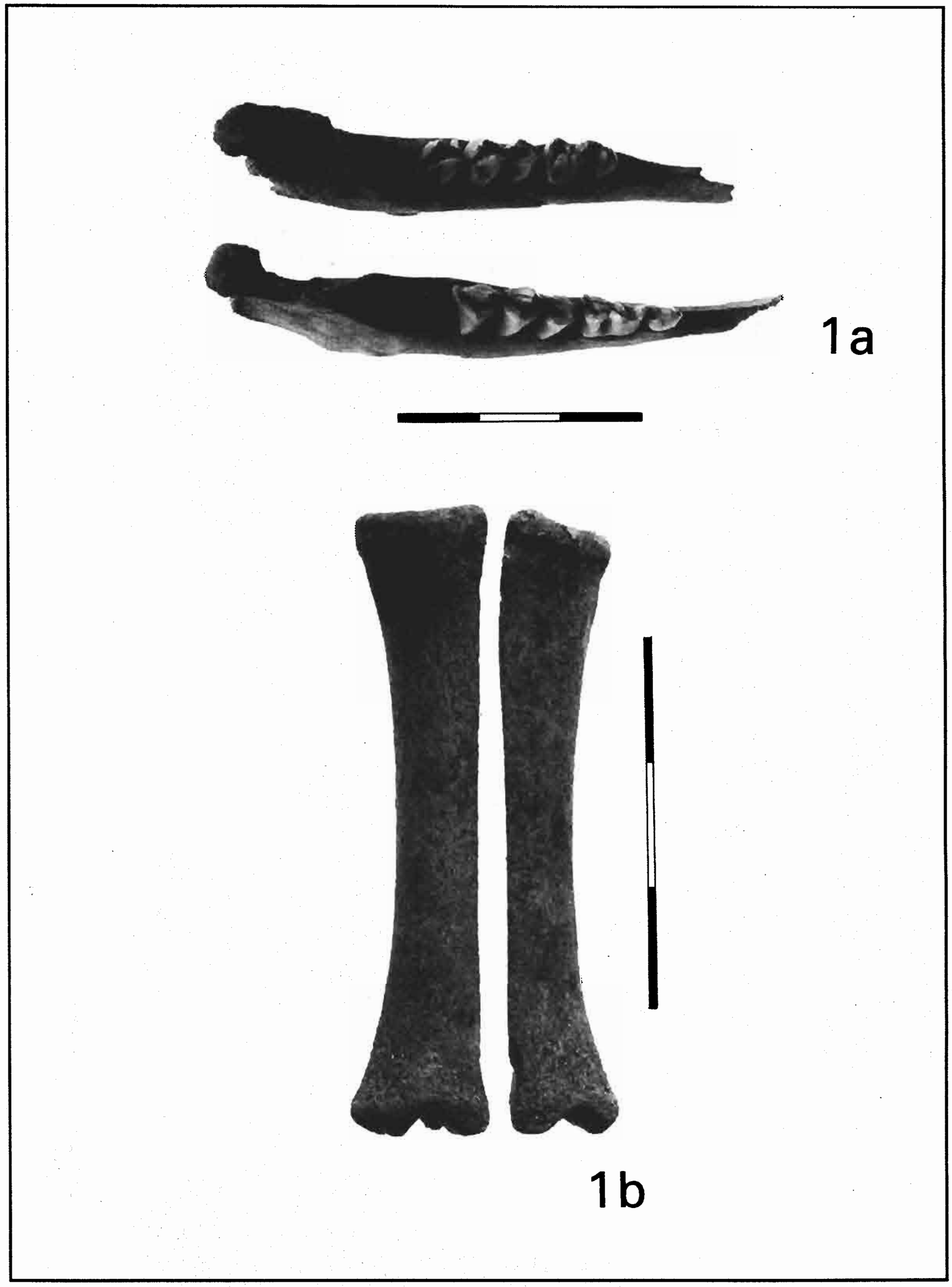


Plate 1. (a) Two juvenile goat mandibles (upper specimen: box 900744, Period 6, late 13th century and lower specimen: box 900732, Period 8, mid-late 15th century). Note the shape of dP_3 and the bovine pillar on dP_4; (b) Longitudinally unfused goat metacarpals from Period 6 (box 900722, late 13th century). Scales: 10 mm.

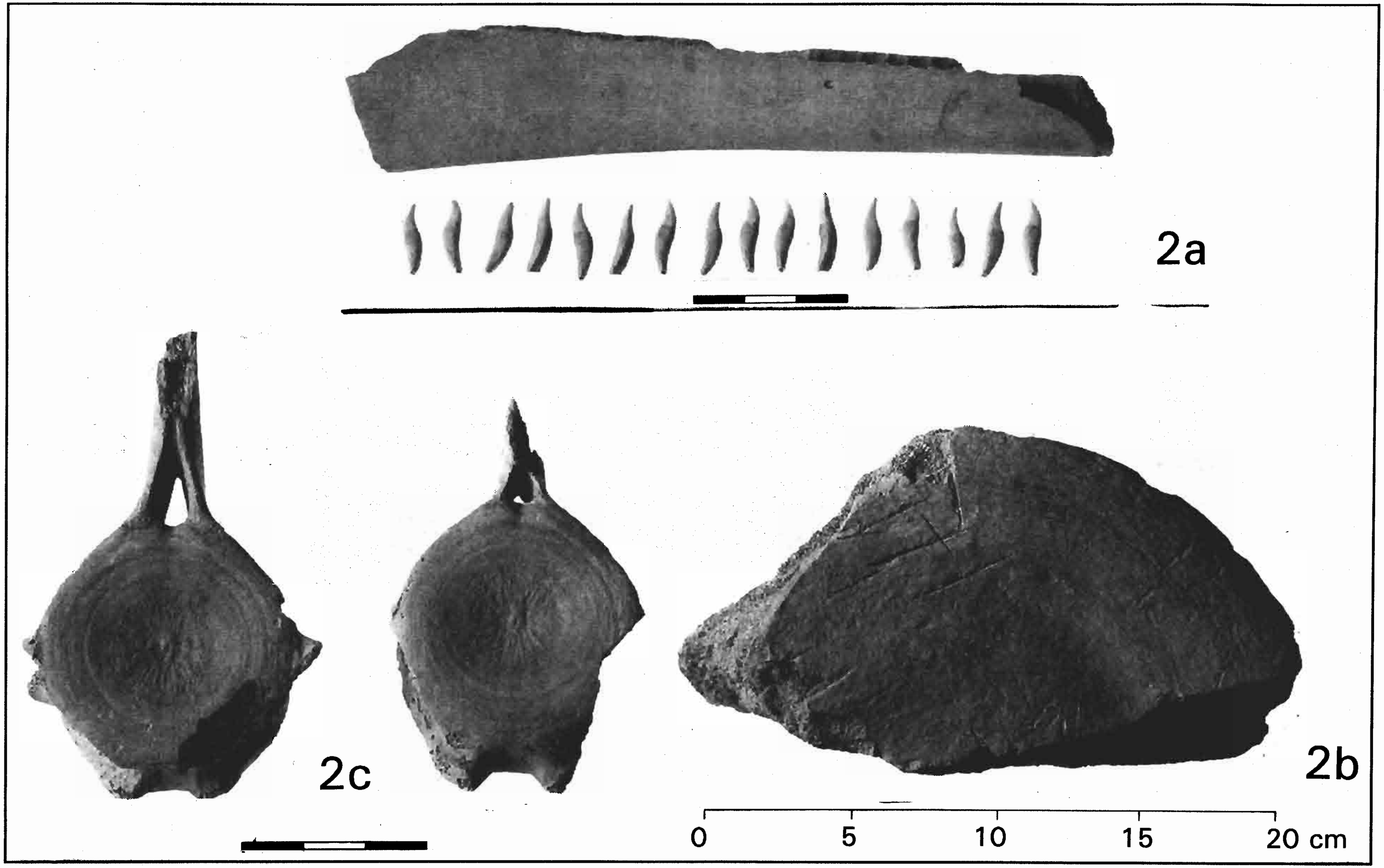


Plate 2. (a) Mandible and teeth of the common dolphin, Delphinus delphis *(box 900719, Period 8, mid-late 15th century); (b). Whale vertebra fragment with chop-marks on the articular surface (box 900696, Period 8, mid-late 15th century); (c) Two small cetacean vertebrae (box 900721, Period 8, mid-late 15th century). Scales: 10 mm.*

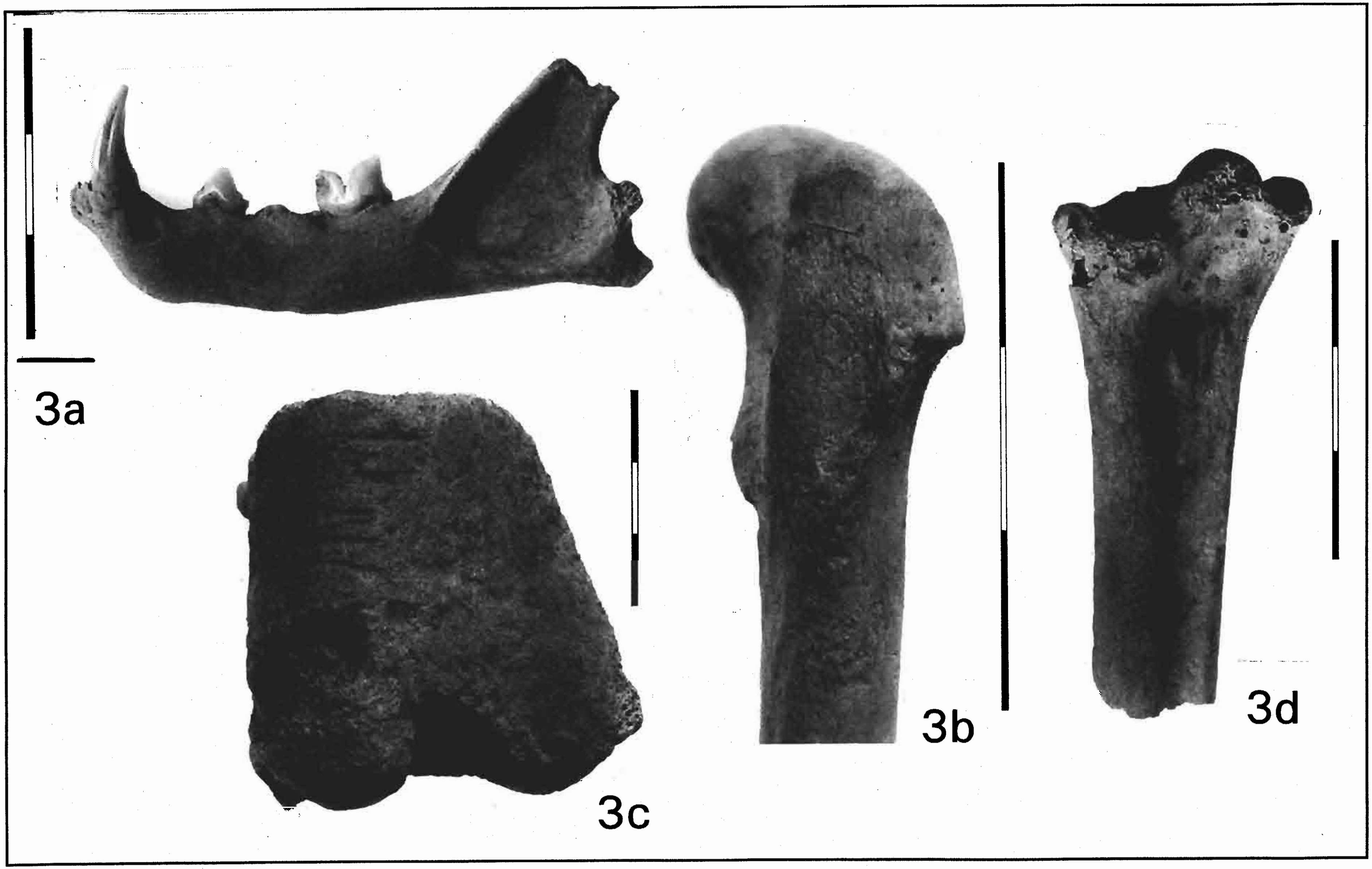


Plate 3. (a) Cat mandible with cut marks (box 900715, Period 8, mid-late 15th century); (b) Proximal end of canid (small dog?) femur with a small cut mark (skinning mark?) across the proximal part of the major trochanter (box 900760, Period 10, 18th century-1840); (c) Equid distal tibia with chop marks (box 900715, Period 3, early 12th century); (d) Proximal end of a crane tarso-metatarsus with small cut marks across the shaft (box 861302, Period 6, late 13th century). Scales: 10 mm.

record. For this reason we suggest that the larger specimens are entire males rather than castrates. One specimen with a rudimentary spur plots in the larger group in Figure 22 and is therefore a male. This supports West's assumption that tarso-metatarsi with reduced spurs or spur scars are males (or capons) rather than females (West 1985).

The 'asymmetric' cattle metatarsals and the missing hypoconulids

Excessive stress such as may be induced by ploughing is supposed (though this is not proven) to induce an arthropathy—a medial extension of the medial condyle of the metatarsal. These arthropathies were found in small numbers in the early medieval levels at Prudhoe Castle, though they became scarcer in the later medieval and post-medieval (Davis 1987b). This could have been a result of the replacement of oxen by horses. The rigid horse harness, which allowed horses to pull (in fact they were now pushing) with greater effect, was introduced from the continent some time in the 12th century and gradually led to the increased use of horses (Lefebvre des Noettes 1931). At Launceston the small decrease in observed occurrences of this condition between Periods 8 and 9 (Table 23) could, therefore, be explained in terms of a shift from oxen to horses as sources of power.

If we accept that the lowered frequency of M_3s without hypoconulids in cattle after Period 8 reflects a change in the genetic constitution of the Launceston cattle, then this corroborates the suggestion that a different breed of cattle was present in the region after the 15th century.

Morphometry: size and shape change and the agricultural revolution

The size changes we observe in the Launceston cattle, sheep and pigs are, we suggest, relevant to our understanding of livestock improvement in England during and after medieval times. First we try to understand what caused the size increase at Launceston, then we consider whether it was a local or countrywide phenomenon, and finally, by referring to historical texts, we shall see that animal size variation at Launceston is relevant to our understanding of when English agriculture improved i.e. the onset of the Agricultural Revolution.

What caused these animals to increase in size? One possibility is that it was caused by castration. Castration is known to result in delayed epiphysial closure (Hatting 1983) which permits continued growth of long-bones. However, preliminary results from work in progress suggest castration hardly alters long-bone width and most of the measurements we took at Launceston are widths. Moreover castration does not influence teeth. Therefore, castration seems an unlikely explanation of size variation at Launceston and a real size increase must have occurred in these animals. We suggest that the increase in their size reflects a real (i.e. genetic) change, probably the result of artificial selection and/or import of breeding stock, in turn a reflection of a greater degree of sophistication in animal husbandry in the 16th and 17th centuries.

As we mention above, cattle bones not only show a *size increase* between late medieval (Period 8) and post-medieval (Period 9) but also underwent a simultaneous *shape change* (see the plots for metatarsals and astragali in Figs. 28 and 29). We do not believe that the relative 'narrowing' of the distal metatarsals resulted from a change in the sex ratio of the beeves eaten at Launceston—for example, a shift from a population with many males with their short, stocky metatarsals to a population with a predominance of steers with their slender metatarsals (see for example Higham 1968). Figure 28 includes plots of Fock's (1966) data from modern animals of known sex and breed together with data from Launceston and Dorchester (Davis 1987b). It shows that shape differences between breeds are greater than between sexes. Fock's data for samples of sexed cattle help to rule out a 'sex-change' explanation for the shift between Period 8 and Period 9 at Launceston: sexes are differentiated along the same regression line—the two indexes *both* change indicating that males are simply more robust than females in *both* distal and minimum shaft widths—which is quite different from the 'distal narrowing' indicated by the Period 8 to Period 9 shift (where Bd/GL changes while SD/GL remains stable).

Since we have observed that on average cattle in Period 8 are older at death than in later periods, the possibility that the shape change between Periods 8 and 9 reflects an age shift has to be considered. It is possible that some post-fusion growth occurs on cattle distal metapodials. However, despite the lack of experimental evidence, we find it difficult to believe that this would be sufficient to cause

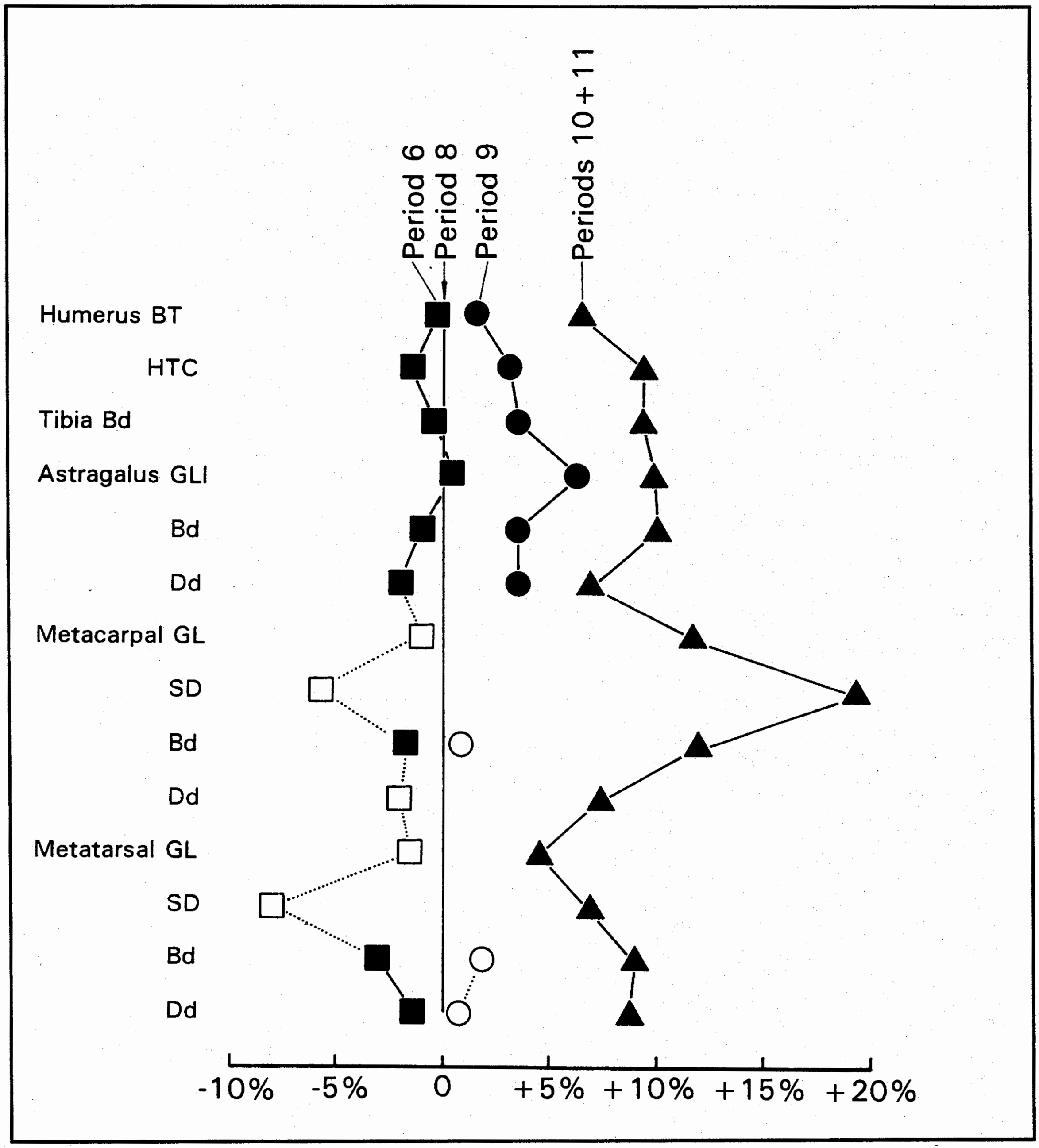


Figure 30. Sheep: percentage differences from Period 8 mean values for selected measurements and selected elements; samples where n<10 are shown as open symbols.

the dramatic shape-change we observe between Periods 8 and 9 at Launceston. Moreover, the change in the kill-off pattern at Launceston is better explained in terms of an increase in the proportion of calves (see Table 15) rather than a smaller number of elderly animals. Since calves would have unfused metapodials (and their measurements were not included in our analysis), such a change would not affect the measurements.

One other possibility is that the narrowing of the distal ends of the cattle metatarsals after Period 8 reflects reduced stress, as the reduced occurrences of the 'asymmetric' arthropathy (see above) would indicate. However, the degree of change in the ratio of the condyle measurements 'a':'b' (see Table 23 and Fig. 23) is not statistically significant and cannot therefore have brought about the kind of shape-change in Figure 28. Another

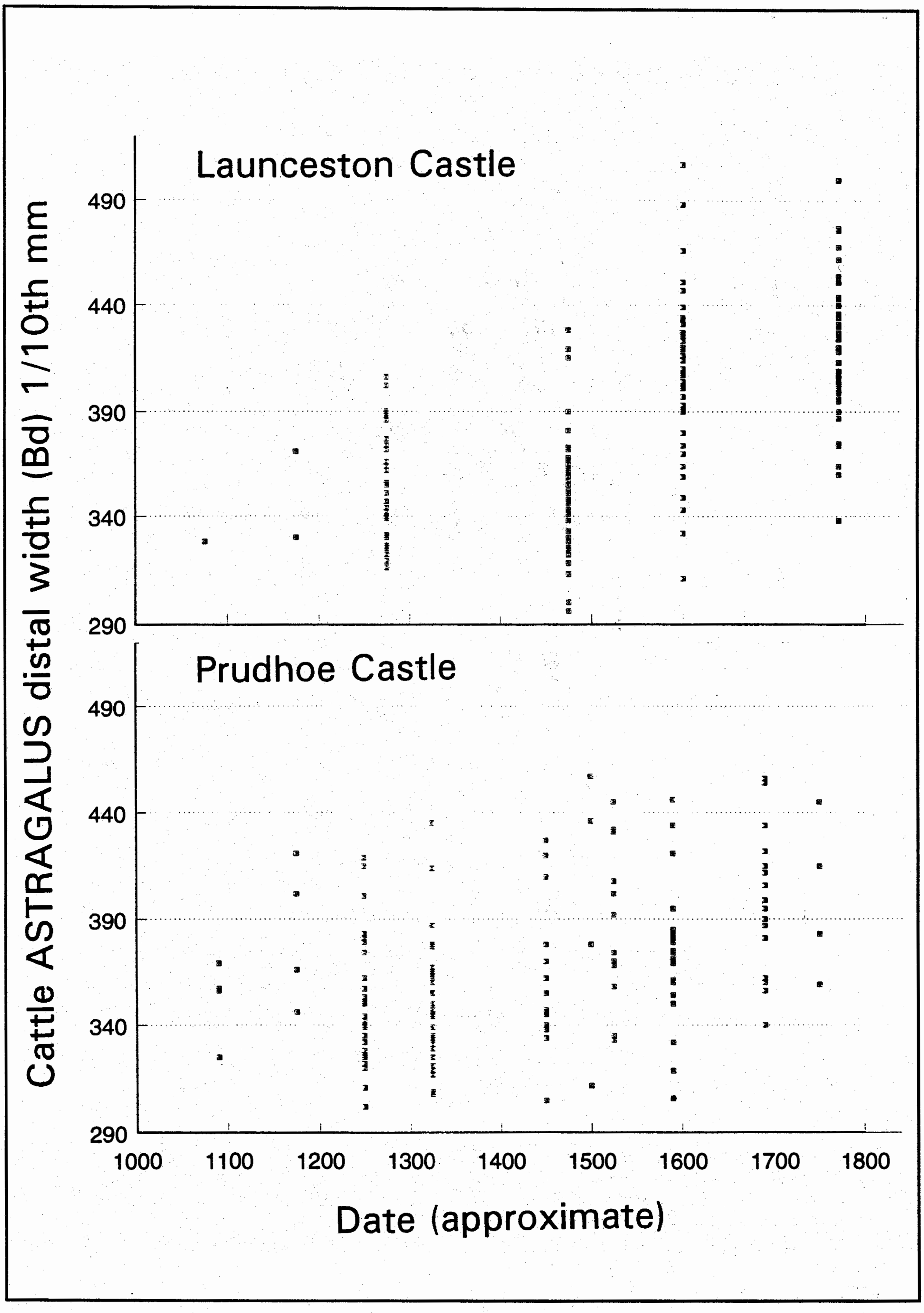


Figure 31. Plots of measurements of cattle astragalus distal breadth (Bd) in tenths of millimetres by approximate date for assemblages from Prudhoe Castle, Northumberland, and Launceston Castle.

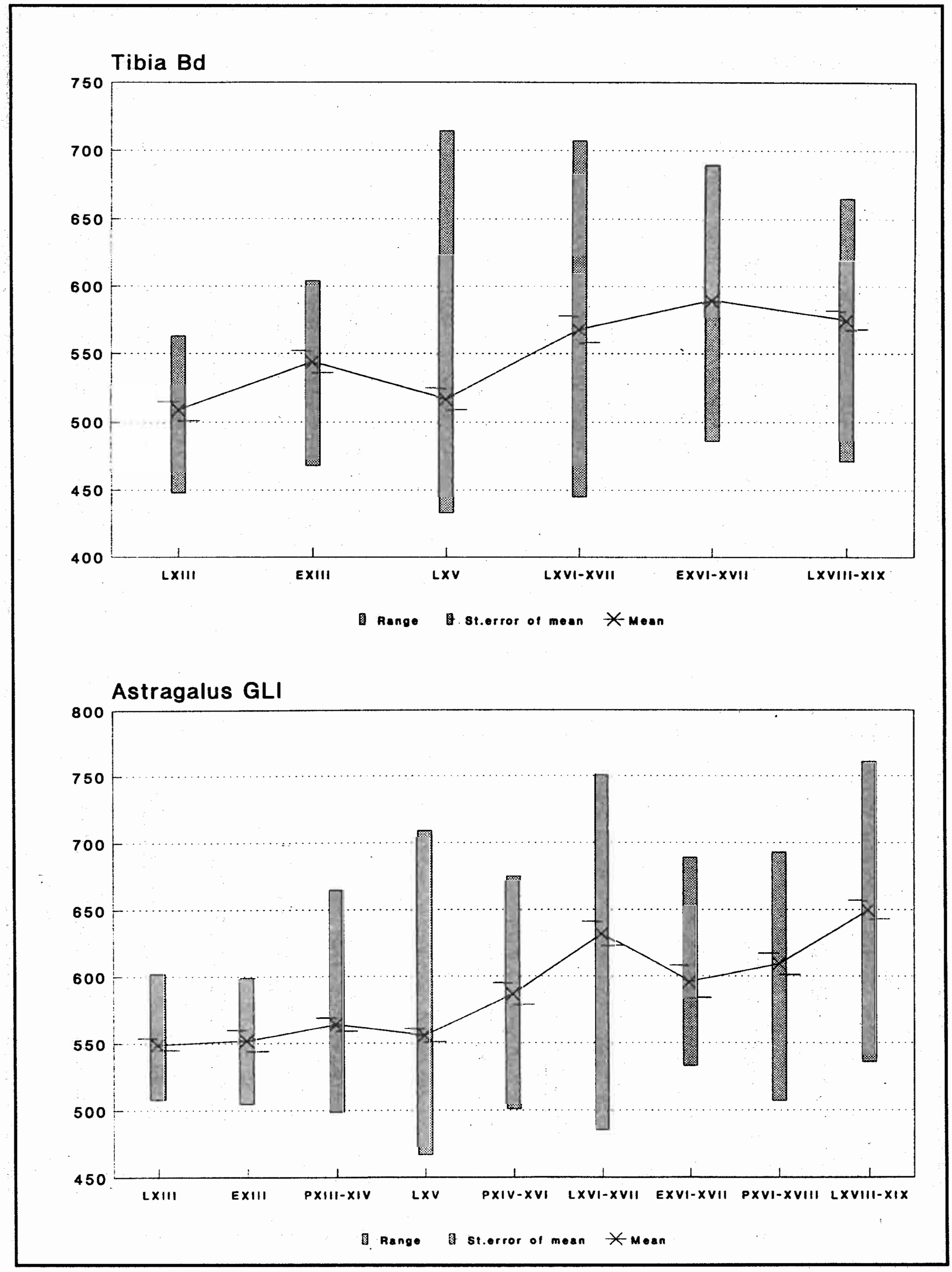


Figure 32. Cattle: comparison of measurements of tibia distal breadth (Bd) for material from Launceston Castle (L, with centuries in Roman numerals on x-axis) and Exeter (E) (above; for EXVI-XVII the sample is small and the s.d. unknown) and of astragalus lateral length (GLl) for Launceston Castle (L), Prudhoe Castle (P) and Exeter (E) (below).

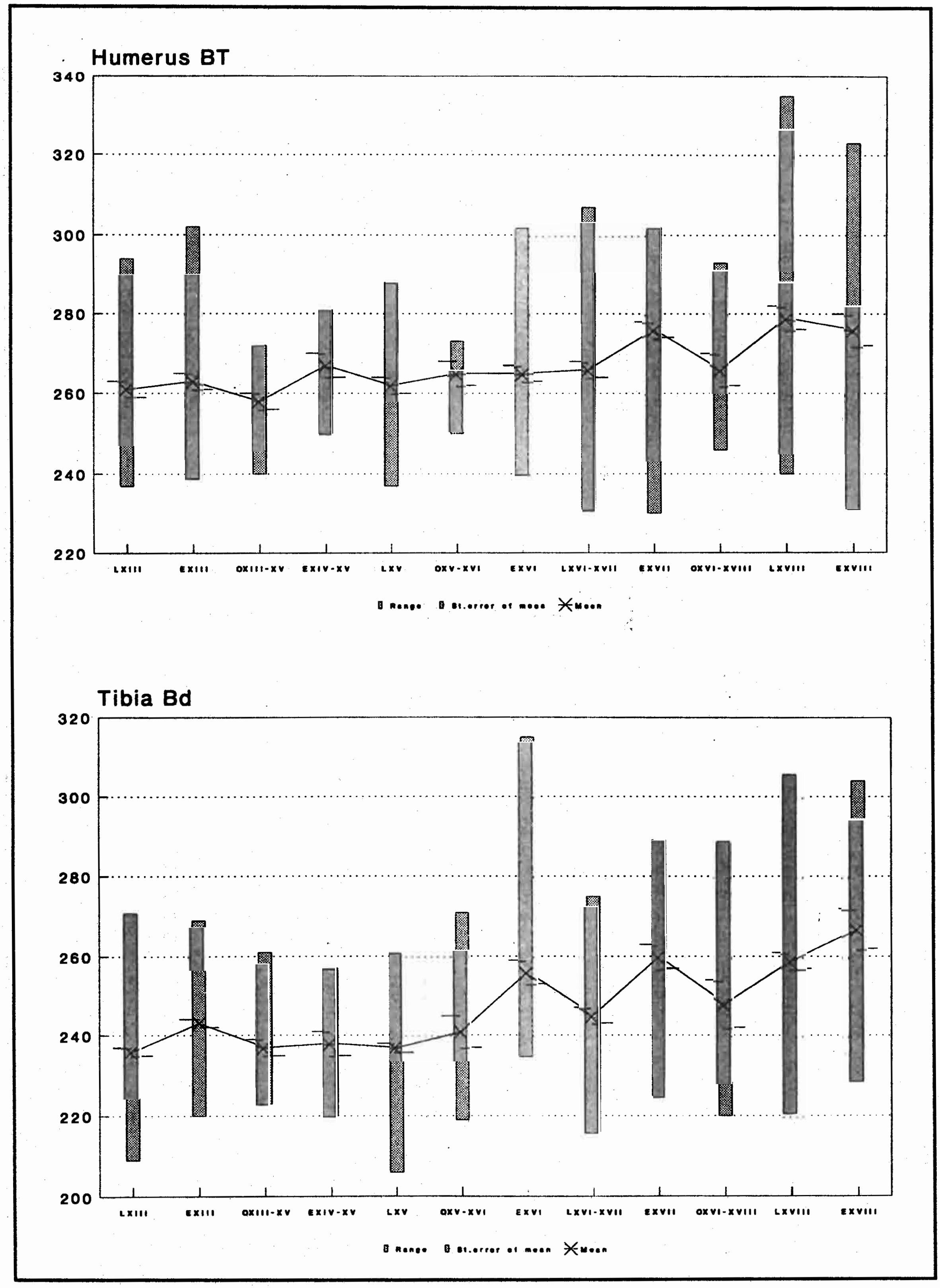


Figure 33. Sheep/goat: comparison of measurements of humerus distal trochlea breadth (BT, above) and of tibia distal breadth (Bd, below), for material from Launceston Castle (L, with centuries in Roman numerals on x-axis), Okehampton (O) and Exeter (E).

observation which we believe strengthens our suggested genetic change of the cattle between Periods 8 and 9 is the decreased frequency of M_3s with missing hypoconulids after Period 8. This, we suggest, supports the notion of a change of breeding stock at Launceston between late and post-medieval times.

In the light of these considerations we think that for the cattle at Launceston, the altered shape, increase in size, and reduced frequency of aberrant M_3s, all reflect genetic change—most probably an 'improvement'. The similarity in shape of the 17th century cattle metatarsals from Dorchester with those from Launceston suggests that perhaps we are witnessing something that was happening over a much wider geographical range. More data from other medieval and post-medieval sites should be of great interest.

What remains an open question is whether we can explain this supposedly genetic change in terms of local selection, or whether it reflects the import of new stock from overseas as suggested by some writers of that time (see below).

To digress briefly, the general robustness of the modern cattle metatarsals measured by Fock (Fig. 28) is also intriguing. Several possible explanations come to mind. One is that it simply reflects recent selection for heavier carcass weights (i.e. greater massiveness); another (Sebastian Payne, pers. comm.) is that it has resulted from an introgression of genes expressing achondroplastic dwarfing, a condition in which growth in length becomes reduced relative to width (both distal and shaft widths). Metapodial shape-variation is the subject of a study by one of us (Albarella, forthcoming).

It is interesting to compare (via Figs. 25 and 26) cattle and sheep in terms of how their sizes increased. Cattle appear 'suddenly' to increase in size between Periods 8 and 9, while sheep increase more gradually, the amount of increase on most of the bones between periods 8 and 9 being roughly equal to the amount between periods 9 and 10+11.

It is unfortunate that there are insufficient sheep bones in all four main periods at Launceston to study shape variation of this animal. In the absence of such data, we can merely suggest at this stage that the gradual increase in size of sheep between Periods 8 and 10+11 reflects a gradual improvement of sheep.

The small samples of pig remains, especially the post-cranial bones, have prevented us from drawing more definite conclusions. However, they appear to comprise a single evolving population, with the possible import of stock, on one or even two occasions. The teeth changed relatively less (and even differently) than the bones—perhaps a reflection of the conservative nature of mammalian teeth in evolution. As in the case of the cattle, pigs at Launceston underwent improvements after Period 8 leading to their increased bone-size. (In some cases—we suspect a function of small samples—this is not very apparent but, when all post-cranial bones are considered together, a general size increase of post-cranial bones is evident.) The admittedly unusual *decrease* in tooth size may reflect the import into the local pig population of a small-toothed race, or possibly (though this seems less likely) resulting from overstocking and poor nourishment during infancy when molar crowns were being formed. Do the even greater-sized pigs in Period 10+11 represent new stock introduced from overseas? Towards the end of the eighteenth century pigs were imported into England from the Far East (Epstein and Bichard 1984).

To return to the size change we observe at Launceston, **is there evidence for similar change taking place at that time elsewhere in England?** Measurements of sheep and cattle bones from three other contemporary post-medieval archaeological sites also provide evidence for size increases of sheep, and in one case of cattle too which, like Launceston, indicates a staggering of size increase in these two animals. The sites are Aldgate in the City of London (Armitage 1984), St Frideswide's Priory in Oxford (Stallibrass 1988) and Closegate, Newcastle (Davis 1991a). At St Frideswide's 'massive cattle bones' were found even in 16th, as well as 17th, century contexts and large sheep/goat bones were found in the 17th century. At Aldgate several very long (and slender) sheep metatarsals ranging in length from 150-180 mm were found in late 17th to early 18th century contexts. At Closegate large sheep bones were recognised in late 17th century contexts. Thus the pattern of cattle increasing in size a century or so *before* sheep at St. Frideswide's seems to parallel what was happening at Launceston Castle. The measurements from Exeter, Okehampton, and Prudhoe also confirm the rather more sudden increase in size of cattle in the 16th century and subsequent more gradual increase in size of the sheep in the 17th-18th century (Figs. 31-3).

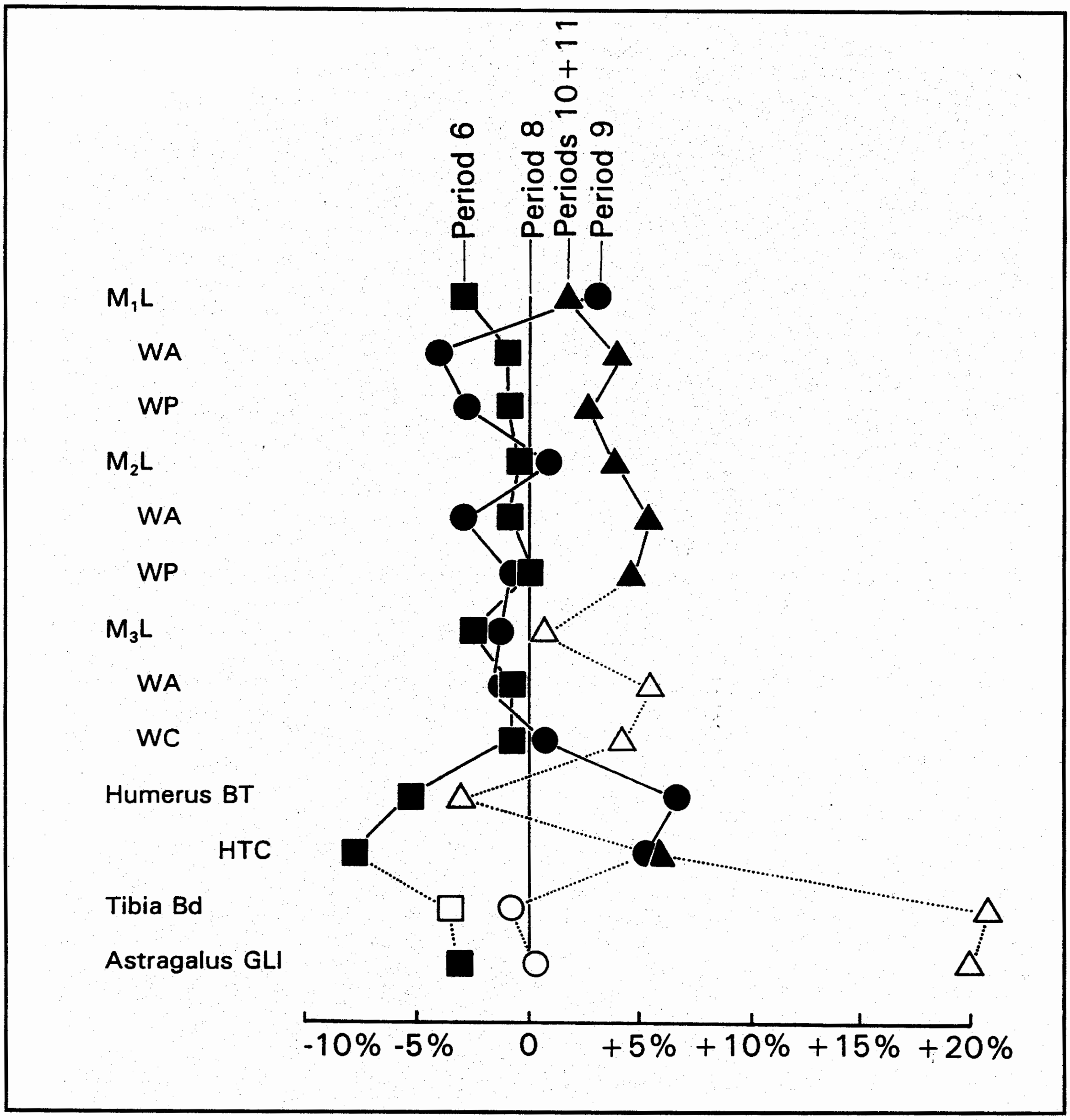


Figure 34. Pig: percentage differences from Period 8 mean values for selected measurements and selected elements; samples where n<10 are shown as open symbols.

We have now established that the three main species of farmyard animals underwent a size-increase: cattle probably quite rapidly in the 16th/17th century, sheep more gradually in the 16th-18th centuries, and perhaps pigs too. As Stallibrass (1988) has suggested, we believe that these size increases mark the beginnings of a general improvement in animal husbandry.

What do the history books tell us? There is some textual evidence for cross-breeding and even for the import of foreign livestock in the 16th and 17th centuries. Cattle, for example, were now being sent on the hoof along countrywide droveways to London via routes that were well established by the 17th century (Armitage 1982). Kerridge (1988, 20) writes of the supply of beef to London from regions as far away as Lancashire and eventually Scotland and Ireland. Perhaps better communication lead to cross-breeding and hence improvement through 'hybrid vigour'. In this respect Markham (1614, 42) recommended mixing Yorkshire with Staffordshire cattle, or Staffordshire with Lancashire, or Derbyshire with any of the 'black races'.

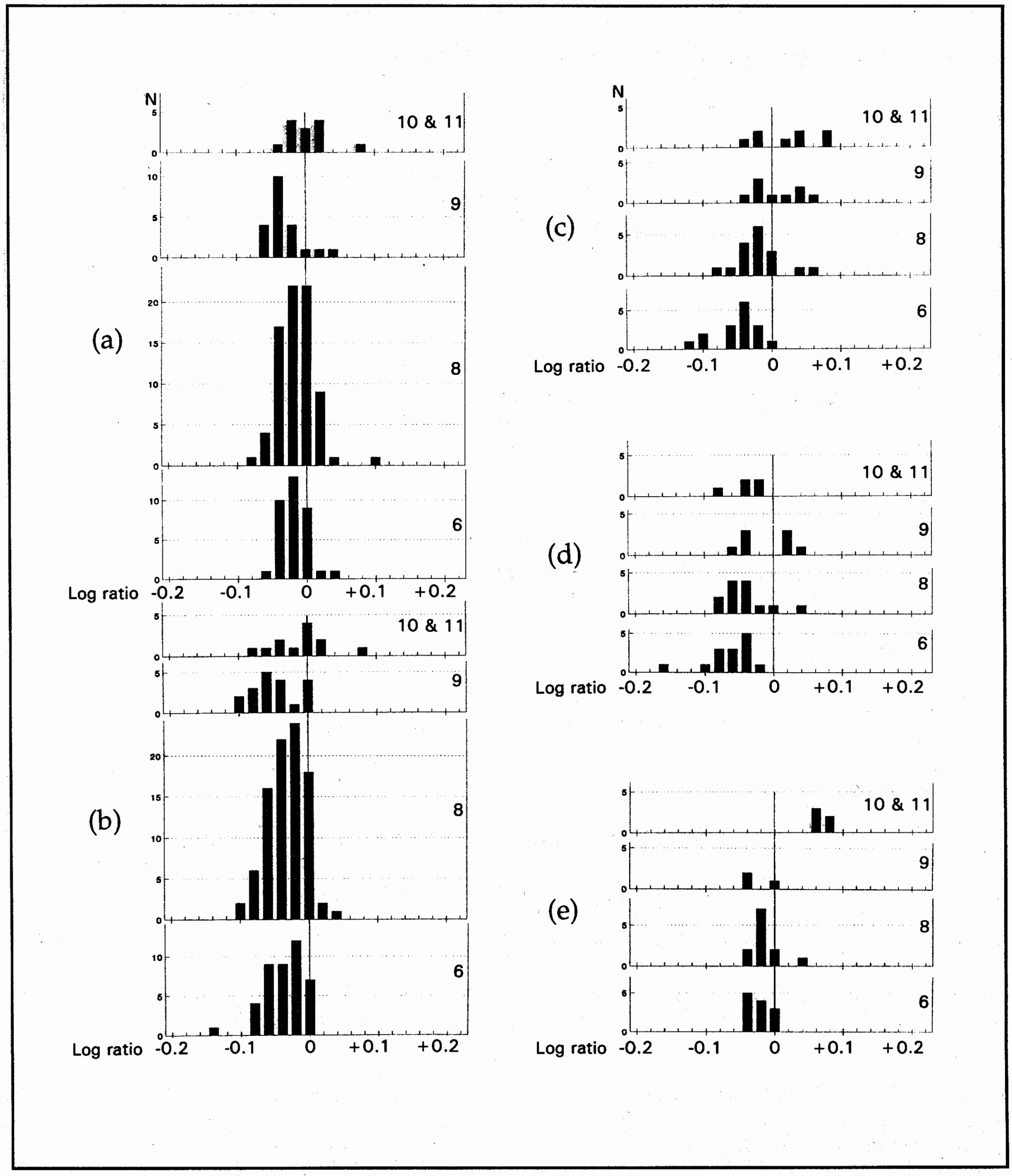


Figure 35. Variation in pig tooth and bone measurements for material from Launceston Castle compared with the standard Neolithic pig sample from Durrington Walls, Wiltshire, England (Albarella and Payne, in prep.), using the log ratio technique (Payne and Bull 1988). For humeri, fused specimens only are included. Elements measured: (a) M_1 wa; (b) M_2 wa; (c) humerus HTC; (d) humerus BT; (e) astragalus GLl.

Trow-Smith (1957, 202), citing various contemporary sources, mentions that in the 17th century and possibly earlier, a pied strain begins to be noted among English cattle. These were, according to some sources, of Dutch origin, and were described by Markham (1614, 42) as being for '... the most part, pyde with more white. ... of bodies exceeding tall, long and large, ... and are indeed fittest for labour and draught.' Mortimer (1707, 166), too, writes

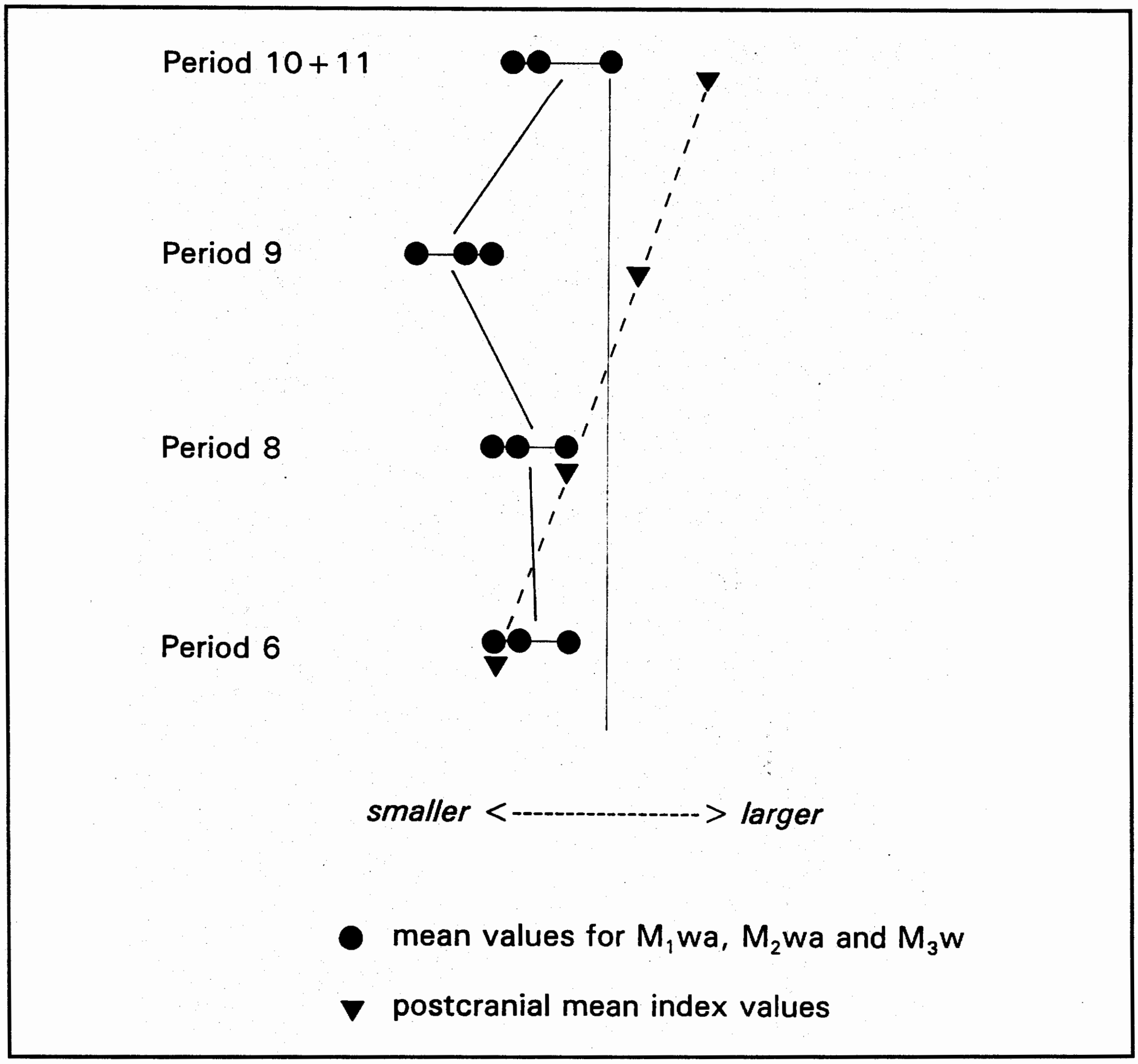


Figure 36. Sketch summarising size changes in pig teeth and post-cranial bones from Launceston Castle using a log ratio for comparison with the Durrington Walls standard (see also Fig. 35).

about these cattle, stating that they are 'the best sort of cows for the pail, ... and need very good keeping, are long legged short horn'd cow of the Dutch breed in some places of Lincolnshire, but most used in Kent ...' In Holland there is a persistent tradition of large exports of cattle to Lincolnshire in the 17th century (Trow-Smith 1957). These Dutch cows, which were the basis of the late medieval Dutch butter and cheese export trade, not only had a high milk yield, but had *considerable size*. Trow-Smith suggests that imports into England of large milky Dutch cattle began in the late 16th or early 17th century.

It seems clear to us that cattle and sheep were being improved in various parts of England in the 16th and 17th centuries, and this to some extent was a result of cross-breeding and import of foreign stock (in the case of Dutch cattle). It is obviously tempting to compare this 'new breed' with the change observed in size and morphology (narrower distal metatarsals, for example). Note how, perhaps like those of Dutch cattle, the cattle metatarsals at Launceston became longer (Table 24 and Fig. 28).

The size increases which the Launceston livestock remains show, and the improvements alluded to in the literature, suggest an increased sophistication of our farming ancestors in the 16th and 17th centuries. If we are correct, how do other

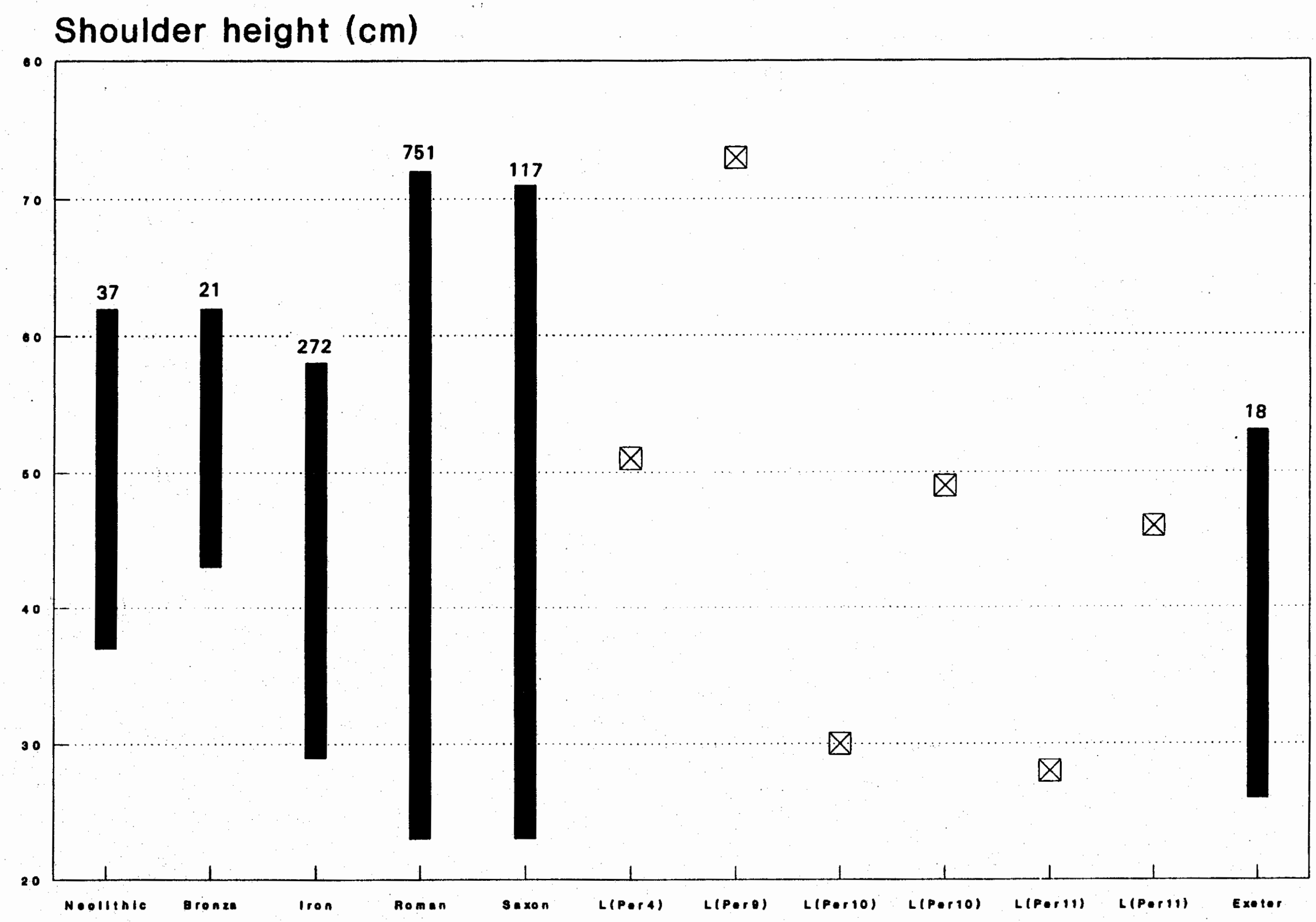


Figure 37. Dog: shoulder heights calculated from five complete humeri (from Periods 4, 9, 10 and 11) and one complete radius (from Period 11), using the formula of Harcourt (1974). These are compared with British dogs from other periods (Neolithic-Saxon data from Harcourt (op. cit.)*; Exeter post-medieval data from Maltby 1979. Number of specimens at top of bar; L = Launceston.*

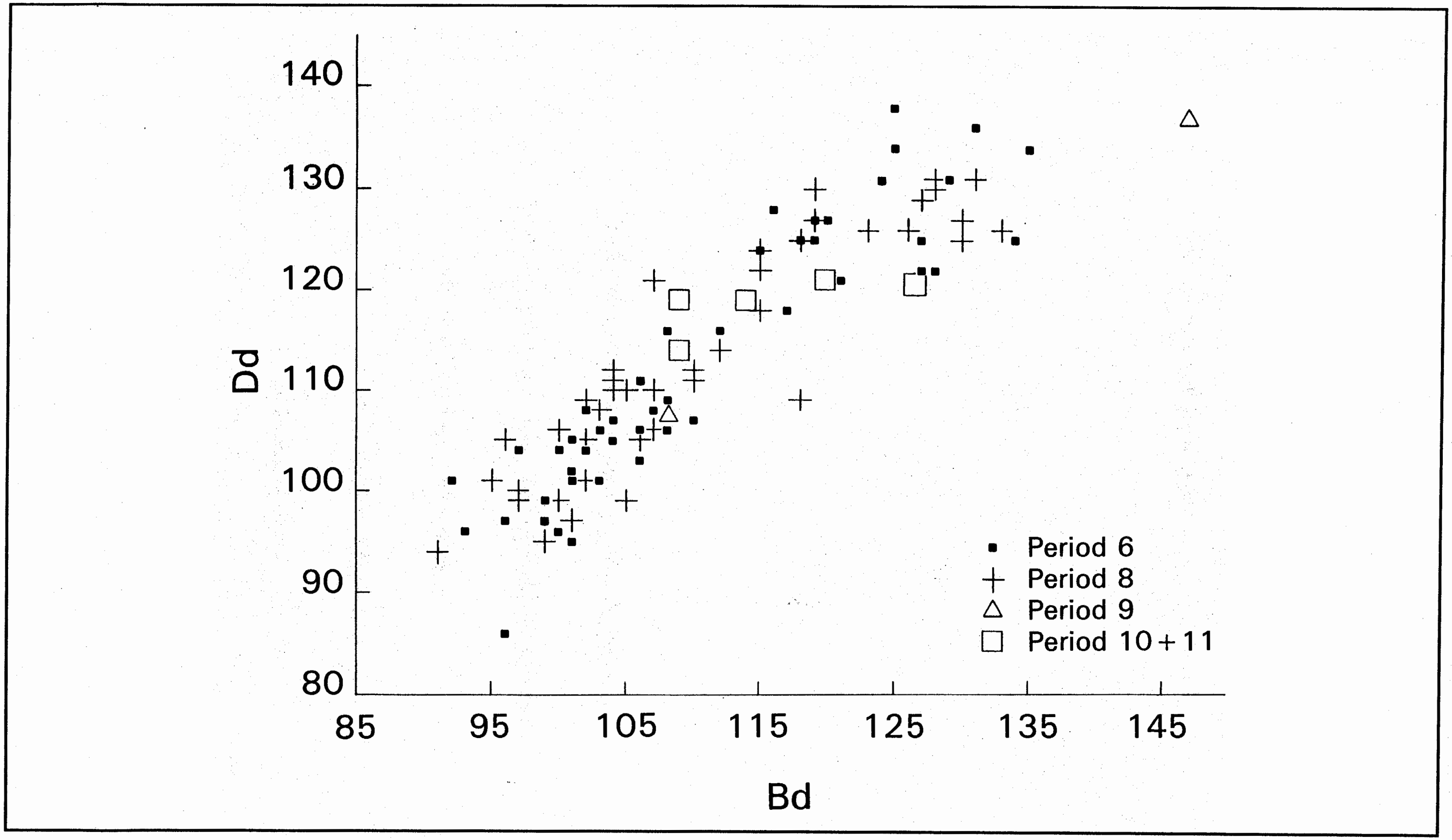


Figure 38. Chicken: plot of measurements Bd and Dd of distal tibio-tarsus.

students of English economic and agrarian history see progress during the last four or five centuries? A perusal of some of the literature concerned with British agricultural history reveals the existence of two schools of thought. Some writers like Orwin (1949), Trevelyan (1957), and Ritvo (1987) ascribe the agricultural revolution to the 18th century. It comprised a cluster of innovations which occurred roughly between 1750 and 1850 coinciding with the industrial revolution which was taking place in England at that time and which commenced with the accession of George III. It was a period that supposedly saw improvement of the nation's breeds of cattle and sheep. Food was needed to feed the rapidly expanding population which nearly doubled during the 18th century. England was often at war with her neighbours and therefore vulnerable to blockade. Other writers such as Burke (1834), Green (1888), and especially Kerridge (1967 and 1988) hold that it occurred much earlier: agricultural improvements of a revolutionary kind were taking place as early as the 16th and 17th centuries. This was the aftermath of the great pestilences of the 14th century. These plagues probably killed about one half (though estimates vary) of the population (Postan 1939). (The 15th century was also the time of the last and most disastrous phase of the 100 Years War.) Matters, it seems could only have improved after these times, a change to which Green (1888) alludes.

The Elizabethan period was one of peace and prosperity (Green 1888, 393-4). London developed into the general emporium of Europe. It was a time characterised by greater consumption of meat, the rise of the middle classes and tremendous improvements in agriculture. More resources were put into farming, the breeds of horses and of cattle were improved, and a far greater use made of manure and dressings. Woollen manufacture was fast becoming an important element in the national wealth. England no longer sent her fleeces to be woven in Flanders and to be dyed at Florence. It was under Elizabeth that commerce developed rapidly. In the early part of the sixteenth century the annual export of English wool and drapery was estimated at a sum of over £2m sterling. This 16th century increase of trade—especially wool—made farming a national rather than a purely local concern, with the development of *national* markets and international trade. Estate owners, in their quest for land for grazing sheep, cleared and enclosed (often with force) much waste land (Drummond and Wilbraham 1939, 24). Kerridge (1988) suggests too that by the 16th century the whole of the English countryside was covered by a network of market towns and livestock strains were widely interchanged. Burke (1834, 25) goes on to mention continuing developments in British agriculture after the 15th century. In the mid 17th century many 'gentlemen', who had been impoverished by the civil war, devoted themselves to farming and husbandry, an endeavour actively encouraged by Cromwell. The cultivation of the soil, hitherto almost exclusively confined to 'unlettered men', began now to interest the educated classes.

Kerridge's criteria for an agricultural revolution, hitherto ignored by historians, include the adoption of a grass-arable rotation otherwise known as 'up-and-down husbandry' leading to soil improvement and increased yields of crops such as grass and corn, and the 'floating of water meadows' a practice which he suggests commenced around 1560. Also by the turn of the 17th century many new crops were being cultivated. Many of these had previously been grown in kitchen and market gardens, and their cultivation as field crops provided an important source of winter fodder for cattle, sheep and horses. (Winter fodder such as turnips solved the problem of keeping cattle in health during winter.)

Kerridge also provides documentary evidence which indicates that farmers were improving their stock as early as the turn of the 17th century. For example, the Cotswold was transformed by both improved feed and crossing with the Midland pasture sheep, 'their legs shortened and their carcasses became larger and fleshier.' He also cites mid-16th century examples of sheep farmers importing sheep from other parts of the country. Improvements in the Midland pasture sheep occurred in the second half of the 17th century.

To turn briefly to the pig. According to Trow-Smith (1957, 250) there is little evidence that the techniques of pig husbandry developed in Tudor or Stuart times, or that swine were kept on more than a domestic or very small commercial scale. However, he does suggest that some advances beyond the traditional 'pig-swill' and 'cabbage-stalk' phase were being made and quotes writers recommending, in the early 17th century, fattening on peas and

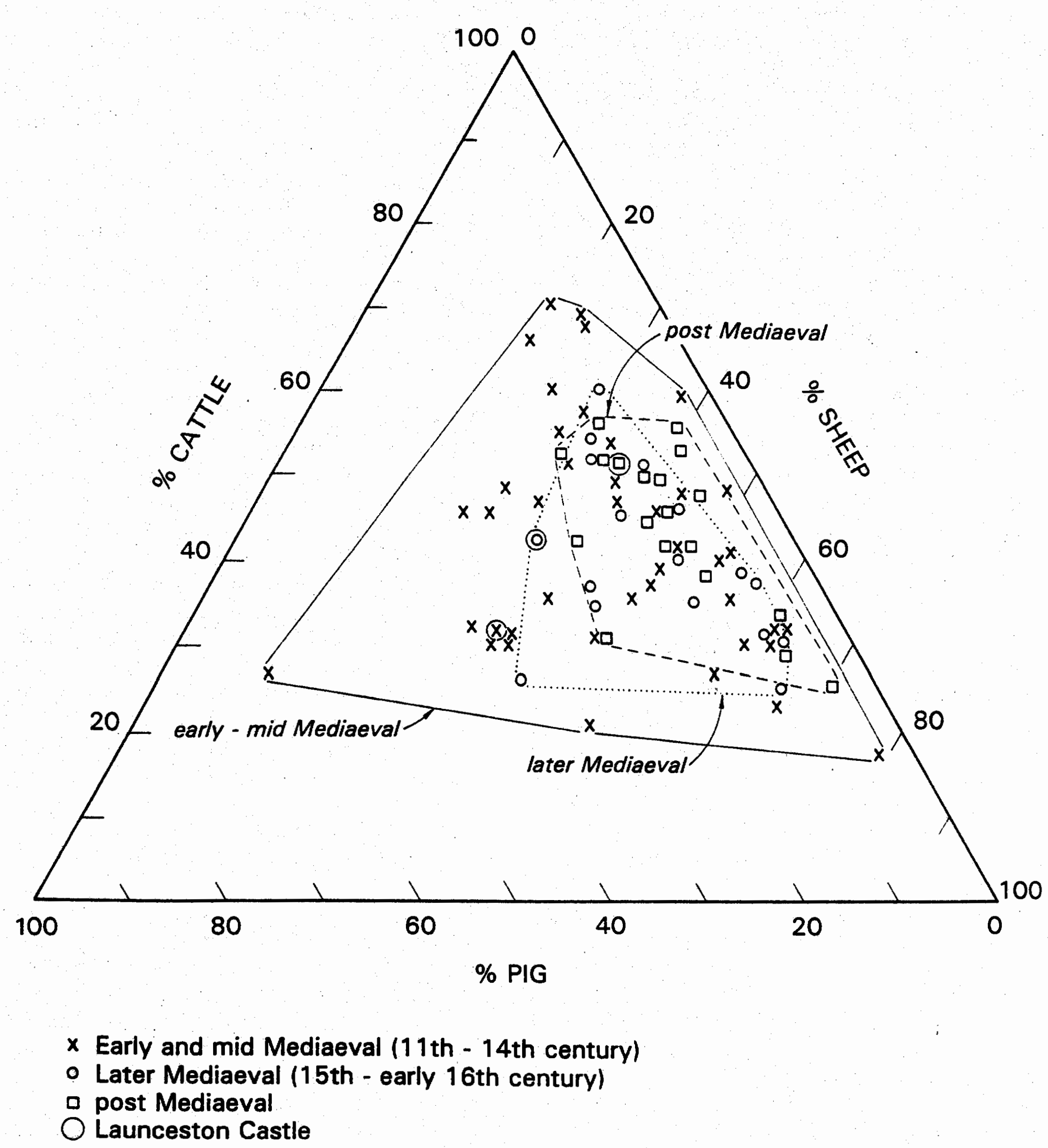


Figure 39. Tripolar diagram showing percentages of three food animals in assemblages from various medieval and post-medieval castles, towns, and villages, with period groups outlined. The three plots for the Launceston Castle material are, from lower left to upper right, Periods 6, 8 and 9.

beans. Subsequently Chinese stock was imported from the Canton district in 1770-80 (Epstein and Bichard 1984).

Trow-Smith (1957, Chapter 5), like Kerridge, suggests that the 16th and 17th centuries saw a transition from what he terms 'senile mediaevalism' to 'vigorous and adolescent modernity', a change from subsistence farming to commercial agriculture. He suggests that in livestock husbandry the main motivating force was the demand for meat and other livestock products by a rising population of townsmen. This great 'urban

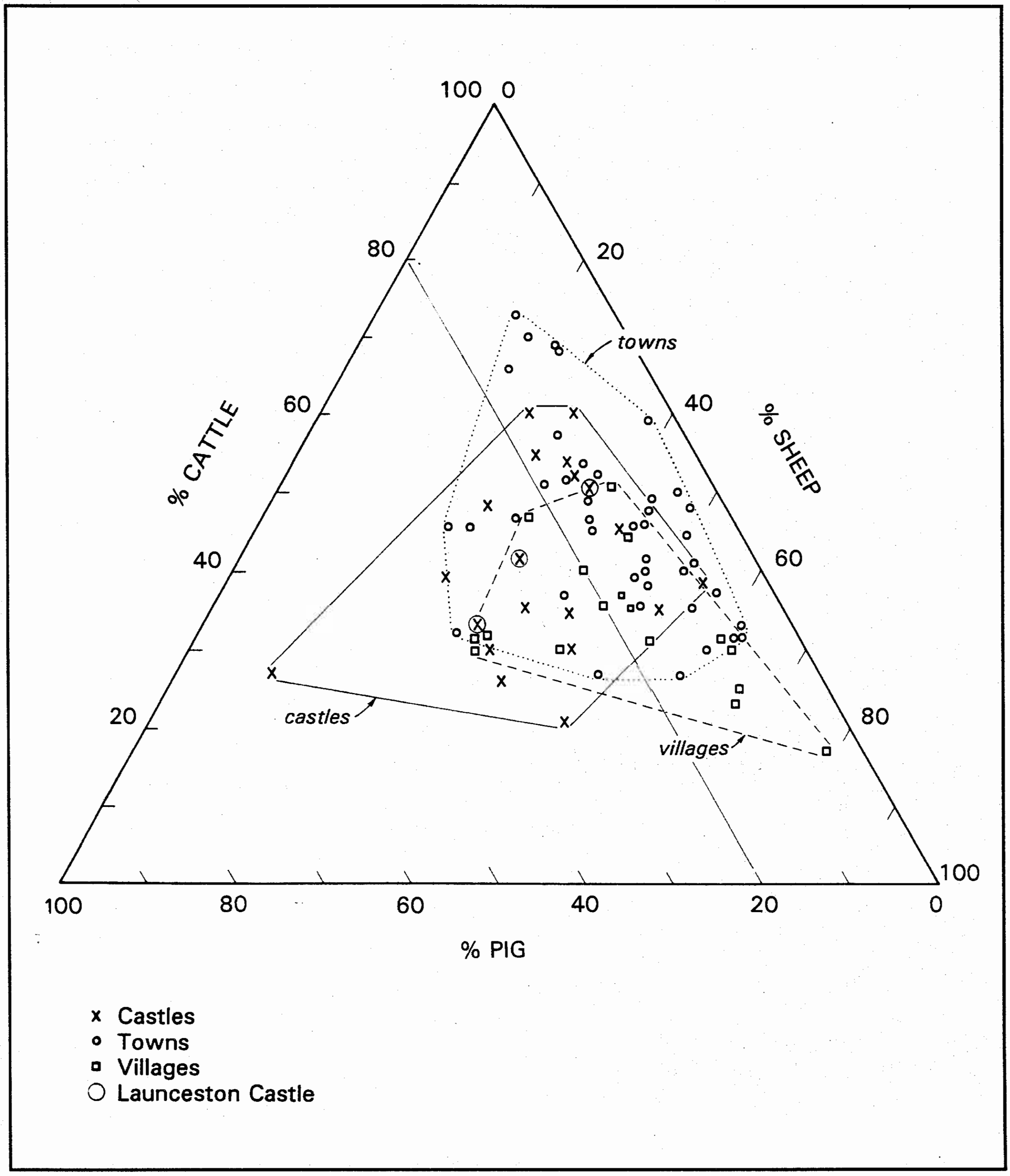


Figure 40. Tripolar diagram showing percentages of three food animals in assemblages from various medieval and post-medieval castles, towns, and villages with site types outlined. The three plots for the Launceston Castle material are as in Fig. 39.

mouth' coincided with a breakdown of the feudal structure of land tenure, the release of monastic land following the dissolution of the monasteries, a consolidation of a rural class of yeomen, and the retirement to the countryside of the businessmen-turned-farmers who brought a new spirit of commercial exploitation. It was during the two centuries of Tudor and Stuart rule that the stockman ceases to be satisfied with the traditional methods of livestock management and sought new methods of husbandry and new animals. Wool remained saleable but red meat, butter and cheese rose in

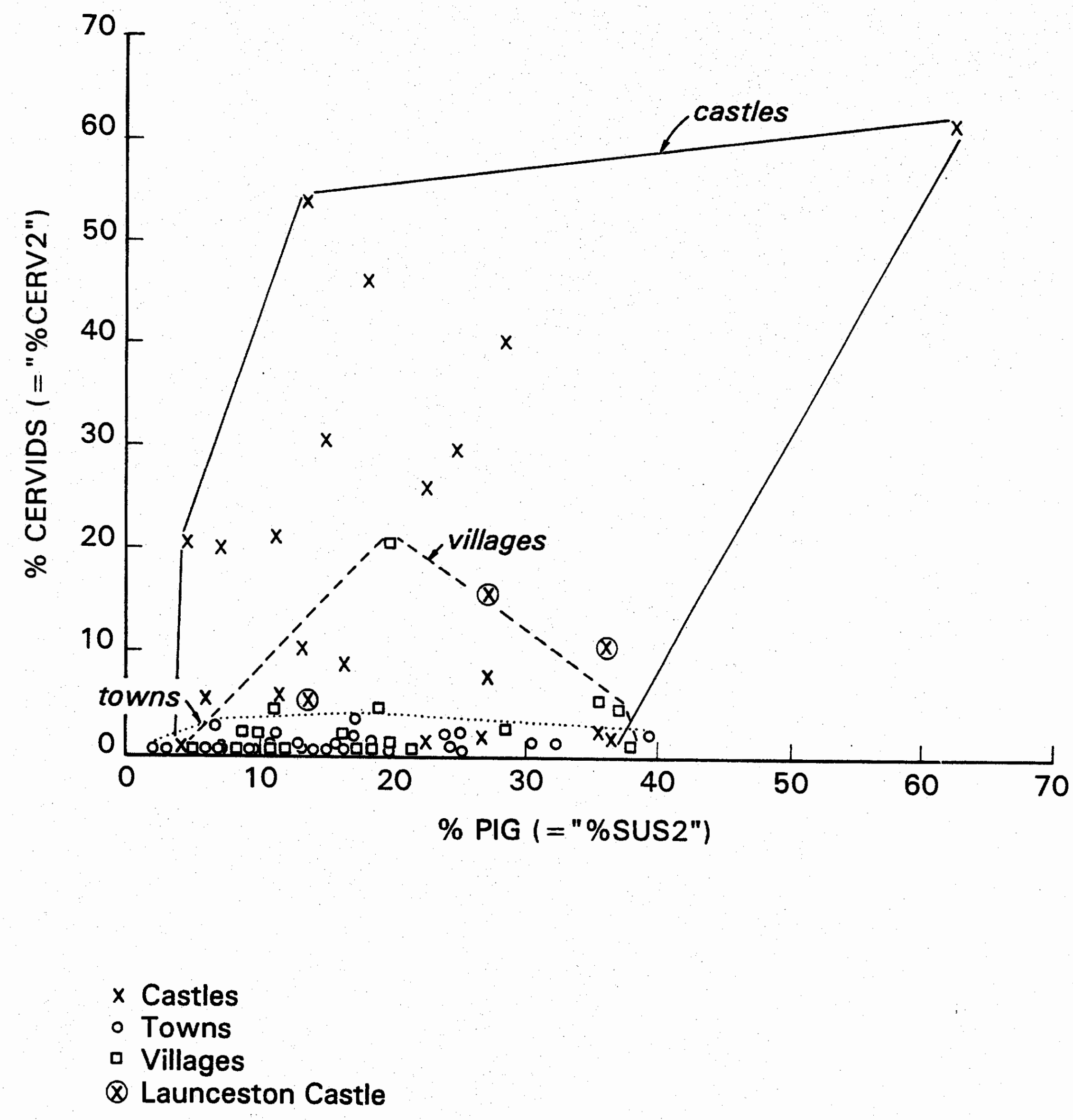


Figure 41. Plot of percentage frequencies of pig against cervids for assemblages of medieval and post-medieval date (see Table 31 for explanation of '%SUS2' and '%CERV2'); the plots for the Launceston Castle material are, right to left, Periods 6, 8 and 9.

importance. The cow shifted in importance during the 16th and 17th centuries from a beast of traction to become a breeder of meat and supplier of milk, hence the increase of juvenile cattle from Period 9 onwards at Launceston. The carcass of sheep now assumed an importance equal to the quantity and quality of its wool, 'and the pig began to be more fully domesticated than it had been'—'but only slowly so' (Trow-Smith, *op. cit.*).

Kerridge, who argues along the same lines and concerning the 16th and 17th centuries, writes (Kerridge 1967, 347-8) 'Contemporaries were thus quite clear that they lived in the age of the agricultural revolution. Medieval England had accepted as an ineluctable fate the vicious circle of poverty imposed by the cessation of grass growth in the winter months. In early modern England private enterprise found half a dozen ways to break this circle and with characteristic vigour adopted them all in an agricultural revolution of unparalleled achievement.'

Herein lies the significance of the Launceston Castle animal bones: was the agricultural revolution an Elizabethan or a Georgian phenomenon? Our data from Launceston Castle appear to corroborate Burke, Green, Kerridge and Trow-Smith, and we believe provide zoo-archaeological support for their thesis that agriculture in England in the 16th and 17th centuries was definitely on the move.

Conclusions and summary

Most of the vertebrate remains found at Launceston castle belonged to sheep, cattle and pig. Birds and fish were also common, but they declined in relative importance during Launceston's occupation from the 12th to 19th centuries. This decline of fish and birds probably reflects the gradual demise of the aristocratic use of the castle and its increasing tendency (especially in Periods 10 and 11) to become merely part of the town of Launceston and its use as a town rubbish tip. In Period 9 the castle was still used, if somewhat infrequently, by the aristocracy. Of the mammals, cattle increased and pig declined in numbers.

Around the 15th/16th century a shift towards culling of younger cattle occurred which suggests the possible development, at least in that part of the country, of more specialised beef farming, most probably geared more to veal and dairy production. We observed no change in the ages at which sheep were culled, most having been slaughtered between 2 and 6 years. On this basis we suggest the chief interest was on wool production, though of course mutton and perhaps milk too were considered to be important.

Some goat bones and teeth were found. Most of these belonged to young kid, known to have once been a great delicacy at the high table. This animal declined in importance after the 16th-17th centuries, which seems to agree with contemporary writers on the subject.

The diners at Launceston castle, especially during its early periods of occupation, were without doubt from the privileged classes as is indicated not only by the consumption of highly esteemed birds such as crane, swan, partridge, woodcock, plovers, etc. (more common in the earlier periods) but also by the abundant cervid bones, most of which derive from the hind limbs.

The diet of these privileged people, like most inhabitants of castles, was much more varied than their fellow inhabitants in towns and villages. Moreover, at Launceston a strong maritime connection is suggested by the abundant fish bones, and by the presence of whale, dolphin, and marine species of birds such as shearwater (perhaps from the Scillies) and gannet.

Both sheep and cattle increased markedly in size during the period Launceston Castle was occupied—cattle appear to have done so quite rapidly between the 15th and 16th/17th century, sheep rather more gradually between the 15th and the 18th/19th century. These size increases have been reported from other contemporary sites in different parts of England and we strongly believe they signify a countrywide improvement of the nation's sheep and cattle. The pigs appear to have changed size in a somewhat complicated way, which may reflect two different factors at play. The teeth show a small *decrease* in size between Period 8 and 9 followed by an increase between Periods 9 and 10+11. The post-cranial bones show a continuous trend towards increased size, and the large increase in size of the hind-limb bones may be reflecting a general change in shape, possibly a result of the supposed import of Chinese stock in the 18th century.

As well as increasing in size between Periods 8 and 9 (15th-16th/17th centuries), cattle metapodials became more slender at their distal ends which we suggest signifies a genetic change of the local cattle, in turn possibly a result of the import of new breeding animals. This appears to coincide with historical records indicating that Dutch cattle (pied milkers) were coming into the country at that time, as well as a supposed increase in the movement of breeding stock around the country.

We argue that the size increase of the cattle and sheep and the change in shape of the cattle metapodials serve as evidence for the onset of the Agricultural Revolution. If this is so, then it commenced in the 16th and 17th centuries and not the 18th and 19th centuries: supporting the arguments put forward by Kerridge (1967) and others.

Acknowledgements

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Tables 1-31 appear on the following pages (65-97); the *Appendix*, which includes Tables 32-77, begins on p. 99.

Period	1 n	2 n	3 n	4 n	5 n	6 n	**6** **%**	7 n	8 n	**8** **%**	9 n	**9** **%**	10+11 n	**10+11** **%**
Cattle	12	-	42	33	72.5	397.5	**19**	23	1185	**30**	577.5	**40**	690.5	**43**
Sheep/goat	1	-	52	23	24	427	**21**	4	854.5	**22**	409.5	**28**	569	**36**
(sheep	-	-	5	1	3	61	-	-	83	-	47	-	98	-)
(goat	-	-	1	-	2	12	-	-	8	-	1	-	1	-)
Pig	5.5	2	55.5	41.5	25.5	463.5	**22**	2	764.5	**19**	156.5	**11**	138	**9**
Fallow deer	-	-	1	-	2	64.5	**3**	-	324	**8**	45	**3**	33.5	**2**
Red deer	3	-	2	4	4.5	16	**1**	-	15	-	3	-	2	-
Roe deer	-	1	1	2	3	13	**1**	1	24.5	**1**	7	-	1	-
Horse	1	1	5	8	2	7	-	4	42	**1**	102	**7**	54	**3**
Hare	1	-	1	1	1.5	24	**1**	1	49.5	**1**	3	-	4.5	-
Rabbit	-	-	-	-	-	19	**1**	-	19.5	-	13	**1**	3	-
Dog	-	2	1	14	6	17	**1**	-	23	**1**	60	**4**	55	**3**
Fox	-	-	3	-	-	3	-	-	22	**1**	1	-	-	-
Cat	-	-	-	1	-	7	-	-	8	-	2	-	5.5	-
Badger	-	-	-	-	-	-	-	-	1	-	-	-	1	-
Hedgehog	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Rat	-	-	-	-	-	4	-	-	1	-	2	-	1	-
Common dolphin	-	-	-	-	-	+	-	-	1	-	-	-	-	-
Whale	-	-	+	-	+	+	-	-	+	-	+	-	+	-
Chicken	-	1	4	11	21	472	**23**	1	497	**13**	40	**3**	39	**2**
Grey partridge	-	-	-	-	-	16	**1**	-	13	-	-	-	-	-
Quail	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Turkey	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Goose	-	-	1	3	2	52	**3**	-	77	**2**	12	**1**	2	-
Duck	-	-	-	-	-	4	-	-	5	-	1	-	-	-
Swan (?mute)	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Woodcock	-	-	3	2	5	19	**1**	-	8	-	7	-	1	-
Snipe	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Curlew	-	-	-	-	-	-	-	-	-	-	1	-	-	-
?Redshank	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Lapwing	-	-	-	-	-	1	-	-	1	-	-	-	-	-

Table 1 (above and continued overleaf). Numbers of mammal and bird bones in all levels at Launceston Castle (sieved samples are not included). Sheep/goat and golden/grey plover also include the specimens identified at species level. Cases where only 'non-countable' bones such as a whale vertebra were present are denoted by a '+'. Percentages are given for periods whose total numbers of countable bones exceed 250, i.e. Periods 6, 8, 9, and 10+11.

Golden/grey plover	-	-	1	2	1	8	-	-	3	-	1	-	-	-
(Golden plover	-	-	-	1	-	5	-	-	-	-	1	-	-	-)
(Grey plover	-	-	-	-	-	1	-	-	-	-	-	-	-	-)
Red kite	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Kestrel	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Pigeon	-	-	-	-	-	4	-	-	1	-	-	-	-	-
Gannet	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Grey heron	-	-	-	-	-	-	-	-	6	-	-	-	-	-
Crane	-	-	-	-	-	1	-	-	+	-	-	-	-	-
Manx shearwater	-	-	-	-	-	11	1	-	1	-	-	-	-	-
Raven	-	-	-	-	-	1	-	-	2	-	-	-	1	-
Crow/rook	-	-	-	1	-	3	-	-	5	-	-	-	-	-
Small corvid	-	-	-	-	-	4	-	-	1	-	5	-	-	-
?Shrike	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Turdid	-	-	-	-	-	2	-	-	3	-	1	-	-	-
Total	23.5	9	172.5	148.5	174.5	2060.5		36	3956.5		1448.5		1602	

Period	1 n	6 n	8 n
Cattle	-	1	-
Sheep/goat	-	10	-
(sheep	-	2	-)
(goat	-	2	-)
Pig	-	10	4
Hare	-	1	5
Rabbit	-	3	12
Cat	-	2	1
Rat	-	4	-
Wood mouse	-	1	6
Hedgehog	-	1	-
Mole	-	-	+
Chicken	1	25	18
Grey partridge	1	7	5
Goose	-	1	-
Pigeon	-	2	-
Woodcock	6	8	2
Snipe	-	1	-
Plover	-	2	5
Manx shearwater	-	1	-
Crow/rook	-	1	-
Corvid	-	2	-
Turdid	3	4	1
Total	11	91	59

Table 2 (left). Numbers of mammal and bird bones from sieved samples at Launceston Castle. Sheep/goat also includes the specimens identified at species level. Cases where only 'non-countable' bones were present are denoted by a '+'.

	Period 3				Period 4				Period 5				Period 6			
	S	?S	?G	G	S	?S	?G	G	S	?S	?G	G	S	?S	?G	G
Milk teeth	1	-	-	1	-	-	-	-	1	-	-	1	2	-	1	10
Astragalus	3	-	-	-	-	-	-	-	1	-	-	-	21	-	-	1
Fused metacarpal	-	-	-	-	1	-	-	-	1	-	-	1	19	-	-	-
Fused metatarsal	1	-	-	-	-	-	-	-	-	-	-	-	21	-	-	-
Total	5	-	-	1	1	-	-	-	3	-	-	2	63	-	2	12

	Period 8				Period 9				Period 10+11			
	S	?S	?G	G	S	?S	?G	G	S	?S	?G	G
Milk teeth	8	-	-	6	13	-	-	1	5	-	-	1
Astragalus	45	2	-	-	12	-	-	-	15	1	-	-
Fused metacarpal	15	-	-	-	10	-	-	-	34	-	-	-
Fused metatarsal	15	-	-	-	12	-	-	-	44	-	-	-
Total	83	2	4	8	47	-	-	1	98	1	-	1

Table 3. Numbers of sheep and goat teeth and bones at Launceston Castle. The identifications were made on the basis of the criteria suggested by Boessneck (1969) and Payne (1969; 1985). S = sheep, G = goat.

Period			Tooth wear stage				Comments
	dP_2	dP_3	dP_4	M_1	M_2	M_3	
10		P	14L				
9	P	P					
8			P				
8		P	7L	V			
8			4A				
8			4A				
8			2B				
8		P	13L	U			
6			8A				
6		P	5A				
6	P	P	10N	E			
6			0				
6			0				
6			0				
6			0				
6	P	P					
6			0				?goat
6		P					from sieved samples
6		P					from sieved samples
5	P	P	P				
3		P	16L	8A	2A		

Period	Bone		Fusion	Comments
8	Metacarpal	shaft	U	v juv
8	Metacarpal	shaft	U	v juv
8	Metatarsal	shaft	U	v juv, ?goat
8	Metatarsal	shaft	U	v juv, ?goat
8	Metacarpal	shaft	U	?goat
8	Metacarpal	shaft	U	?goat
6	Metacarpal	shaft	U	?foetal longitudinally unfused, ?goat
6	Metacarpal	shaft	U	v juv
6	Humerus	distal	F	
6	Astragalus			?female
5	Metacarpal	distal	F	
4	Radius		proximal	F

Table 4. Summary of the goat teeth and bones found at Launceston Castle (P denotes presence of tooth, wear stage not recorded).

Period	1	2	3	4	5	6	6	7	8	8	9	9	10+11	10+11
	n	n	n	n	n	n	%	n	n	%	n	%	n	%
Cattle	12	-	42	33	72.5	397.5	**29**	23	1185	**37**	577.5	**48**	690.5	**48**
Sheep/goat	1	-	52	23	24	427	**31**	4	854.5	**27**	409.5	**34**	569	**40**
Pig	5.5	2	55.5	41.5	25.5	463.5	**34**	2	764.5	**24**	156.5	**13**	138	**10**
Red deer	3	-	2	4	4.5	16	**1**	-	15	-	3	-	2	-
Fallow deer	-	-	1	-	2	64.5	**5**	-	324	**10**	45	**4**	33.5	**2**
Roe deer	-	1	1	2	3	13	**1**	1	24.5	**1**	7	**1**	1	-
Totals	21.5	3	153.5	103.5	131.5	1381.5		30	3167.5		1198.5		1434	

Table 5. Numbers of the artiodactyls in all levels (unsieved collection). Percentages are given for levels whose total numbers of bones exceed 250, i.e. levels 6, 8, 9, and 10+11.

Period	1	2	3	4	5	6	6	7	8	8	9	9	10+11	10+11
	n	n	n	n	n	n	%	n	n	%	n	%	n	%
Cattle	12	-	42	33	72.5	397.5	**31**	23	1185	**42**	577.5	**51**	690.5	**49**
Sheep/goat	1	-	52	23	24	427	**33**	4	854.5	**30**	409.5	**36**	569	**41**
Pig	5.5	2	55.5	41.5	25.5	463.5	**36**	2	764.5	**27**	156.5	**14**	138	**10**
Totals	18.5	2	149.5	97.5	122	1288		290	2804		1143.5		1397.5	

Table 6. Numbers of the three main species in all levels (unsieved collection). Percentages are given for levels whose total numbers of bones exceed 250, i.e. levels 6, 8, 9, and 10+11.

Period	6	6	8	8	9	9	10+11	10+11
	n	%	n	%	n	%	n	%
Cattle	22 (AS,CA)	**23**	55 (MT)	**25**	42 (CA)	**39**	52 (CA)	**43**
Sheep/goat	40 (TI)	**43**	104 (TI)	**47**	50 (HU)	**47**	57 (HU)	**47**
Pig	32 (CAN)	**34**	62 (CAN)	**28**	15 (M1/2)	**14**	11 (CAN)	**9**

Table 7. Minimum Number of Individuals of the three main species (unsieved collection). Those parts of the skeleton which indicated the highest MNI are given in parentheses. CAN=canine, M1/2=first or second lower molar, HU=humerus, TI=tibia, AS=astragalus, CA=calcaneum, MT=metatarsal.

Period	6		8		9		10+11		Total	
	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Incisor	3	**14**	13	**25**	3	**7**	3	**6**	22	**14**
dP_4+P_4	7	**32**	30	**57**	13	**31**	11	**21**	61	**40**
$M_{1/2}$	11	**50**	47	**89**	11	**26**	9	**17**	78	**51**
M_3	11	**50**	43	**81**	11	**26**	13	**25**	78	**51**
Scapula	15	**68**	22	**41**	18	**43**	14	**27**	69	**45**
Humerus	8	**36**	19	**36**	11	**26**	19	**37**	57	**37**
Femur	2	**9**	8	**15**	10	**24**	10	**19**	30	**20**
Radius	4	**18**	14	**26**	11	**26**	8	**15**	37	**24**
Tibia	14	**64**	36	**68**	29	**69**	29	**56**	108	**71**
Astragalus	22	**100**	43	**81**	28	**67**	48	**92**	141	**93**
Calcaneum	22	**100**	36	**68**	42	**100**	52	**100**	152	**100**
Metacarpal	7	**32**	45	**83**	16	**36**	16	**31**	84	**55**
Metatarsal	11	**55**	55	**100**	18	**40**	30	**58**	114	**75**
Phalanx 1	8	**36**	14	**26**	10	**24**	14	**27**	46	**30**
Phalanx	4	**18**	5	**9**	4	**10**	3	**6**	16	**11**
Total	149		430		235		279		1093	

Table 8. Cattle from Launceston Castle. MNI (Minimum number of individuals) by anatomical element.

Unfused epiphyses are not counted. Incisors and phalanges have been divided by 8, M1/M2 by 4, all other elements by 2. Metacarpal = (MC1 + MC2/2 + MP1/2 + MP2/4)/2. Metatarsal = (MT1 + MT2/2 + MP1/2 + MP2/4)/2. MC1 = complete distal metacarpal. MC2 = half distal metacarpal. MT1 = complete distal metatarsal MT2 = half distal metatarsal. MP1 = complete distal metapodial. MP2 = half distal metapodial. % = frequency of an element expressed in relation to the most common one.

Period	6		8		9		10+11		Total	
	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Incisor	1	**2**	1	**1**	-	**0**	-	**0**	2	**1**
dP_4+P_4	6	**15**	29	**28**	16	**32**	16	**31**	67	**30**
$M_{1/2}$	8	**20**	36	**35**	20	**40**	23	**44**	87	**38**
M_3	12	**30**	36	**35**	21	**42**	31	**60**	100	**44**
Scapula	17	**42**	23	**22**	18	**36**	29	**56**	87	**38**
Humerus	27	**67**	57	**55**	50	**100**	57	**100**	186	**82**
Femur	7	**17**	16	**15**	12	**24**	13	**21**	46	**20**
Radius	17	**42**	45	**43**	14	**28**	17	**33**	93	**41**
Tibia	40	**100**	104	**100**	34	**68**	54	**92**	226	**100**
Astragalus	14	**35**	31	**30**	12	**14**	10	**19**	62	**27**
Calcaneum	15	**37**	23	**22**	13	**16**	9	**17**	55	**24**
Metacarpal	11	**27**	11	**11**	6	**12**	19	37	47	**21**
Metatarsal	13	**32**	13	**12**	8	**16**	23	**44**	57	**25**
Phalanx 1	6	**15**	4	**4**	2	**4**	4	**8**	16	**7**
Phalanx 3	1	**2**	1	**1**	1	**2**	-	**0**	3	**1**
TOTAL	195		430		217		292		1134	

Table 9. Sheep from Launceston Castle. MNI (Minimum number of individuals) by anatomical elements.

Unfused epiphyses are not counted. Incisors and phalanges have been divided by 8, M1/M2 by 4, all other elements by 2. Metacarpal = (MC1 + MC2/2 + MP1/2 + MP2/4)/2. Metatarsal = (MT1 + MT2/2 + MP1/2 + MP2/4)/2. MC1 = complete distal metacarpal. MC2 = half distal metacarpal. MT1 = complete distal metatarsal. MT2 = half distal metatarsal. MP1 = complete distal metapodial. MP2 = half distal metapodial. % = frequency of an element expressed in relation to the most common one.

Period	6		8		9		10+11		Total	
	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Incisor	14	**44**	20	**32**	4	**27**	4	**36**	42	**36**
Canine	32	**100**	62	**100**	13	**87**	11	**100**	118	**100**
dP_4+P_4	22	**69**	52	**84**	11	**73**	7	**64**	92	**78**
$M_{1/2}$	27	**84**	56	**90**	15	**100**	9	**81**	107	**91**
M_3	19	**59**	38	**61**	14	**93**	7	**64**	78	**66**
Scapula	5	**16**	11	**18**	4	**27**	3	**27**	23	**19**
Humerus	12	**37**	15	**24**	6	**40**	6	**55**	39	**33**
Femur	1	**3**	2	**3**	1	**7**	1	**9**	5	**4**
Radius	9	**28**	10	**16**	3	**20**	4	**36**	26	**22**
Tibia	12	**37**	19	**31**	3	**20**	4	**36**	38	**32**
Astragalus	10	**31**	11	**18**	2	**13**	3	**27**	26	**22**
Calcaneum	13	**41**	17	**27**	3	**20**	2	**18**	35	**30**
Metacarpal	10	**31**	19	**31**	1	**7**	2	**18**	32	**27**
Metatarsal	10	**31**	17	**27**	2	**13**	2	**18**	31	**26**
Phalanx 1	4	**12**	5	**8**	1	**7**	1	**9**	11	**9**
Phalanx 3	1	**3**	2	**3**	-	**0**	1	**9**	4	**3**
Total	201		356		83		67		707	

Table 10. Pig from Launceston Castle. MNI (Minimum number of individuals) by anatomical elements.

Unfused epiphyses are not counted. Incisors have been divided by 6, phalanges by 8, M1/M2 by 4, all other elements by 2. Metacarpal = (MC/2 + MP/4)/2. Metatarsal = (MT/2 + MP/4)/2. MC = metacarpal. MT = metatarsal. MP = metapodial. % = frequency of an element expressed in relation to the most common one.

Period	6	8		9	10+11	Total	
	MNI	MNI	%	MNI	MNI	MNI	%
Incisor	1	1	**3**	-	-	2	**4**
dP_4+P_4	3	4	**11**	-	-	7	**14**
$M_{1/2}$	3	5	**14**	-	1	9	**16**
M_3	2	4	**11**	-	1	7	**14**
Scapula	-	-	**0**	1	-	1	**2**
Humerus	1	3	**8**	1	2	7	**14**
Femur	1	2	**6**	-	1	4	**8**
Radius	-	2	**6**	-	-	2	**4**
Tibia	6	32	**89**	6	6	50	**100**
Astragalus	10	23	**64**	4	2	39	**78**
Calcaneum	3	16	**44**	1	1	21	**42**
Metacarpal	1	5	**14**	2	-	8	**16**
Metatarsal	4	36	**100**	5	3	48	**96**
Phalanx 1	1	8	**22**	1	1	11	**22**
Phalanx 3	-	1	**3**	-	-	1	**2**
Total	36	142		21	18	217	

Table 11. Fallow deer from Launceston Castle. MNI (Minimum number of individuals) by anatomical element.

Unfused epiphyses are not counted. Incisors and phalanges have been divided by 8, M1/M2 by 4, all other elements by 2. Metacarpal = (MC1 + MC2/2 + MP1/2 + MP2/4) / 2. Metatarsal = (MT1 + MT2/2 + MP1/2 + MP2/4) / 2. MC1 = complete distal metacarpal. MC2 = half distal metacarpal. MT1 = complete distal metatarsal. MT2 = half distal metatarsal. MP1 = complete distal metapodial. MP2 = half distal metapodial. % = frequency of an element expressed in terms of the most common one.

	Red deer				Roe deer				Horse			
Period	6	8	9	10+11	6	8	9	10+11	6	8	9	10+11
Teeth	4	3	1	1	1	10	-	-	-	15	26	18
Scapula	-	-	-	-	2	2	2	-	-	1	9	1
Humerus	-	-	1	-	2	3	4	-	-	2	8	2
Femur	-	-	-	-	-	-	-	-	-	-	3	-
Radius	-	2	-	-	-	1	-	-	-	4	4	2
Tibia	1	-	-	-	-	1	1	1	2	2	13	6
Astragalus	3	2	1	1	-	-	-	-	1	-	5	6
Calcaneum	3	-	-	-	-	-	-	-	-	-	5	2
Metacarpal	-	-	-	-	2	3	-	-	2	3	5	-
Metatarsal	-	1	-	-	3	5	-	-	-	2	5	1
Phalanx 1	-	4	-	-	1	2	-	-	1	8	10	9
Phalanx 3	1	-	-	-	1	-	-	-	-	-	4	5

	Dog				Fox				Cat			
Period	6	8	9	10+11	6	8	9	10+11	6	8	9	10+11
Teeth	3	3	12	9	1	2	1	-	1	5	-	1
Scapula	-	2	1	3	-	1	-	-	-	-	-	-
Humerus	4	4	9	9	-	5	-	-	2	2	1	2
Femur	2	2	2	-	-	4	-	-	1	-	-	2
Radius	1	2	2	5	-	-	-	-	-	-	-	-
Tibia	1	1	8	3	-	3	-	-	2	1	1	-
Astragalus	1	1	-	2	-	1	-	-	-	-	-	-
Calcaneum	-	-	2	1	-	1	-	-	-	-	-	-
Metacarpal	2	2	12	1	-	2	-	-	-	-	-	-
Metatarsal	1	2	4	6	-	1	-	-	-	-	-	1
Phalanx 1	1	3	4	6	-	-	-	-	-	-	-	-
Phalanx 3	-	-	2	2	-	-	-	-	-	-	-	-

	Hare				Rabbit				Rat			
Period	6	8	9	10+11	6	8	9	10+11	6	8	9	10+11
Teeth	1	4	-	-	4	4	3	-	-	-	-	-
Scapula	1	1	-	-	4	-	-	-	-	-	-	-
Humerus	8	15	1	2	7	7	5	1	1	-	-	-
Femur	-	1	-	-	2	3	3	1	3	1	1	1
Radius	1	2	-	-	-	-	1	-	-	-	-	-
Tibia	1	11	2	2	-	2	-	1	-	-	1	-
Astragalus	-	2	-	-	-	-	-	-	-	-	-	-
Calcaneum	2	5	-	-	-	-	-	-	-	-	-	-
Metacarpal	1	3	-	-	-	2	-	-	-	-	-	-
Metatarsal	11	12	-	-	4	3	2	-	-	-	-	-
Phalanx 1	1	-	-	-	-	-	-	-	-	-	-	-
Phalanx 3	-	-	-	-	-	-	-	-	-	-	-	-

Table 12. Less common mammals recorded at Launceston Castle. Number of specimens by anatomical elements (sieved samples are not included).

Period	Chicken 6	8	9	10+11	Grey partridge 6	8	9	10+11
Scapula	58	16	3	1	-	1	-	-
Humerus	95	139	9	12	4	2	-	-
Femur	90	114	8	8	-	-	-	-
Tibio-tarsus	97	90	10	10	1	2	-	-
Tarso-metatarsus	114	127	8	6	11	8	-	-
Period	**Goose 6**	**8**	**9**	**10+11**	**Duck 6**	**8**	**9**	**10+11**
Scapula	9	4	1	-	-	1	-	-
Humerus	4	12	-	-	-	-	-	-
Femur	7	7	1	1	-	-	-	-
Tibio-tarsus	17	17	3	1	1	1	1	-
Tarso-metatarsus	14	35	7	1	1	2	-	-
Period	**Woodcock 6**	**8**	**9**	**10+11**	**Golden/Grey plover 6**	**8**	**9**	**10+11**
Scapula	-	-	2	-	-	-	-	-
Humerus	9	7	2	1	4	3	1	1
Femur	1	1	-	-	-	-	-	-
Tibio-tarsus	4	-	1	-	-	-	-	-
Tarso-metatarsus	5	-	1	-	4	-	-	-
Period	**Manx shearwater 6**	**8**	**9**	**10+11**	**Pigeon 6**	**8**	**9**	**10+11**
Scapula	-	-	-	-	-	-	-	-
Humerus	-	-	-	-	3	-	-	-
Femur	1	-	-	-	-	-	-	-
Tibio-tarsus	10	1	-	-	-	-	-	-
Tarso-metatarsus	-	-	-	-	1	1	-	-

Table 13. Birds: numbers of specimens by anatomical elements (material from sieved samples is not included).

	Periods 6 & 8				Periods 9, 10 & 11			
	Fused		Unfused		Fused		Unfused	
Element	n	%	n	%	n	%	n	%
Scapula	48	**100**	-	**0**	44	**90**	5	**10**
Humerus d	53	**100**	-	**0**	54	**93**	4	**7**
Radius d	29	**83**	6	**17**	30	**81**	7	**19**
Metacarpal d	102	**95**	5	**5**	56	**89**	7	**11**
Femur d	15	**75**	5	**25**	32	**82**	7	**18**
Tibia d	94	**97**	3	**3**	105	**91**	10	**9**
Calcaneum	43	**67**	21	**33**	77	**60**	51	**40**
Metatarsal d	121	**90**	13	**10**	77	**82**	17	**18**
Phalanx 1 p	169	**99**	1	**1**	176	**97**	5	**3**

Table 14. Cattle: data concerning fused + fusing versus unfused diaphyses (p=proximal, d=distal).

	Period	C	V	E	H	a	b	c	d	e	f	g	h	j	k	l	m	n	o	p
dP_4	6						1													
	8						4	2	1						1	2	1			
	9						3	7	4					1						
	10+11							12						1						
P_4	6								2		6	2	3							
	8					2	4			1	10	25	6							
	9					1	1	3		1	2	2	1							
	10+11										2	2	3	1						
M_1	6													1	2	4				
	8												1	1	8	11	8			1
	9						1					1		1	5	5				
	10+11					1									1	2		1		
M_2	6											1		2	6	1				
	8							1			1	2		6	17	6	4			
	9											3		1	7	1				
	10+11												3		4	2				
$M_{1/2}$	6									1		2		2	9	7	3		1	
	8							1		2	4	19	2	11	39	25	8		1	
	9										1	2	1	2	5	3	1			
	10+11										3	1	2	3	6					1
M_3	6										1	8		9	1		1			
	8			1		2	2	3	1		10	24	4	16	10	4	6			
	9	1				1	1	1	1	1	1	6		1	3		2			
	10+11						3	1		3	2	5	2	5	2	2				

Table 15. Cattle wear stages of individual teeth (following Grant 1982). Both teeth in mandibles and isolated teeth are included. Grant's stage 'U' is considered equivalent to stage 'a'. Isolated teeth which could have been in one of the eruption stages (C,V,E,H) are coded as 'a'.

	Period	C	V	E	H	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19
dP_4	6																							
	8								1		1		1						2			2		2
	9																		2	2		2	1	
	10+11												1						2					
P_4	6										1		1	1	5			1		2				
	8				1			1					10	13	13			6		3				
	9							1			1	1	3	2	9		1	2		1				
	10+11							2	1			1	3	3	9		2	6		2				
M_1	6														8						2			
	8			1		2							2	2	26		5	3		2	8			
	9					1							2	5	15	1		2			2			
	10+11						1	1						1	20	1	3				3			
M_2	6											1	1	2	8	1								
	8								2				2	7	36	1	1	2						
	9							3			1		2	1	17		1				1			
	10+11					1					1		2	6	23		1							
$M_{1/2}$	6														5	1								
	8							1			1	1	5	2	28						1			
	9							2			1	1	6		13		1							
	10+11												6	3	17									
M_3	6							2		1	1	2			5	2	11							
	8					2		4		4		5	9	8	9	2	26							
	9							3		3	2		1	7	7	6	11		1					
	10+11		1				1	3		5	4	6	2	11	3	3	16							

Table 16. Sheep: wear stages of individual teeth (following Payne 1973; 1987). Both teeth in mandibles and isolated teeth are included. Isolated teeth which could have been in one of the eruption stages (C,V,E,H) are coded as 'a'.

	age ranges	tooth	wear stage	% killed within age range	cumulative % killed	age
Period 10+11	0-2 years	3 dP_4		9	9	*c.* 2 years
	>2 years	29 P_4		91		
	2-3 years	9 M_3	2-4	15	24	*c.* 3 years
	3-5 years	29 M_3	5-10	49	73	*c.* 5 years
	6-10 years	16 M_3	11G	27	100	*c.* 10 years
	>10 years	-	>11G	0		
Period 9	0-2 years	11 dP_4		34	34	*c.* 2 years
	>2 years	21 P_4		66		
	2-3 years	6 M_3	2-4	10	44	*c.* 3 years
	3-5 years	23 M_3	5-10	37	81	*c.* 5 years
	6-10 years	11 M_3	11G	18	99	*c.* 10 years
	>10 years	1 M_3	>11G	2	100	
Period 8	0-2 years	10 dP_4		18	18	*c.* 2 years
	>2 years	46 P_4		82		
	2-3 years	8 M_3	2-4	10	28	*c.* 3 years
	3-5 years	33 M_3	5-10	40	68	*c.* 5 years
	6-10 years	26 M_3	11G	32	100	*c.* 10 years
	>10 years	-	>11G	0		
Period 6	0-2 years	1 dP_4		8	8	*c.* 2 years
	>2 years	11 P_4		92		
	2-3 years	3 M_3	2-4	11	19	*c.* 3 years
	3-5 years	10 M_3	5-10	38	57	*c.* 5 years
	6-10 years	11 M_3	11G	42	100	*c.* 10 years
	>10 years	-	>11G	0		

Table 17. Sheep: kill-off pattern deduced from teeth (dP_4/P_4 and M_3), both single and in mandibles, using the system suggested by Payne (1988). Unworn P_4s are included and wear stages are as in Payne (1973).

	Periods 6 & 8				Periods 9, 10 & 11			
	Fused		Unfused		Fused		Unfused	
Element	n	%	n	%	n	%	n	%
Scapula	49	**86**	8	**14**	62	**98**	1	**2**
Humerus d	154	**93**	12	**7**	201	**99**	2	**1**
Radius d	96	**78**	27	**22**	55	**90**	6	**10**
Metacarpal d	34	**79**	9	**21**	44	**92**	4	**8**
Femur d	34	**76**	11	**24**	32	**71**	13	**29**
Tibia d	280	**98**	7	**2**	160	**98**	4	**2**
Calcaneum	60	**86**	10	**14**	26	**90**	3	**10**
Metatarsal d	38	**73**	14	**27**	56	**89**	7	**11**
Phalanx 1 p	62	**97**	2	**3**	29	**88**	4	**12**

Table 18. Sheep: fused + fusing versus unfused diaphyses. p=proximal, d=distal.

	Period	C	V	E	H	a	b	c	d	e	f	g	h	j	k	l	m	n
dP_4	6					1						2	1			1		
	8							1	2		1	1	2	4	4	1		
	9					1			1			1	1	1	1			
	10+11								1		1			1				
P_4	6					5	18	4	3	2	4	1						
	8					28	29	6	7	8	4	1						
	9			1		5	6	2		2								
	10+11		1			1	5	2	1	1								
M_1	6							4	9	3	3	5	9	3	1		3	1
	8					1	2	9	21	11	11	10	15	3	7	2	5	3
	9		1				2	2	3	2	4	4		3	1	2	3	
	10+11			1		1	1	2		2	1	3		1	2		1	
M_2	6			1	1	12	10	4	4	8	4	1		3	3			
	8		1			30	16	24	13	8		5	1	2	2			
	9		2	2		7	2	1	5	2	2	1		1	1			
	10+11		1	1		4		3	5			1	1		1			
$M_{1/2}$	6					5	1		3	2	1	2						
	8					3	3	2	5		1			1	1		1	
	9						1			1		1			1			
	10+11						1											
M_3	6	1	3	4	1	11	3	6	3	1	1							
	8	2	11	7	4	35	7	5		3				2				
	9	1	3	2	4	9	2	2	1	2		1						
	10+11		2	1	1	4	3	2										

*Table 19. **Pig**: wear stages of individual teeth (following Grant 1982). Both teeth in mandibles and isolated teeth are included. Grant's stage 'U' is considered equivalent to stage 'a'. Isolated teeth which could have been in one of the eruption stages (C,V,E,H) are coded as 'a'.*

	Periods 6 & 8				Periods 9, 10 & 11			
	Fused		Unfused		Fused		Unfused	
Element	n	%	n	%	n	%	n	%
Scapula	17	**74**	6	**26**	7		2	
Humerus d	46	**87**	7	**13**	22	**92**	2	**8**
Radius d	-	**0**	36	**100**	-	**0**	14	**100**
Metacarpal d	12	**16**	62	**84**	-		7	
Femur d	-		6		-		2	
Tibia d	16	**27**	44	**73**	7	**54**	6	**46**
Calcaneum	3	**6**	44	**94**	1		6	
Metatarsal d	6	**9**	59	**91**	2		4	
Phalanx 1 p	25	**37**	43	**63**	5		3	

Table 20. Pig: fused + fusing versus unfused diaphyses. d= distal, p=proximal.

	Periods 6 & 8				Periods 9, 10 & 11			
	Fused		Unfused		Fused		Unfused	
Element	n	%	n	%	n	%	n	%
Scapula	-		-		2		-	
Humerus d	5		-		5		-	
Radius d	3		-		-		-	
Metacarpal d	7		2		2		-	
Femur d	3		-		1		-	
Tibia d	71	**97**	2	**3**	24	**100**	-	**0**
Calcaneum d	20	**69**	9	**31**	1		1	
Metatarsal d	53	**71**	22	**29**	11	**85**	2	**15**
Phalanx 1 d	59	**94**	4	**6**	7		2	

Table 21. Fallow deer: fused + fusing versus unfused diaphyses. d=distal, p=proximal.

Period	Females	Males
10+11	7 (0)	15 (3)
9	6 (2)	20 (1)
8	21 (1)	101 (17)
6	19 (1)	44 (10)
total	53 (4)	180 (31)

Table 22. Numbers of sexed pig mandibles at Launceston Castle (this includes isolated canines and mandibles with canines). The numbers of canines in mandibles is given in parenthesis.

Period	N asymmetric metatarsals	N_1	% asymmetric metatarsals	r	N_2
9+10+11	4	64	6	0.924	44
10+11	3	41	7	0.938	27
9	1	23	4	0.899	17
(6+8				*0.875*	*84)*
6+8	15	110	14	0.810	85
8	12	94	13	0.795	74
6	3	16	19	0.737	11

Table 23. 'Asymmetry' of cattle metatarsals. N = the number of asymmetric metatarsals (i.e. with a medial widening of the medial condyle). N_1 = the total number of metatarsals. r = the correlation coefficient of measurement 'a' (width of medial condyle) with measurement 'b' (width of lateral condyle). N_2 = the number of metatarsals used to calculate r (less than N_1 since some were damaged and could not be measured). In the italicised line (in parentheses) a single very asymmetric specimen (see Fig. 23) has been excluded from the calculation of r). The difference between r for periods 6+8 (outlier excluded) and 9+10+11 is not significant (with a 20-30% probability that the difference is due to chance; see Simpson, Roe and Lewontin 1960, 246).

Table 24 (opposite and page 84). Cattle: means, coefficients of variation (V), ranges and sample sizes for selected measurements. Fusing bones are included, unfused ones are not. A few measurements are approximated. All the measurements are in tenths of millimetres.

Measurement	Mean	V	Minimum	Maximum	N
ALL PERIODS					
M_3L	334	6.8	285	396	116
M_3WA	145	6.6	121	175	150
Humerus BT	683	9.3	548	845	61
Humerus HTC	301	10.4	236	380	82
Tibia Bd	541	10.5	433	714	149
Astragalus GLl	597	10.6	467	761	193
Astragalus Bd	383	11.1	296	507	197
Astragalus Dl	331	11.0	262	445	172
Metacarpal GL	1784	9.6	1510	2228	29
Metacarpal SD	290	12.1	226	384	28
Metacarpal Bd	533	9.4	441	673	123
Metacarpal BatF	480	9.8	390	637	111
Metacarpal Ddm (2)	252	9.2	210	351	107
Metatarsal GL	2043	9.0	1710	2570	40
Metatarsal SD	233	11.0	189	307	39
Metatarsal Bd	496	9.4	395	661	147
Metatarsal BatF	457	10.8	360	627	145
Metatarsal Ddm (2)	250	9.9	208	341	132
PERIODS 10 & 11					
M_3L	356	5.9	309	385	17
M_3WA	155	6.4	138	175	22
Humerus BT	718	6.9	621	845	25
Humerus HTC	325	8.8	253	380	29
Tibia Bd	575	7.3	471	665	39
Astragalus GLl	650	7.5	536	761	56
Astragalus Bd	413	8.0	338	500	62
Astragalus Dl	363	8.3	295	445	50
Metacarpal GL	1931	8.6	1690	2228	9
Metacarpal SD	307	10.6	253	359	8
Metacarpal Bd	559	9.4	478	673	24
Metacarpal BatF	516	10.4	409	637	22
Metacarpal Ddm (2)	271	10.3	220	351	18
Metatarsal GL	2237	8.0	1930	2570	10
Metatarsal SD	259	11.2	218	307	10
Metatarsal Bd	526	10.5	431	661	30
Metatarsal BatF	501	12.0	374	627	32
Metatarsal Ddm (2)	274	11.1	227	341	26
PERIOD 9					
M_3L	344	8.9	290	396	12
M_3WA	150	7.9	132	170	13
Humerus BT	688	9.9	588	806	11
Humerus HTC	303	7.1	274	348	14
Tibia Bd	568	9.9	445	707	30
Astragalus GLl	633	8.9	486	751	38
Astragalus Bd	406	9.9	311	507	38
Astragalus Dl	346	9.5	269	415	32
Metacarpal GL	1870	5.7	1770	2015	6
Metacarpal SD	301	15.4	261	384	6
Metacarpal Bd	547	10.5	449	656	20
Metacarpal BatF	493	10.4	411	593	18
Metacarpal Ddm (2)	256	11.4	217	327	16
Metatarsal GL	2088	5.6	1873	2238	8
Metatarsal SD	229	8.4	189	259	8
Metatarsal Bd	498	10.1	434	641	20
Metatarsal BatF	459	10.5	381	561	19
Metatarsal Ddm (2)	255	9.5	214	305	17

Table 24 (continued)

Measurement	Mean	V	Minimum	Maximum	N
PERIOD 8					
M_3L	330	5.7	285	373	56
M_3WA	143	5.7	126	167	76
Humerus BT	653	8.4	573	773	18
Humerus HTC	284	8.8	242	342	26
Tibia Bd	517	11.3	433	714	51
Astragalus GLl	556	7.1	467	709	62
Astragalus Bd	353	8.0	296	428	61
Astragalus Dl	308	7.4	262	393	56
Metacarpal Gl	1665	5.0	1510	1780	10
Metacarpal SD	275	11.0	226	317	10
Metacarpal Bd	522	8.6	446	600	69
Metacarpal BatF	466	7.8	395	537	62
Metacarpal Ddm (2)	247	7.1	210	279	63
Metatarsal GL	1958	6.3	1710	2170	17
Metatarsal SD	224	7.8	192	260	16
Metatarsal Bd	487	8.5	395	598	82
Metatarsal BatF	442	7.9	360	534	81
Metatarsal Ddm (2)	243	6.9	211	286	77
PERIOD 6					
M_3L	329	5.3	300	357	18
M_3WA	142	6.1	121	154	21
Humerus BT	625	7.8	548	694	7
Humerus HTC	281	8.8	236	323	11
Tibia Bd	509	6.3	448	563	20
Astragalus GLl	549	4.6	508	602	34
Astragalus Bd	356	7.0	316	406	33
Astragalus Dl	305	4.9	275	329	33
Metacarpal GL	1613		1561	1650	3
Metacarpal SD	274		249	291	3
Metacarpal Bd	521	8.7	441	581	10
Metacarpal BatF	459	9.0	390	506	8
Metacarpal Ddm (2)	243	7.4	217	268	9
Metatarsal GL	1870		1794	1960	5
Metatarsal SD	219		194	241	5
Metatarsal Bd	482	10.3	403	561	14
Metatarsal BatF	439	8.0	384	500	12
Metatarsal Ddm (2)	235	7.5	208	255	11

Measurement	Mean	V	Minimum	Maximum	N
ALL PERIODS					
Humerus BT	268	6.3	231	335	219
Humerus HTC	133	7.8	108	167	297
Tibia Bd	242	6.5	206	306	387
Astragalus GLl	262	7.6	162	336	103
Astragalus Bd	173	7.1	153	227	100
Astragalus Dl	146	6.6	128	191	95
Metacarpal GL	1210	9.5	977	1503	35
Metacarpal SD	137	14.0	110	177	36
Metacarpal Bd	245	9.0	212	307	68
Metacarpal Dd	152	7.1	137	184	47
Metatarsal GL	1291	6.9	1129	1495	33
Metatarsal SD	118	10.6	98	156	31
Metatarsal Bd	231	8.1	187	280	70
Metatarsal Dd	149	6.9	125	179	50
PERIODS 10 & 11					
Humerus BT	279	7.4	240	335	57
Humerus HTC	141	7.9	113	167	86
Tibia Bd	259	6.6	221	306	77
Astragalus GLl	281	8.3	245	336	15
Astragalus Bd	187	10.6	160	227	14
Astragalus Dd	154	10.1	134	191	13
Metacarpal GL	1270	8.4	1100	1503	20
Metacarpal SD	148	11.4	120	177	21
Metacarpal Bd	261	8.8	220	307	30
Metacarpal Dd	160	7.1	142	184	19
Metatarsal GL	1316	6.7	1190	1495	22
Metatarsal SD	122	11.0	106	156	20
Metatarsal Bd	243	7.8	216	280	30
Metatarsal Dd	159	5.1	149	179	15
PERIOD 9					
Humerus BT	266	6.0	231	307	60
Humerus HTC	133	6.7	113	156	75
Tibia Bd	245	5.8	216	275	53
Astragalus GLl	272	7.8	229	305	10
Astragalus Bd	176	6.5	153	195	12
Astragalus Dd	149	6.5	128	163	11
Metacarpal GL	1121		1119	1122	2
Metacarpal SD	127		122	132	2
Metacarpal Bd	235	5.5	215	259	8
Metacarpal Dd	148		137	156	5
Metatarsal GL	1234		1129	1316	5
Metatarsal SD	112		106	122	5
Metatarsal Bd	227	4.7	216	247	9
Metatarsal Dd	147		141	151	4

Table 25 (above and overleaf). Sheep: means, coefficients of variation (V), ranges and sample sizes for selected measurements (the few specimens identified as goat have been excluded). Fusing bones are included, unfused ones are not. A few measurements are approximated. All measurements are in tenths of millimetres.

Table 25 (continued)

Measurement	Mean	V	Minimum	Maximum	N
PERIOD 8					
Humerus BT	262	4.4	237	288	59
Humerus HTC	129	5.4	116	146	81
Tibia Bd	237	4.6	206	261	172
Astragalus GLl	256	7.1	162	284	52
Astragalus Bd	170	4.6	158	190	47
Astragalus Dl	144	5.0	131	159	49
Metacarpal GL	1137	8.4	977	1244	7
Metacarpal SD	124	6.1	112	134	7
Metacarpal Bd	233	4.6	212	250	13
Metacarpal Dd	149	4.6	137	157	7
Metatarsal GL	1258		1168	1321	3
Metatarsal SD	114		113	115	3
Metatarsal Bd	223	3.6	205	235	13
Metatarsal Dd	146	5.1	134	160	13
PERIOD 6					
Humerus BT	261	4.6	237	294	33
Humerus HTC	127	6.5	108	148	43
Tibia Bd	236	4.8	209	271	71
Astragalus GLl	257	4.1	233	281	24
Astragalus Bd	168	3.8	156	180	24
Astragalus Dd	141	4.4	129	151	20
Metacarpal GL	1126	5.1	1011	1163	6
Metacarpal SD	117	6.3	110	129	6
Metacarpal Bd	229	3.9	214	245	16
Metacarpal Dd	146	4.0	138	157	15
Metatarsal GL	1238		1182	1333	3
Metatarsal SD	105		98	113	3
Metatarsal Bd	216	6.1	187	233	17
Metatarsal Dd	144	6.7	125	161	18

Measurement	Mean	V	Minimum	Maximum	N
ALL PERIODS					
DP_4L	181	4.4	169	206	31
DP_4W	84	4.8	75	92	29
M_1L	164	7.8	96	208	151
M_1WA	100	6.6	86	128	157
M_1WP	105	6.8	89	135	149
M_2L	203	6.4	164	256	172
M_2WA	127	6.6	107	161	172
M_2WP	129	6.8	101	167	173
M_3L	318	7.4	242	404	87
M_3WA	147	6.5	130	186	96
M_3WC	141	5.6	122	174	88
Humerus BT	284	8.4	217	350	47
Humerus HTC	190	9.8	148	242	60
Tibia Bd	295	11.8	257	366	14
Astragalus GLl	399	8.8	316	491	35
PERIODS 10 & 11					
DP_4L	188		178	206	3
DP_4W	84		80	89	3
M_1L	167	8.0	146	198	14
M_1WA	104	6.6	96	122	13
M_1WP	108	9.1	96	133	11
M_2L	210	9.7	185	256	14
M_2WA	134	9.3	113	161	12
M_2WP	135	11.0	110	167	14
M_3L	323	12.3	265	404	8
M_3WA	155	11.0	132	186	9
M_3WC	146	10.1	123	174	8
Humerus BT	277	6.5	255	296	7
Humerus HTC	202	12.5	165	242	10
Tibia Bd	344		311	366	3
Astragalus GLl	473		459	491	5
PERIOD 9					
DP_4L	181		169	189	5
DP_4W	84		79	87	5
M_1L	169	6.7	150	184	17
M_1WA	96	5.9	88	111	21
M_1WP	102	6.6	91	117	20
M_2L	204	7.1	179	243	20
M_2WA	122	7.3	109	136	19
M_2WP	128	7.4	112	143	19
M_3L	317	5.7	297	348	9
M_3WA	145	5.7	130	158	15
M_3WC	141	5.9	131	160	13
Humerus BT	305	8.7	274	338	8
Humerus HTC	201	7.9	183	229	9
Tibia Bd	283		257	309	2
Astragalus GLl	385		365	411	3

Table 26 (above and overleaf). Pig: means, coefficients of variation (V), ranges and sample sizes for selected measurements. Fusing bones are included, unfused ones are not. A few measurements are approximated. All the measurements are in tenths of millimetres.

Table 26 (continued)

Measurement	Mean	V	Minimum	Maximum	N
PERIOD 8					
DP_4L	181	3.5	174	197	14
DP_4W	85	4.1	80	92	13
M_1L	164	7.0	137	208	78
M_1WA	100	6.3	86	128	77
M_1WP	105	6.7	89	135	74
M_2L	202	5.4	164	235	90
M_2WA	127	6.0	107	149	91
M_2WP	129	6.3	101	150	90
M_3L	321	6.4	278	370	36
M_3WA	147	5.3	131	167	37
M_3WC	140	4.2	131	151	32
Humerus BT	286	8.1	261	350	15
Humerus HTC	191	6.9	167	222	20
Tibia Bd	285		264	324	5
Astragalus GLl	394	5.0	373	450	12
PERIOD 6					
DP_4L	178		173	187	5
DP_4W	81		75	86	4
M_1L	159	9.5	96	178	33
M_1WA	99	5.1	89	114	36
M_1WP	104	5.3	95	115	34
M_2L	201	6.9	165	226	38
M_2WA	126	5.5	113	139	41
M_2WP	129	4.8	117	144	40
M_3L	313	8.4	242	360	24
M_3WA	146	6.3	131	167	26
M_3WC	139	5.5	122	157	26
Humerus BT	271	7.4	217	298	14
Humerus HTC	176	7.5	148	199	17
Tibia Bd	275		264	289	4
Astragalus GLl	382	3.3	316	410	13

Table 27 (opposite). Fallow deer: means, coefficients of variation (V), ranges and sample sizes for selected measurements. Fusing bones are included, unfused ones are not. A few measurements are approximated. All the measurements are in tenths of millimetres.

Measurement	Mean	V	Minimum	Maximum	N
ALL PERIODS					
Humerus BT	367	5.0	333	382	6
Humerus HTC	202	7.0	177	216	9
Tibia Bd	334	5.6	288	373	89
Astragalus GLl	367	4.4	324	396	70
Astragalus Bd	241	5.2	214	268	71
Astragalus Dl	200	4.9	176	218	67
Metacarpal GL	1881	4.8	1786	1995	6
Metacarpal SD	164	5.9	153	175	6
Metacarpal Bd	284	6.1	267	309	8
Metacarpal Dd	183	6.1	174	199	6
Metatarsal Gl	2122	4.2	1990	2270	25
Metatarsal SD	162	6.5	149	184	23
Metatarsal Bd	297	4.0	271	324	61
Metatarsal Dd	191	4.7	173	215	54
PERIODS 10 & 11					
Tibia Bd	326	4.8	298	342	11
Astragalus GLl	359		340	370	4
Astragalus Bd	237		221	254	3
Astragalus Dl	195		192	198	3
Metatarsal Bd	310		302	324	3
Metatarsal Dd	199		191	206	2
PERIOD 9					
Tibia Bd	344	3.9	317	359	12
Astragalus GLl	370	3.8	352	392	7
Astragalus Bd	244	3.6	233	256	8
Astragalus Dl	203	4.1	195	216	7
Metatarsal GL	2154		1990	2264	4
Metatarsal SD	169		155	183	4
Metatarsal Bd	306	4.3	279	322	7
Metatarsal Dd	194	4.1	177	202	7
PERIOD 8					
Tibia Bd	333	6.0	288	368	55
Astragalus GLl	368	4.6	324	396	39
Astragalus Bd	242	5.2	214	268	40
Astragalus Dd	200	5.1	176	214	37
Metatarsal GL	2100	3.7	1995	2242	17
Metatarsal SD	159	4.9	149	171	15
Metatarsal Bd	295	4.9	271	322	46
Metatarsal Dd	190	4.7	173	215	40
PERIOD 6					
Tibia Bd	337	5.5	315	373	11
Astragalus GLl	367	4.5	334	394	19
Astragalus Bd	240	5.8	223	261	19
Astragalus Dd	199	5.2	183	218	19
Metatarsal GL	2181		2065	2270	4
Metatarsal SD	170		151	184	4
Metatarsal Bd	300		280	316	5
Metatarsal Dd	192		179	202	5

Measurement	Mean	V	Minimum	Maximum	N
ALL PERIODS					
Humerus GL	670	7.8	586	815	68
Humerus SD	65	9.4	55	80	104
Humerus Bd	146	8.6	125	181	189
Femur GL	753	8.4	666	920	54
Femur Lm	706	7.6	631	859	60
Femur SD	66	10.4	53	84	70
Femur Bd	146	10.2	121	185	136
Femur Dd	127	9.7	108	164	72
Tibiotarsus GL	1105	11.9	896	1300	15
Tibiotarsus La	1071	10.4	864	1264	20
Tibiotarsus SD	61	10.4	49	72	26
Tibiotarsus Bd	110	10.4	91	147	137
Tibiotarsus Dd	112	11.1	86	138	107
Tarsometatarsus GL	697	10.0	577	870	53
Tarsometatarsus SD	61	15.0	49	86	61
Tarsometatarsus Bd	126	10.2	105	161	119
PERIODS 10 & 11					
Humerus GL	712		644	815	4
Humerus SD	69	10.9	59	78	8
Humerus Bd	154	10.5	137	181	10
Femur Bd	142		126	166	3
Tibiotarsus GL	1099		1070	1136	3
Tibiotarsus La	1059		1030	1097	3
Tibiotarsus SD	62		58	65	3
Tibiotarsus Bd	113	8.9	95	127	7
Tibiotarsus Dd	119		114	121	5
Tarsometatarsus GL	719		637	778	3
Tarsometatarsus SD	62		53	68	3
Tarsometatarsus Bd	129		111	141	5
PERIOD 9					
Humerus GL	659		586	747	3
Humerus SD	64		59	71	5
Humerus Bd	146		134	157	4
Femur GL	694		686	701	2
Femur Lm	703		657	749	2
Femur SD	65		58	77	3
Femur Bd	151		130	167	3
Tibiotarsus Bd	123		108	147	4
Tarsometatarsus GL	633		577	666	4
Tarsometatarsus SD	56		52	60	4
Tarsometatarsus Bd	117		115	117	4

Table 28 (above and opposite). Chicken: means, coefficients of variation (V), ranges and sample sizes for selected measurements. A few measurements are approximated. All the measurements are in tenths of millimetres.

Table 28 (continued)

PERIOD 8					
Humerus GL	672	6.7	590	752	30
Humerus SD	66	8.5	57	80	43
Humerus Bd	146	8.0	126	168	104
Femur GL	749	7.8	676	895	22
Femur Lm	704	7.2	634	834	28
Femur SD	66	10.3	56	84	31
Femur Bd	148	10.4	125	185	71
Femur Dd	128	9.7	108	150	40
Tibiotarsus La	1084		1042	1131	5
Tibiotarsus SD	61		56	68	5
Tibiotarsus Bd	110	10.7	91	133	56
Tibiotarsus Dd	113	10.3	94	131	44
Tarsometatarsus GL	692	9.7	577	791	19
Tarsometatarsus SD	60	14.4	49	75	24
Tarsometatarsus Bd	124	9.5	105	150	58
PERIOD 6					
Humerus GL	667	7.9	601	773	29
Humerus SD	65	9.6	55	78	46
Humerus Bd	145	9.1	125	176	66
Femur GL	756	8.3	666	920	26
Femur Lm	706	8.1	631	859	28
Femur SD	66	10.2	53	84	32
Femur Bd	145	9.7	121	176	55
Femur Dd	126	10.0	110	164	28
Tibiotarsus GL	1074	14.4	896	1300	9
Tibiotarsus La	1053	13.2	864	1264	11
Tibiotarsus SD	61	11.8	49	72	17
Tibiotarsus Bd	110	10.0	92	135	63
Tibiotarsus Dd	112	11.9	86	138	49
Tarsometatarsus GL	707	10.3	612	870	27
Tarsometatarsus SD	61	16.5	50	86	29
Tarsometatarsus Bd	128	10.1	105	161	51

Taxon	Measurement	Periods compared	Probability
Pig	M_1WA	(1-6) - 8	0.551
Pig	M_1WA	8 - 9	0.007 **
Pig	M_1WA	9 - (10-11)	0.001 **
Pig	M_2WA	(1-6) - 8	0.417
Pig	M_2WA	8 - 9	0.014 *
Pig	M_2WA	9 - (10-11)	0.007 **
Pig	Humerus HTC	(1-6) - 8	0.009 **
Pig	Humerus HTC	8 - 9	0.069
Pig	Humerus HTC	9 - (10-11)	0.889
Pig	Astragalus GLl	(1-6) - 8	0.141
Pig	Astragalus GLl	8 - 9	0.509
Pig	Astragalus GLl	9 - (10-11)	0.000 **
Cattle	M_3L	6 - 8	0.912
Cattle	M_3L	8 - 9	0.036 *
Cattle	M_3L	9 - (10-11)	0.159
Cattle	M_3L	(6-8) - (9-11)	0.000 **
Cattle	M_3WA	6 - 8	0.501
Cattle	M_3WA	8 - 9	0.010 *
Cattle	M_3WA	9 - (10-11)	0.166
Cattle	M_3WA	(6-8) - (9-11)	0.000 **
Cattle	Tibia Bd	6 - 8	0.578
Cattle	Tibia Bd	8 - 9	0.001 **
Cattle	Tibia Bd	9 - (10-11)	0.732
Cattle	Astragalus GLl	6 - 8	0.396
Cattle	Astragalus GLl	8 - 9	0.000 **
Cattle	Astragalus GLl	9 - (10-11)	0.207
Sheep	Humerus HTC	6 - 8	0.194
Sheep	Humerus HTC	8 - 9	0.002 **
Sheep	Humerus HTC	9 - (10-11)	0.000 **
Sheep	Tibia Bd	6 - 8	0.504
Sheep	Tibia Bd	8 - 9	0.000 **
Sheep	Tibia Bd	9 - (10-11)	0.000 **

Table 29. Significance of the size differences between groups of selected pig, cattle and sheep bones from different periods as indicated by a **t-test**. *Key: ** = the difference is significant at the 1% level; * = the difference is significant at the 5% level; no asterisk = no significant difference.*

	Lau 10+11		Lau 9		Lau 8		Lau 6		Khirokitia (all levels)		Durrington Walls		Mikulčice	
	V	N	V	N	V	N	V	N	V	N	V	N	V	N
Measurement														
M_1L	**8.0**	14	**6.7**	17	**7.0**	78	**9.5**	32	**3.4**	11	**5.2**	128		
M_1WA	**6.6**	13	**5.9**	21	**6.3**	77	**5.2**	35	**5.6**	9	**4.5**	127		
M_2L	**9.7**	14	**7.1**	20	**5.4**	90	**7.1**	39	**5.1**	11	**4.6**	81	**6.1**	672
M_2WA	**9.3**	12	**7.3**	19	**6.0**	91	**6.6**	42	**7.8**	12	**4.3**	74		
M_3L	**12.3**	8	**5.7**	9	**6.4**	36	**8.4**	24	**6.9**	47	**5.5**	39	**7.8**	1191
M_3WA	**11.0**	9	**5.7**	15	**5.3**	37	**6.3**	26	**5.4**	26	**6.0**	42	**6.1**	1200
Humerus BT	**6.5**	7	**8.7**	8	**8.1**	15	**7.4**	14	**7.7**	131	**6.2**	117		
Humerus HTC	**12.5**	10	**7.9**	9	**10.2**	20	**7.5**	17	**7.3**	150	**5.8**	190		
Astragalus GLl					**5.0**	12	**3.3**	13	**5.3**	171	**6.0**	160	**5.2**	422

Table 30. The coefficients of variation (V) of pig teeth and limb-bone measurements; a comparison of the Launceston (Lau) data with those from other sites as follows: Khirokitia, Cyprus, Aceramic Neolithic, 6th millennium bc (Davis 1984, 1989 and 1994); Durrington Walls, England, Neolithic, 4th millennium bc (Albarella and Payne, in prep.); Mikulčice, Czechoslovakia, 6th - 10th centuries AD (Kratochvil, 1981, cited by Payne and Bull, 1988).

Site	Type	Period	PUBPER	N. BOS	N. OVIS	N. SUS	N. CERV	% BOS1	% BOS2	% OVIS1	% OVIS2	% SUS1	% SUS2	% CERV1	% CERV2	Reference
Abingdon, Stert St.	U	LM	XV-XVI	**21**	**48**	**14**	**0**	25	25	58	58	17	17	0	0	Wilson 1979
Abingdon, Stert St.	U	MM	XIII-XIV	**229**	**453**	**127**	**0**	28	28	56	56	16	16	0	0	ditto
Abingdon,West St Helen St.	U	MM	lateXIII-earlyXV	**62**	**79**	**12**	**0**	41	41	52	52	8	8	0	0	Wilson 1975
Abingdon,West St Helen St.	U	EM+MM	XII-XIII	**38**	**41**	**7**	**0**	44	44	48	48	8	8	0	0	ditto
Aylesbury	U	MM	2-3 (XIII-XIV)	**488**	**396**	**170**	**0**	46	46	38	38	16	16	0	0	Jones G. 1983
Banbury Castle	C	PM	XVII-XVIII	**47**	**22**	**3**	**0**	65	65	31	31	4	4	0	0	Wilson 1976
Banbury Castle	C	EM+MM	XIII-XIV	**48**	**67**	**42**	**2**	30	31	42	43	26	27	1	2	ditto
Barnard Castle	C	PM	10 (XVII onwards)	**521**	**430**	**279**	**330**	33	42	28	35	18	23	21	26	Jones R. *et al.* 1985b
Barnard Castle	C	LM	8 (XV-XVI)	**130**	**150**	**93**	**117**	27	35	31	40	19	25	24	29	ditto
Barnard Castle	C	MM	5 (XIII)	**959**	**302**	**2108**	**2024**	18	28	6	9	39	63	38	62	ditto
Bath	U	M	X-XIII	**581**	**767**	**219**	**7**	37	37	49	49	14	14	0	1	Grant 1979
Beverley, 33-35 Eastgate	U	MM	6-12 (XIII-XIV)	**3029**	**4558**	**808**	**7**	36	36	54	54	10	10	+	+	Scott 1992
Beverley, 33-35 Eastgate	U	EM	3-5 (XI-XII)	**2706**	**3499**	**622**	**6**	40	40	51	51	9	9	+	+	ditto
Beverley, Lurk Lane	U	PM	9 (XVI)	**202**	**230**	**54**	**2**	41	42	47	47	11	11	+	+	Scott 1991
Beverley, Lurk Lane	U	LM	8 (XV)	**384**	**337**	**137**	**3**	45	45	39	39	16	16	+	+	ditto
Beverley, Lurk Lane	U	MM	7 (XIII-XIV)	**1068**	**1339**	**500**	**89**	36	37	45	46	17	17	3	4	ditto
Bramber Castle	C	M		**274**	**182**	**254**	**10**	38	39	25	26	35	36	1	2	Westley 1977
Bristol, Mary-le-Port	U	M		**660**	**571**	**113**	**0**	49	49	42	42	8	8	0	0	Noddle 1985
Burystead & Langham Rd.	V	M	XII-XV	**181**	**199**	**79**	**0**	39	39	43	43	17	17	0	0	Davis 1992b
Carlisle, Blackfriars St.	U	PM	post-med.	**142**	**86**	**45**	**0**	52	52	32	32	16	16	0	0	Rackham 1990
Carlisle, Blackfriars St.	U	M	XII-XVI	**179**	**40**	**27**	**0**	73	73	16	16	11	11	0	0	ditto
Castle Lane	V	MM	XIII	**455**	**904**	**123**	**3**	31	31	61	61	8	8	0	0	Jones R. *et al.* 1985a
Cheddar Palace	P	MM+LM	6 (XIII-XVI)	**118**	**141**	**134**	**81**	25	30	30	36	28	34	17	24	Higgs *et al.* 1979
Cheddar Palace	P	EM+MM	4-5 (XI-XII)	**274**	**95**	**57**	**17**	62	64	21	22	13	13	4	4	ditto

Table 31 (this page and next three). List of medieval and post-medieval sites whose faunal assemblages are plotted in the tripolar diagrams (Figs. 39-41). Assemblages with less than 150 identified specimens have been excluded from the diagrams.

Key: C=castle, M=monastic, N=manor house, P=palace, U=urban, V=village. M=medieval, EM=early medieval (late XI-XII), MM=middle medieval (XIII-XIV), LM=late medieval (XV-early XVI), PM=post-medieval. '+' means that the taxon is present but its % is <0.5. PUBPER is the code and date of each period in the original publication. In order to avoid confusion between period codes and dates, the periods are given in Arabic numbers, even if in the original publication they were numbered with Roman numbers. The number of fragments (NISP) is calculated in different ways by different authors; when a 'diagnostic zones' method was used this has been preferred to the crude number of identified fragments. The '%taxon1' is the percentage of that taxon out of a total of all four taxa (i.e. Bos, Ovis, Sus, *Cervidae). '%taxon2' is, in the case of* Bos, Ovis, *and* Sus, *the proportion of that taxon expressed as a percentage of Bos+Ovis+Sus; and '%CERV2' is the proportion of cervids expressed as a percentage of* Bos+Ovis+*Cervidae. For most of the sites the figure for* Ovis *includes* Capra.

Table 31 (continued)

Site	Type	Period	PUBPER	N. BOS	N. OVIS	N. SUS	N. CERV	% BOS1	% BOS2	% OVIS1	% OVIS2	% SUS1	% SUS2	% CERV1	% CERV2	Reference
Chester, Dominican Friary	M	MM+LM	XIII	**331**	**217**	**182**	**8**	45	45	29	30	25	25	1	1	Morris 1990
Chester, Dominican Friary	M	MM	XIV-XVI	**210**	**67**	**184**	**5**	45	46	14	15	39	40	1	2	ditto
Christchurch	U	PM	post-med.	**73**	**75**	**25**	**1**	42	42	43	43	14	14	1	1	Coy 1983
Christchurch	U	M	mediev.	**88**	**85**	**21**	**0**	45	45	44	44	11	11	0	0	ditto
Copt Hay	V	EM+MM	3-5	**98**	**105**	**124**	**2**	30	30	32	32	38	38	1	1	Pernetta 1974
Copt Hay	V	EM	1-2	**39**	**23**	**13**	**0**	52	52	31	31	17	17	0	0	ditto
Droitwich	U	LM	5ii-6 (XIII-XIV)	**58**	**60**	**38**	**1**	37	37	38	38	24	24	1	1	Locker 1992
Droitwich	U	MM	7 (XV-XVI)	**644**	**427**	**340**	**21**	45	46	30	30	24	24	1	2	ditto
Earl's Bu	V	M	XI-XV	**373**	**244**	**170**	**0**	47	47	31	31	22	22	0	0	Mainland 1993
Eckweek	V	MM	XIII-XIV	**113**	**333**	**54**	**0**	23	23	67	67	11	11	0	0	Davis 1991b
Exeter	U	PM	Pm1-4 (XVI-XVIII)	**2156**	**2900**	**608**	**62**	38	38	51	51	11	11	1	1	ditto
Exeter	U	LM	Md10 (XIV-XV)	**112**	**133**	**37**	**0**	40	40	47	47	13	13	0	0	ditto
Exeter	U	MM	Md5-9 (XIII-XIV)	**2454**	**2871**	**913**	**9**	39	39	46	46	15	15	+	+	Maltby 1979
Faccombe Netherton	N	LM	XIII-XIV	**105**	**127**	**114**	**12**	29	30	35	37	32	33	3	5	Sadler 1990
Faccombe Netherton	N	MM	XV and later	**616**	**682**	**754**	**197**	27	30	30	33	34	37	9	13	ditto
Gloucester, East Gate	U	M		**1219**	**942**	**283**	**1**	50	50	39	39	12	12	+	+	Maltby 1983
Gloucester, West Gate	U	M	5-7	**?**	**?**	**?**	**?**	27	27	48	48	25	25	0	0	ditto
Gorhambury	V	M		**81**	**110**	**76**	**5**	30	30	40	41	28	28	2	3	Locker 1990
Grenstein	V	M	XI-XV	**130**	**214**	**78**	**0**	31	31	51	51	18	18	0	0	Ambros 1980
Ilchester	U	M		**1483**	**1614**	**250**	**1**	44	44	48	48	7	7	+	+	Levitan 1982
King's Lynn	U	PM	XIV-XVIII	**895**	**513**	**195**	**0**	56	56	32	32	12	12	0	0	Noddle 1977
King's Lynn	U	LM	3 (XIV-XV)	**674**	**411**	**209**	**2**	52	52	32	32	16	16	+	+	ditto
King's Lynn	U	MM	2 (XIII-XIV)	**2493**	**1861**	**764**	**9**	49	49	36	36	15	15	+	+	ditto
Kirkstall Abbey	M	LM	XV-XVI	**?**	**?**	**?**	**?**	90	92	5	5	3	3	2	2	Ryder 1959
Launceston Castle	C	PM	9 (XVI-XVII)	**577**	**409**	**156**	**55**	48	51	34	36	13	14	5	5	
Launceston Castle	C	LM	8 (mid-late XV)	**1185**	**854**	**764**	**363**	37	42	27	30	24	27	11	15	
Launceston Castle	C	MM	6 (late XIII)	**397**	**427**	**463**	**94**	29	31	31	33	34	36	7	10	
Lincoln, Flaxengate	U	LM	S6-S10 (XV-XVI)	**959**	**970**	**208**	**?**	.	45	.	45	.	10	.	.	O'Connor 1982
Lincoln, Flaxengate	U	MM	S1-S5 (XIII-XIV)	**919**	**856**	**177**	**?**	.	47	.	44	.	9	.	.	ditto
Lincoln, Bishops Palace	P	LM	XV	**65**	**186**	**7**	**0**	25	25	72	72	3	3	+	+	Ellison 1975
Lyveden	V	MM+LM		**253**	**254**	**126**	**130**	33	40	33	40	17	20	17	20	Grant 1975
Middleton Stoney	C	PM	7	**?**	**?**	**?**	**?**	.	31	.	43	.	27	.	.	Levitan 1984a

Table 31 (continued)

Site	Type	Period	PUBPER	N. BOS	N. OVIS	N. SUS	N. CERV	% BOS1	% BOS2	% OVIS1	% OVIS2	% SUS1	% SUS2	% CERV1	% CERV2	Reference
Middleton Stoney	C	LM	6	?	?	?	?	.	26	.	38	.	37	.	.	ditto
Middleton Stoney	C	MM	5	?	?	?	?	.	21	.	47	.	32	.	.	ditto
Newcastle, Queen St.	U	PM	6-6i (IXVI-eXVII)	144	121	31	0	49	49	41	41	10	10	0	0	Allison 1988
Newcastle, Queen St.	U	MM+LM	5-5i (mid XIV-XV)	920	557	217	17	54	54	33	33	13	13	1	1	ditto
Newcastle, Queen St.	U	MM	1-4ii (XIII)	475	227	111	2	58	58	28	28	14	14	+	+	ditto
Newcastle, Closegate I & II	U	PM	XVII-XVIII	44	121	8	1	25	26	69	70	5	5	1	1	Davis 1991a
Newcastle, Closegate I & II	U	LM	XV-XVI	299	585	66	1	31	31	62	62	7	7	+	+	ditto
Newcastle, Closegate I & II	U	MM	XIII-XIV	39	71	13	1	31	32	57	58	10	11	1	1	ditto
North Elmham Park	V	PM	6 (XVI-XVII)	1169	623	419	85	51	53	27	28	18	19	4	5	Noddle 1980
North Elmham Park	V	M	5	1025	1063	1225	99	30	31	31	32	36	37	3	5	ditto
North Elmham Park	V	EM	3-4	290	291	321	33	31	32	31	32	34	36	4	5	ditto
North Petherton	V	LM	3	46	34	10	4	49	51	36	38	11	11	4	5	Adcock 1976/77
Northampton, St Peter's St.	U	PM	5 (XVI-XVII)	58	100	12	0	34	34	59	59	7	7	0	0	Harman 1979
Northampton, St Peter's St.	U	LM	4 (XV)	391	784	107	0	30	30	61	61	8	8	0	0	ditto
Northampton, St Peter's St.	U	EM+MM	3 (XII-XIV)	1042	2006	377	0	30	30	59	59	11	11	0	0	ditto
Norwich, Whitefriars	U	EM	2-3 (lateX-XII)	504	374	294	19	42	43	31	32	25	25	2	2	Cartledge 1983
Okehampton Castle	C	PM	post-med.	631	467	54	282	44	55	33	41	4	5	20	20	Maltby 1982
Okehampton Castle	C	LM	late med.	489	674	185	1357	18	36	25	50	7	14	50	54	ditto
Okehampton Castle	C	MM	XIV	264	271	214	356	24	35	25	36	19	29	32	40	ditto
Oxford Castle	C	MM+LM	XIII-midXV	68	30	28	1	54	54	24	24	22	22	1	1	Marples 1976
Oxford, Queen St.	U	MM	4a-4b (XIII)	63	69	26	1	40	40	43	44	16	16	1	1	Wilson *et al.* 1985
Oxford, Queen St.	U	LM	5b (XV-XVI)	19	136	32	0	10	10	73	73	17	17	0	0	ditto
Oxford, The Hamel	U	PM	9-10 (XVI)	376	435	73	3	42	43	49	49	8	8	+	+	Wilson & Bramwell 1980
Oxford, The Hamel	U	MM+LM	7-8 (lateXIII-XVI)	415	531	194	14	36	36	46	47	17	17	1	1	ditto
Oxford, The Hamel	U	MM	4-5 (XIII-XIV)	370	577	232	1	31	31	49	49	20	20	+	+	ditto
Oxford, The Hamel	U	EM	2-3 (XII)	257	435	141	7	31	31	52	52	17	17	1	1	ditto
Portchester Cas. (Innr Bail.)	C	PM	C (XVI-XVII)	89	88	27	20	40	44	39	43	12	13	9	10	Grant 1985
Portchester Cas. (Innr Bail.)	C	MM	A-B (XIII-XIV)	182	202	220	7	30	30	33	33	36	36	1	2	ditto
Portchester Cas. (Outr Bail.)	C	LM	6 (XV-XVI)	70	99	13	42	31	38	44	54	6	7	19	20	Grant 1977
Portchester Cas. (Out. Bail.)	C	MM	3-4 (XIII-XIV)	390	155	107	52	55	60	22	24	15	16	7	9	ditto
Prudhoe Castle	C	PM	9-11 (midXVI-XVIII)	351	352	45	40	45	47	45	47	6	6	5	5	Davis 1987c
Prudhoe Castle	C	LM	6-8 (XV-midXVI)	177	85	34	16	57	60	27	29	11	11	5	6	ditto

Table 31 (continued)

Site	Type	Period	PUBPER	N. BOS	N. OVIS	N. SUS	N. CERV	% BOS1	% BOS2	% OVIS1	% OVIS2	% SUS1	% SUS2	% CERV1	% CERV2	Reference
Prudhoe Castle	C	MM	4-5 (XIII-XIV)	**249**	**129**	**141**	**31**	45	48	23	25	26	27	6	8	ditto
Sandal Castle	C	PM	'+'-1 (XVI-XVIII)	**684**	**521**	**154**	**321**	41	50	31	38	9	11	19	21	Griffith *et al.* 1983
Sandal Castle	C	LM	2-4 (XV)	**526**	**314**	**149**	**366**	39	53	23	32	11	15	27	30	ditto
Sandal Castle	C	MM	5-6 (XII-XIV)	**99**	**49**	**33**	**126**	32	55	16	27	11	18	41	46	ditto
Southampton	U	PM	C (XVI-XVIII)	**47**	**49**	**12**	**2**	43	44	45	45	11	11	2	2	Noddle 1975
Southampton	U	MM	B (XIII-XIV)	**73**	**62**	**88**	**3**	32	33	27	28	39	39	1	2	ditto
Southampton	U	EM+MM	A (XI-XIII)	**145**	**73**	**104**	**3**	45	45	22	23	32	32	1	1	ditto
So'ton, Quilter's Vault	U	PM	C	**29**	**67**	**15**	**0**	26	26	60	60	14	14	0	0	Bourdillon 1979
So'ton, Quilter's Vault	U	MM	B	**88**	**55**	**32**	**2**	50	50	31	31	18	18	1	1	ditto
So'ton, Quilter's Vault	U	EM	A	**412**	**442**	**118**	**1**	42	42	45	45	12	12	+	+	ditto
Taunton, Benham's Garage	U	PM	post-med.	**154**	**120**	**6**	**0**	55	55	43	43	2	2	0	0	Levitan 1984b
Taunton, Benham's Garage	U	MM	4 (XIII-XIV)	**1346**	**1316**	**125**	**0**	48	48	47	47	4	4	0	0	ditto
Taunton, Benham's Garage	U	EM+MM	3 (XII-XIII)	**374**	**242**	**20**	**0**	59	59	38	38	3	3	0	0	ditto
Taunton, Priory Barn	U	EM+MM	1 (XII-XIII)	**199**	**367**	**35**	**0**	33	33	61	61	6	6	0	0	ditto
Thrislington	V	MM	XIII-XIV	**252**	**249**	**67**	**1**	44	44	44	44	12	12	+	+	Rackham 1989
Totnes	U	PM		**79**	**169**	**21**	**0**	29	29	63	63	8	8	0	0	Bovey 1984
Upton	V	EM+MM	XII-XIII	**106**	**452**	**23**	**0**	18	18	78	78	4	4	0	0	Noddle *et al.* 1969
Walton	V	M	mediev.	**645**	**827**	**292**	**25**	36	37	46	47	16	17	1	2	Noddle 1976
Walton	V	EM	Saxo-Norman	**726**	**871**	**396**	**20**	36	36	43	44	20	20	1	1	ditto
Wharram Percy	V	LM	XIII-XIV	**328**	**851**	**132**	**23**	25	25	64	65	10	10	2	2	Ryder 1974
Wharram Percy	V	MM	XV-early XVI	**438**	**886**	**126**	**30**	30	30	60	61	9	9	2	2	ditto
Winchcombe	U	PM	XVI-XVII	**31**	**24**	**4**	**0**	53	53	41	41	7	7	0	0	Levitan 1985
Winchcombe	U	M	XII onwards	**280**	**259**	**23**	**2**	50	50	46	46	4	4	+	+	ditto
York, Fishergate	U	EM	4 (XI-XII)	**1025**	**660**	**237**	**0**	53	53	34	34	12	12	0	0	O'Connor 1991
York, General Accident Site	U	MM	12 (XIV)	**581**	**200**	**76**	**0**	68	68	23	23	9	9	0	0	O'Connor 1988
York, General Accident Site	U	EM+MM	10-11 (XII-XIV)	**4059**	**1054**	**656**	**27**	70	70	18	18	11	11	+	1	ditto
York, General Accident Site	U	EM	9 (XI-XII)	**139**	**38**	**33**	**2**	66	66	18	18	16	16	1	1	ditto
York, Skeldergate	U	LM	SkD-SkE (earlyXV)	**438**	**674**	**80**	**32**	36	37	55	57	7	7	3	3	O'Connor 1984
York, Skeldergate	U	EM	SkK+SkN+ SkZ (XI-XII)	**1223**	**410**	**159**	**6**	68	68	23	23	9	9	+	+	ditto
York, Petergate	U	MM	XI-XIV	**207**	**117**	**141**	**4**	44	45	25	25	30	30	1	1	Ryder 1971

Appendix

The appendix comprises tables of measurements of mammal and bird bones and teeth from Launceston Castle, organised by taxon, part of skeleton and period.

Measurements taken are as in Davis (1987a; for equid teeth), Davis (1992a), von den Driesch (1976) and Payne and Bull (1988). Note that 'H' = the height of the mandibular ramus measured behind M_1 and up the lingual side; 'A' = medial width of condyle; 'B' = lateral width of condyle; '1' = medial width of trochanter, and '4' = lateral width of trochanter of Payne (1969). M3WC (in pigs) = width of central pillar.

Key to abbreviations:

Taxa (TAX) are coded as follows (numbers in parenthesis are the tables in which measurements can be found):

B	*Bos* (cattle) (32-7)
O/C	*Ovis* or *Capra* (sheep or goat) (38-43)
OVA	*Ovis* (sheep) (40, 42-3, 76)
CAH	*Capra* (goat) (38, 40, 42)
S	*Sus* (pig) (44-7)
CEE	*Cervus elaphus* (red deer) (48)
DAD	*Dama dama* (fallow deer) (49-53)
CAC	*Capreolus capreolus* (roe deer) (54)
EQ	*Equus* (equid) (55-6)
EQC	*Equus caballus* (horse) (55)
CAF	*Canis familiaris* (dog) (57-8)
VUV	*Vulpes vulpes* (fox) (59, 61)
FEC	*Felis catus* (cat) (59-60)
LE	*Lepus* (hare) (62)
LEE	*Lepus europaeus* (brown hare) (62)
ORC	*Oryctolagus cuniculus* (rabbit) (63, 76)
GNP	*Gallus/Numida/Phasianus* (chicken/ guinea fowl/pheasant) (64-7, 77)
GAG	*Gallus gallus* (chicken) (67, 77)
GN	*Gallus/Numida* (chicken/guinea fowl) (65, 67, 77)
GP	*Gallus/Phasianus* (chicken/pheasant) (67)
ANS	*Anser* (goose) (68)
ANA	*Anas* (duck) (69)
SCR	*Scolopax rusticola* (woodcock) (70, 77)
PL	*Pluvialis* (golden/grey plover) (73, 77)
PLA	*Pluvialis apricaria* (golden plover) (73)
PLS	*Pluvialis squatarola* (grey plover) (73)
PEP	*Perdix perdix* (partridge) (71, 77)
PUP	*Puffinus puffinus* (Manx shearwater) (74, 77)
CO	*Corvus* (corvid) (75)
?PIP	?*Pica pica* (?magpie) (72)
TU	*Turdus* (turdid) (75, 77)

The following are also *mentioned* in this report, but they are either not coded or did not have any measurable element. An asterisk (*) indicates taxa which were not positively identified, being one of two or more possible genera or species (e.g records of *Anas crecca/querquedula*).

Meles meles (badger)
Rattus (rat)
Apodemus sylvaticus (wood mouse)
Erinacaeus europaeus (hedgehog)
Talpa (mole)
Delphinus delphis (common dolphin)
Coturnix coturnix (quail)
Meleagris gallopavo (turkey) (75)
Alectoris (red-legged partridge)* (75)
Lagopus (willow grouse/ptarmigan)* (75)
Cygnus olor (mute swan)
Anas crecca (teal)* (69)
A. querquedula (garganey)* (69)
Numenius cf. *arquata* (?curlew) (75)
Tringa cf. *totanus* (?redshank) (75)
Vanellus vanellus (lapwing) (75)
Gallinago gallinago (snipe) (77)
Milvus milvus (red kite) (75)
Falco tinnunculus (kestrel) (75)
Columba cf. *livia* ?(rock dove/domestic pigeon) (75)
Morus bassanus (gannet) (75)
Ardea cinerea (grey heron) (75)
Grus grus (crane) (75)
Corvus corax (raven) (75)
Corvus corone (crow)* (75, 77)
Corvus frugilegus (rook)* (75, 77)
Corvus cf. *monedula* (jackdaw) (75, 77)
cf. *Garrulus glandarius* (?jay) (75)
?*Lanius* (?shrike) (75)
Turdus cf. *merula* (?blackbird) (75, 77)
T. cf. *philomelos* (?song thrush) (75, 77)
T. cf. *iliacus* (?redwing) (75)

Approximate measurements are designated:

c - within the nearest 0.2 mm
e - within the nearest 0.5 mm

Epiphysial fusion/age (FUS) is coded as follows:

F	fused
G	fusing
UM	unfused metaphysis
UE	unfused epiphysis
J	juvenile (for birds)

The pig canines (C) are coded as follows:

AF	female alveolus
AM	male alveolus
F	female
M	male

The presence/absence of a spur on a bird tarso-metatarsus is coded as follows:

A	absent
P	present
R	reduced

Bones are coded as follows:

SC	scapula
HU	humerus
RA	radius
MC	metacarpal
FE	femur
TI	tibia
AS	astragalus
CA	calcaneum
MT	metatarsal
MP	metapodial
TI-T	tibio-tarsus
T-MT	tarso-metatarsus

Table 32. Measurements of cattle teeth (Key to comments: tpr—third pillar reduced; tpa—third pillar absent).

Period	Box	Tax	M_3L	M_3WA	Comments
1	900715	B	-	135	tpr
1	900715	B	-	129	
3	900717	B	-	153	
3	900688	B	318	148	
4	900710	B	-	142	tpa
4	900715	B	317	140	
4	900715	B	c 334	143	
4	900715	B	335	145	
4	900708	B	336	149	
5	900759	B	-	141	
5	900724	B	295	147	
5	900724	B	307	145	
5	900739	B	318	138	
5	900724	B	335	147	
5	900724	B	345	147	
5	900724	B	355	152	
6	900699	B	-	133	tpr
6	900722	B	-	134	tpa
6	900738	B	-	121	tpa
6	900738	B	300	132	
6	900703	B	303	129	
6	900713	B	312	136	
6	900699	B	316	141	
6	900704	B	316	143	
6	900703	B	317	143	
6	900722	B	318	148	
6	900699	B	324	135	
6	900703	B	327	144	
6	900713	B	c 328	145	
6	900703	B	335	143	
6	900703	B	340	151	
6	900744	B	341	153	
6	900740	B	342	139	
6	900704	B	344	154	
6	900701	B	351	149	
6	900699	B	354	153	
6	861302	B	357	146	
7	900711	B	292	129	
7	900726	B	316	136	
8	861337	B	-	146	
8	861346	B	-	167	tpr
8	900694	B	-	148	
8	900696	B	-	155	
8	900697	B	-	140	tpa
8	900719	B	-	128	
8	900720	B	-	141	tpr
8	900721	B	-	131	
8	900721	B	-	146	
8	900732	B	-	133	tpr
8	900732	B	-	136	tpr
8	900732	B	-	153	tpr
8	900735	B	-	c 142	
8	900735	B	-	c 143	
8	900742	B	-	134	tpr
8	900742	B	-	135	tpr
8	900742	B	-	143	tpa
8	900742	B	-	139	
8	900742	B	-	139	
8	900746	B	-	159	tpa
8	900747	B	-	139	
8	900747	B	-	c 153	
8	900747	B	-	149	
8	900720	B	285	131	
8	900700	B	287	-	
8	900707	B	298	126	
8	900705	B	304	-	
8	900700	B	306	134	
8	900714	B	306	134	
8	900755	B	306	136	
8	900743	B	307	138	
8	900729	B	309	144	
8	900697	B	310	133	
8	900746	B	310	132	
8	900742	B	312	142	
8	861343	B	314	137	
8	900721	B	314	140	
8	900743	B	314	136	
8	900707	B	317	140	
8	900735	B	317	136	
8	900700	B	318	137	
8	900747	B	319	133	
8	900747	B	322	135	
8	900743	B	324	144	
8	900719	B	326	141	
8	900747	B	328	141	
8	900732	B	329	144	
8	900697	B	330	137	
8	900735	B	330	152	
8	900720	B	c 331	145	
8	900735	B	331	141	
8	900693	B	332	148	
8	900732	B	332	142	
8	900697	B	334	149	
8	900707	B	334	141	
8	900721	B	334	151	
8	900697	B	335	151	
8	900718	B	338	146	
8	900696	B	339	150	
8	900729	B	c 339	153	
8	900697	B	340	146	
8	900700	B	340	157	
8	900747	B	342	132	

Period	Box	Tax	M_3L	M_3WA	Comments
8	900707	B	343	140	
8	900732	B	343	160	
8	900746	B	343	135	
8	900694	B	344	141	
8	900697	B	344	-	
8	900696	B	345	143	
8	900743	B	346	152	
8	900721	B	c 347	144	
8	900732	B	348	146	
8	900721	B	349	145	
8	900747	B	349	143	
8	900729	B	352	150	
8	900693	B	354	157	
8	900700	B	354	152	
8	900700	B	368	150	
8	861335	B	373	153	
9	900698	B	-	136	
9	900737	B	290	132	
9	900695	B	c 313	133	
9	861338	B	314	146	
9	900698	B	326	140	
9	861341	B	340	151	
9	900691	B	344	148	
9	900741	B	349	157	
9	900702	B	351	157	
9	900691	B	354	156	
9	900757	B	357	161	
9	900741	B	391	170	
9	900718	B	396	161	
10	900692	B	-	161	
10	900718	B	-	142	tpa
10	900752	B	-	175	
10	900752	B	-	138	
10	900754	B	-	160	
10	900718	B	c 309	c 145	
10	900718	B	332	148	
10	900733	B	334	149	
10	861339	B	351	151	
10	900733	B	351	155	
10	900728	B	358	154	
10	900733	B	359	144	
10	900736	B	c 363	155	
10	900733	B	378	-	
10	900752	B	385	173	
10	900752	B	385	167	
10	900760	B	385	154	
11	900748	B	-	169	
11	900730	B	334	145	
11	900730	B	346	151	
11	900730	B	358	158	
11	900731	B	364	154	
11	900731	B	366	160	

Table 33. Cattle humerus measurements.

Period	Box	Elem	TAX	FUS	BT	HTC
5	900701	HU	B	F	-	281
5	900759	HU	B	F	-	277
6	900690	HU	B	F	606	258
6	900703	HU	B	F	694	287
6	900704	HU	B	F	-	273
6	900704	HU	B	F	548	236
6	900712	HU	B	F	625	283
6	900722	HU	B	F	587	260
6	900738	HU	B	F	-	310
6	900744	HU	B	F	660	297
6	900699	HU	B	G	-	274
6	900699	HU	B	G	-	323
6	900738	HU	B	G	658	291
8	861342	HU	B	F	680	300
8	900693	HU	B	F	-	242
8	900693	HU	B	F	-	268
8	900693	HU	B	F	678	303
8	900693	HU	B	F	c 573	256
8	900694	HU	B	F	-	289
8	900694	HU	B	F	638	-
8	900696	HU	B	F	-	342
8	900700	HU	B	F	730	331
8	900705	HU	B	F	-	274
8	900707	HU	B	F	582	269
8	900714	HU	B	F	691	299
8	900721	HU	B	F	605	268
8	900729	HU	B	F	609	263
8	900729	HU	B	F	c 628	261
8	900732	HU	B	F	615	284
8	900732	HU	B	F	685	298
8	900734	HU	B	F	649	296
8	900734	HU	B	F	682	297
8	900735	HU	B	F	-	251
8	900735	HU	B	F	-	c 275
8	900735	HU	B	F	e 620	273
8	900739	HU	B	F	723	298
8	900742	HU	B	F	773	321
8	900743	HU	B	F	-	266
8	900755	HU	B	F	-	308
8	900720	HU	B	G	601	262
9	900689	HU	B	F	-	310
9	900689	HU	B	F	655	289
9	900689	HU	B	F	c 633	284
9	900691	HU	B	F	e 710	327
9	900695	HU	B	F	588	274
9	900695	HU	B	F	652	286
9	900702	HU	B	F	-	281
9	900702	HU	B	F	761	326
9	900706	HU	B	F	-	290
9	900706	HU	B	F	673	305
9	900718	HU	B	F	769	318

Period	Box	Elem	TAX	FUS	BT	HTC
9	900737	HU	B	F	806	348
9	900751	HU	B	F	698	316
9	900755	HU	B	F	c 625	293
10	900692	HU	B	F	715	358
10	900718	HU	B	F	728	342
10	900733	HU	B	F	648	298
10	900733	HU	B	F	683	313
10	900733	HU	B	F	712	305
10	900733	HU	B	F	720	331
10	900733	HU	B	F	800	333
10	900736	HU	B	F	-	253
10	900736	HU	B	F	706	321
10	900752	HU	B	F	-	346
10	900752	HU	B	F	694	301
10	900752	HU	B	F	703	321
10	900752	HU	B	F	754	344
10	900752	HU	B	F	845	369
10	900754	HU	B	F	740	320
10	900760	HU	B	F	661	284
10	900760	HU	B	F	c 715	-
10	900760	HU	B	F	e 740	354
11	900692	HU	B	F	-	380
11	900731	HU	B	F	733	344
11	900731	HU	B	F	734	333
11	900748	HU	B	F	646	290
11	900748	HU	B	F	e 740	329
11	900749	HU	B	F	-	314
11	900749	HU	B	F	-	345
11	900749	HU	B	F	621	291
11	900753	HU	B	F	757	319
11	900753	HU	B	F	c 747	359
11	900753	HU	B	F	c 753	335
11	900753	HU	B	F	e 650	c 285

Table 34. Cattle metacarpal measurements.

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
5	900701	MC	B	F	e 1650	-	292	487	-	-	214	-	-	191	-	241
5	900739	MC	B	F	-	-	-	-	267	-	215	-	248	209	280	253
6	900690	MC	B	F	-	441	-	390	206	215	174	237	220	186	246	222
6	900690	MC	B	F	-	525	-	437	252	257	213	-	252	203	274	251
6	900699	MC	B	F	1650	502	281	460	240	231	188	258	228	176	249	229
6	900701	MC	B	F	1628	c 546	291	502	267	259	224	-	260	208	285	261
6	900704	MC	B	F	1561	461	249	416	219	218	190	246	217	179	245	225
6	900738	MC	B	F	-	-	-	482	-	-	-	-	-	-	-	-
6	900740	MC	B	F	-	553	-	475	262	262	231	302	268	220	-	265
6	900744	MC	B	F	-	573	-	-	284	261	-	-	-	-	-	-
6	900744	MC	B	F	-	581	-	506	264	288	205	c 274	c 256	220	c 283	c 253
6	900745	MC	B	F	-	514	-	-	235	253	190	269	245	204	276	242
6	900745	MC	B	F	-	516	-	-	240	256	190	-	244	202	274	241
8	861302	MC	B	F	-	518	-	437	254	241	185	265	236	200	-	233
8	861302	MC	B	F	-	590	-	528	286	270	232	304	268	212	294	268
8	900693	MC	B	F	-	493	-	430	235	232	197	263	228	184	c 259	236
8	900696	MC	B	F	-	457	-	405	214	214	174	250	226	188	260	226
8	900696	MC	B	F	-	496	-	422	232	232	190	c 263	236	180	255	235
8	900696	MC	B	F	-	e 490	-	462	-	-	204	c 273	248	216	278	249
8	900697	MC	B	F	-	530	-	454	253	255	220	298	269	213	294	272
8	900697	MC	B	F	-	566	-	484	276	277	229	307	279	212	298	277
8	900700	MC	B	F	-	472	-	404	232	221	199	263	234	182	255	234
8	900700	MC	B	F	-	501	-	449	242	236	208	-	242	193	-	245
8	900700	MC	B	F	-	505	-	462	240	237	211	277	245	198	272	245
8	900700	MC	B	F	-	518	-	475	c 243	247	c 212	-	256	207	c 283	260
8	900700	MC	B	F	-	542	-	492	254	266	211	286	263	228	293	267
8	900700	MC	B	F	-	547	-	487	259	266	205	286	262	229	294	264

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
8	900700	MC	B	F	-	554	-	484	273	267	227	289	260	210	281	258
8	900700	MC	B	F	-	556	-	486	285	254	229	285	251	200	277	253
8	900700	MC	B	F	-	594	-	493	277	299	228	-	263	-	-	-
8	900700	MC	B	F	1720	550	306	490	271	255	222	295	264	204	287	266
8	900705	MC	B	F	-	474	-	-	228	224	188	c 247	218	176	243	219
8	900707	MC	B	F	-	478	-	432	234	225	189	255	227	173	250	227
8	900707	MC	B	F	-	520	-	460	c 249	c 244	-	-	-	-	-	-
8	900707	MC	B	F	-	538	-	467	260	250	221	288	256	207	283	259
8	900707	MC	B	F	-	572	-	504	278	276	230	-	266	212	296	268
8	900707	MC	B	F	-	586	-	520	295	268	240	299	275	213	293	270
8	900707	MC	B	F	-	591	-	485	292	c 274	225	-	-	-	-	-
8	900707	MC	B	F	-	e 560	-	503	-	-	226	-	-	-	-	-
8	900707	MC	B	F	1565	-	226	-	-	214	-	-	-	171	-	-
8	900714	MC	B	F	-	535	-	482	257	262	210	-	244	196	269	250
8	900718	MC	B	F	-	453	-	396	223	215	198	-	233	193	c 255	236
8	900719	MC	B	F	-	473	-	416	235	219	179	-	-	172	-	-
8	900719	MC	B	F	-	c 447	-	395	212	218	137	-	c 230	198	-	c 234
8	900719	MC	B	F	-	c 540	-	c 475	-	-	-	-	-	-	-	-
8	900720	MC	B	F	-	449	-	402	217	220	177	240	210	162	238	215
8	900720	MC	B	F	-	509	-	461	237	240	207	c 274	255	221	-	254
8	900720	MC	B	F	-	563	-	492	267	276	215	278	262	228	288	266
8	900720	MC	B	F	-	c 498	-	446	235	-	196	-	239	207	-	232
8	900721	MC	B	F	-	446	-	-	209	217	183	254	227	170	-	-
8	900721	MC	B	F	-	454	-	-	222	220	190	262	234	177	c 251	234
8	900721	MC	B	F	-	472	-	-	227	218	188	c 253	230	180	249	235
8	900721	MC	B	F	-	499	-	-	238	234	191	c 265	248	198	c 267	237
8	900729	MC	B	F	-	459	-	408	220	213	193	259	226	184	255	230
8	900729	MC	B	F	-	570	-	515	270	259	239	-	271	224	304	277
8	900729	MC	B	F	1759	-	285	-	-	259	-	-	-	-	-	-
8	900732	MC	B	F	-	465	-	420	224	222	195	264	231	181	255	229
8	900732	MC	B	F	-	505	-	444	c 248	c 228	212	276	248	192	-	-
8	900732	MC	B	F	-	566	-	-	278	259	233	c 294	270	-	299	275
8	900732	MC	B	F	-	581	-	535	274	271	223	c 283	266	212	282	266
8	900732	MC	B	F	-	e 560	-	c 505	c 260	c 272	c 194	-	-	216	-	-
8	900732	MC	B	F	-	e 600	-	537	-	279	238	316	276	220	310	278
8	900735	MC	B	F	-	-	-	-	-	260	-	-	-	203	c 277	250
8	900735	MC	B	F	-	509	-	466	234	244	197	267	245	209	c 275	245
8	900735	MC	B	F	-	530	-	449	254	255	207	c 271	252	216	c 272	244
8	900742	MC	B	F	-	511	-	465	c 235	240	211	275	240	199	266	240
8	900742	MC	B	F	-	573	-	495	292	262	225	-	-	208	179	257
8	900742	MC	B	F	-	588	-	489	301	268	226	285	251	203	-	254
8	900742	MC	B	F	e 1510	-	c 239	-	218	-	188	c 243	214	-	-	-
8	900743	MC	B	F	-	455	-	408	215	217	184	246	223	170	-	223
8	900743	MC	B	F	-	486	-	440	242	230	200	-	237	185	-	236
8	900743	MC	B	F	-	521	-	469	252	248	203	274	243	195	-	249
8	900743	MC	B	F	-	544	-	473	262	265	213	269	244	201	266	247
8	900743	MC	B	F	-	574	-	512	273	272	227	292	264	213	284	261
8	900743	MC	B	F	-	c 573	-	c 500	c 288	264	229	310	271	209	293	266
8	900743	MC	B	F	1645	498	258	439	242	235	197	273	240	187	-	239
8	900743	MC	B	F	1648	501	263	442	236	237	196	265	236	188	268	240
8	900746	MC	B	F	-	457	-	415	226	216	192	255	224	175	246	225
8	900746	MC	B	F	-	523	-	478	240	256	193	251	225	178	246	227
8	900746	MC	B	F	1643	533	276	465	c 251	-	216	285	256	204	-	-
8	900746	MC	B	F	1688	566	310	488	265	283	216	-	-	216	-	258
8	900746	MC	B	F	e 1690	581	317	491	270	-	219	292	258	211	-	-
8	900746	MC	B	F	e 1780	545	272	486	264	256	225	296	274	215	-	271

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
8	900747	MC	B	F	-	-	-	486	-	277	207	-	260	249	-	263
8	900747	MC	B	F	-	463	-	-	225	218	185	252	224	176	248	229
8	900746	MC	B	F	e 1770	-	275	-	-	-	-	-	-	-	-	-
8	900747	MC	B	F	-	489	-	-	228	228	200	-	243	208	c 267	238
8	900747	MC	B	F	-	560	-	506	266	274	225	300	266	209	287	260
9	861345	MC	B	F	-	449	-	416	216	209	181	c 240	217	169	234	220
9	861346	MC	B	F	-	c 549	-	-	-	262	229	305	-	241	314	281
9	900689	MC	B	F	-	618	-	-	-	293	270	-	309	248	337	313
9	900689	MC	B	F	1809	c 527	282	483	255	241	212	c 290	250	196	281	252
9	900691	MC	B	F	1770	490	261	447	238	228	214	278	248	200	269	249
9	900691	MC	B	F	1820	538	295	500	257	258	224	e 300	260	207	e 290	263
9	900695	MC	B	F	-	526	-	480	242	258	204	c 265	238	191	c 258	242
9	900698	MC	B	F	1811	-	263	-	-	-	-	279	245	202	c 273	250
9	900702	MC	B	F	1997	617	320	564	296	291	247	-	-	228	-	295
9	900706	MC	B	F	-	585	-	486	306	272	227	287	264	208	279	259
9	900728	MC	B	F	-	e 560	-	c 514	-	-	231	-	-	216	-	-
9	900737	MC	B	F	-	453	-	415	218	219	187	c 254	229	174	246	231
9	900737	MC	B	F	-	464	-	411	220	218	184	247	220	175	244	225
9	900737	MC	B	F	-	542	-	501	254	275	222	288	261	210	282	260
9	900737	MC	B	F	2015	656	384	593	320	311	283	-	c 327	265	-	325
9	900741	MC	B	F	-	542	-	500	251	257	217	-	250	201	-	-
9	900741	MC	B	F	-	567	-	492	261	277	209	-	-	229	c 307	274
9	900741	MC	B	F	-	c 508	-	453	237	243	191	269	244	208	270	240
9	900755	MC	B	F	-	538	-	525	c 262	c 246	224	-	257	203	-	262
9	900757	MC	B	F	-	592	-	542	c 284	288	-	-	-	-	-	-
9	900757	MC	B	F	-	618	-	545	305	301	238	319	277	224	310	281
9	900698	MC	B	F	-	-	c 265	-	-	-	-	-	-	-	-	-
9	900737	MC	B	F	e 1780	-	276	-	259	-	206	269	238	-	-	-
9	900698	MC	B	UM	-	-	257	-	-	-	-	-	-	-	-	-
10	900692	MC	B	F	-	601	-	556	286	276	253	-	284	234	-	287
10	900728	MC	B	F	-	544	-	488	253	255	228	-	255	210	-	248
10	900733	MC	B	F	-	c 526	-	450	c 254	256	c 224	-	253	198	-	257
10	900736	MC	B	F	-	481	-	409	227	239	190	253	220	177	254	229
10	900736	MC	B	F	-	534	-	476	256	256	204	c 279	261	216	289	262
10	900736	MC	B	F	-	567	-	503	275	263	232	298	268	216	296	274
10	900736	MC	B	F	-	c 509	-	c 450	c 251	c 243	-	-	-	-	-	-
10	900736	MC	B	F	1874	536	303	499	255	247	217	292	263	204	287	263
10	900736	MC	B	F	e 1690	c 478	253	-	-	-	-	-	-	-	-	-
10	900752	MC	B	F	-	621	-	580	294	290	241	327	285	227	321	286
10	900752	MC	B	F	1933	576	-	542	280	272	239	315	284	217	295	277
10	900752	MC	B	F	2028	540	320	549	254	252	237	-	270	227	-	281
10	900755	MC	B	F	1940	580	325	544	272	275	247	328	285	238	319	291
10	900755	MC	B	F	2228	653	359	591	c 305	314	258	c 323	293	242	c 313	293
10	900760	MC	B	F	-	541	-	533	246	255	212	295	273	229	-	270
10	900760	MC	B	F	1951	c 542	295	508	-	232	-	-	-	216	-	-
11	900687	MC	B	F	1706	515	278	463	249	245	212	273	240	195	268	244
11	900692	MC	B	F	-	e 640	-	-	-	-	-	-	-	-	-	-
11	900730	MC	B	F	-	491	-	458	235	231	208	-	240	192	-	241
11	900730	MC	B	F	-	546	-	508	256	263	218	-	274	231	-	280
11	900730	MC	B	F	-	c 535	-	512	c 260	c 250	-	-	-	214	-	-
11	900731	MC	B	F	-	673	-	637	324	315	287	392	351	267	378	352
11	900731	MC	B	F	2025	593	325	552	281	275	-	322	287	228	c 312	287
11	900753	MC	B	F	-	591	-	553	291	277	244	-	-	223	-	-

Table 35. Cattle tibia measurements.

Period	Box	Elem	TAX	FUS	Bd
3	900717	TI	B	F	499
3	911967	TI	B	F	523
4	900708	TI	B	F	499
4	900755	TI	B	F	e 550
5	900739	TI	B	F	485
5	900739	TI	B	F	487
5	900739	TI	B	F	523
5	900739	TI	B	F	524
5	900739	TI	B	F	578
6	900690	TI	B	F	563
6	900699	TI	B	F	526
6	900699	TI	B	F	545
6	900703	TI	B	F	448
6	900703	TI	B	F	465
6	900703	TI	B	F	484
6	900703	TI	B	F	521
6	900712	TI	B	F	498
6	900712	TI	B	F	550
6	900713	TI	B	F	473
6	900722	TI	B	F	504
6	900738	TI	B	F	476
6	900740	TI	B	F	498
6	900740	TI	B	F	527
6	900740	TI	B	F	540
6	900740	TI	B	F	545
6	900744	TI	B	F	476
6	900744	TI	B	F	501
6	900744	TI	B	F	508
6	900744	TI	B	F	c 528
8	861302	TI	B	F	c 498
8	900694	TI	B	F	475
8	900694	TI	B	F	501
8	900694	TI	B	F	529
8	900694	TI	B	F	557
8	900697	TI	B	F	483
8	900700	TI	B	F	496
8	900700	TI	B	F	521
8	900700	TI	B	F	582
8	900718	TI	B	F	496
8	900718	TI	B	F	531
8	900719	TI	B	F	496
8	900720	TI	B	F	462
8	900721	TI	B	F	478
8	900721	TI	B	F	653
8	900723	TI	B	F	473
8	900723	TI	B	F	474
8	900723	TI	B	F	481
8	900723	TI	B	F	484
8	900723	TI	B	F	495
8	900729	TI	B	F	531
8	900729	TI	B	F	614
8	900729	TI	B	F	714
8	900732	TI	B	F	455
8	900732	TI	B	F	486
8	900732	TI	B	F	489
8	900732	TI	B	F	497
8	900732	TI	B	F	528
8	900732	TI	B	F	632
8	900734	TI	B	F	443
8	900734	TI	B	F	492
8	900734	TI	B	F	500
8	900734	TI	B	F	532
8	900734	TI	B	F	c 506
8	900735	TI	B	F	445
8	900735	TI	B	F	467
8	900735	TI	B	F	520
8	900735	TI	B	F	e 600
8	900742	TI	B	F	494
8	900742	TI	B	F	508
8	900742	TI	B	F	546
8	900742	TI	B	F	c 661
8	900743	TI	B	F	469
8	900743	TI	B	F	481
8	900743	TI	B	F	499
8	900746	TI	B	F	555
8	900746	TI	B	F	568
8	900721	TI	B	G	547
8	900742	TI	B	G	433
8	900746	TI	B	G	482
8	900746	TI	B	G	484
9	861338	TI	B	F	445
9	861341	TI	B	F	517
9	900689	TI	B	F	542
9	900689	TI	B	F	599
9	900691	TI	B	F	538
9	900691	TI	B	F	707
9	900695	TI	B	F	507
9	900695	TI	B	F	512
9	900695	TI	B	F	562
9	900695	TI	B	F	575
9	900698	TI	B	F	561
9	900698	TI	B	F	570
9	900706	TI	B	F	577
9	900718	TI	B	F	472
9	900718	TI	B	F	593
9	900718	TI	B	F	c 492
9	900728	TI	B	F	566
9	900737	TI	B	F	506
9	900737	TI	B	F	548
9	900741	TI	B	F	645
9	900751	TI	B	F	562
9	900757	TI	B	F	560
9	900757	TI	B	F	574
9	900757	TI	B	F	602
9	900757	TI	B	F	630

Period	Box	Elem	TAX	FUS	Bd
9	900757	TI	B	F	635
9	900758	TI	B	F	601
9	900758	TI	B	F	608
9	900766	TI	B	F	594
9	900695	TI	B	G	646
10	861345	TI	B	F	569
10	900718	TI	B	F	588
10	900728	TI	B	F	499
10	900736	TI	B	F	513
10	900736	TI	B	F	543
10	900736	TI	B	F	568
10	900736	TI	B	F	644
10	900736	TI	B	F	c 617
10	900752	TI	B	F	632
10	900754	TI	B	F	553
10	900755	TI	B	F	568
10	900755	TI	B	F	575
10	900755	TI	B	F	587
10	900755	TI	B	F	c 513
10	900755	TI	B	F	c 592
10	900760	TI	B	F	592
10	900760	TI	B	F	c 556
10	900764	TI	B	F	522
10	900736	TI	B	G	561
10	900754	TI	B	G	551
10	900755	TI	B	G	c 642
11	900687	TI	B	F	471
11	900687	TI	B	F	633
11	900692	TI	B	F	c 665
11	900748	TI	B	F	569
11	900748	TI	B	F	577
11	900748	TI	B	F	594
11	900749	TI	B	F	579
11	900749	TI	B	F	603
11	900749	TI	B	F	635
11	900753	TI	B	F	552
11	900753	TI	B	F	556
11	900753	TI	B	F	562
11	900753	TI	B	F	585
11	900753	TI	B	F	587
11	900753	TI	B	F	c 542
11	900753	TI	B	F	c 545
11	900753	TI	B	F	c 577
11	900753	TI	B	F	c 620

Table 36. Cattle astragalus measurements.

Period	Box	Elem	TAX	GLl	Bd	Dl
1	900725	AS	B	c 535	c 328	c 276
4	900708	AS	B	540	330	-
4	900708	AS	B	558	c 371	-
6	900690	AS	B	548	347	302
6	900699	AS	B	537	331	295
6	900699	AS	B	c 527	351	297
6	900699	AS	B	c 535	355	309
6	900703	AS	B	-	344	-
6	900703	AS	B	544	339	294
6	900703	AS	B	548	356	296
6	900703	AS	B	570	390	324
6	900703	AS	B	578	c 377	322
6	900703	AS	B	579	389	324
6	900712	AS	B	566	362	309
6	900712	AS	B	582	386	320
6	900713	AS	B	584	381	329
6	900722	AS	B	544	-	-
6	900722	AS	B	546	351	302
6	900738	AS	B	-	-	314
6	900738	AS	B	524	325	282
6	900738	AS	B	530	342	291
6	900738	AS	B	533	-	289
6	900738	AS	B	546	331	-
6	900738	AS	B	568	372	318
6	900740	AS	B	530	319	296
6	900740	AS	B	552	c 366	c 316
6	900740	AS	B	556	364	299
6	900740	AS	B	561	362	314
6	900740	AS	B	565	374	312
6	900740	AS	B	571	388	322
6	900744	AS	B	510	340	289
6	900744	AS	B	511	316	275
6	900744	AS	B	518	347	297
6	900744	AS	B	534	322	296
6	900744	AS	B	601	402	325
6	900744	AS	B	602	406	323
6	900745	AS	B	508	326	285
6	900745	AS	B	518	330	284
6	900745	AS	B	547	366	312
8	861302	AS	B	543	352	302
8	861343	AS	B	567	346	315
8	900693	AS	B	556	347	305
8	900693	AS	B	581	351	c 320
8	900694	AS	B	-	318	278
8	900694	AS	B	517	296	c 287
8	900694	AS	B	c 573	c 348	320
8	900694	AS	B	e 540	333	-
8	900696	AS	B	-	419	-
8	900696	AS	B	528	-	-
8	900696	AS	B	562	357	311
8	900696	AS	B	604	c 381	c 338

Period	Box	Elem	TAX	GLl	Bd	Dl
8	900697	AS	B	574	362	315
8	900697	AS	B	590	396	327
8	900700	AS	B	521	327	287
8	900700	AS	B	583	c 362	330
8	900705	AS	B	537	-	301
8	900705	AS	B	576	376	325
8	900705	AS	B	589	-	332
8	900705	AS	B	600	376	-
8	900705	AS	B	e 480	312	275
8	900705	AS	B	e 560	-	314
8	900707	AS	B	-	322	290
8	900707	AS	B	551	368	311
8	900719	AS	B	541	342	288
8	900720	AS	B	519	c 347	288
8	900720	AS	B	543	338	303
8	900720	AS	B	545	338	302
8	900720	AS	B	546	c 359	312
8	900720	AS	B	563	-	323
8	900723	AS	B	-	382	-
8	900723	AS	B	468	305	265
8	900723	AS	B	517	314	282
8	900723	AS	B	530	344	301
8	900723	AS	B	554	339	296
8	900723	AS	B	559	-	-
8	900723	AS	B	563	372	-
8	900723	AS	B	629	424	343
8	900729	AS	B	545	348	-
8	900729	AS	B	553	355	-
8	900729	AS	B	575	-	-
8	900729	AS	B	602	-	333
8	900732	AS	B	530	341	295
8	900732	AS	B	541	324	299
8	900732	AS	B	545	363	308
8	900732	AS	B	551	372	308
8	900734	AS	B	-	361	-
8	900734	AS	B	546	330	301
8	900734	AS	B	c 546	c 346	c 299
8	900735	AS	B	-	355	307
8	900735	AS	B	-	362	-
8	900735	AS	B	531	343	295
8	900742	AS	B	512	325	290
8	900742	AS	B	519	328	278
8	900742	AS	B	527	346	298
8	900742	AS	B	552	351	302
8	900742	AS	B	555	367	317
8	900742	AS	B	605	415	337
8	900743	AS	B	539	347	304
8	900743	AS	B	543	361	306
8	900746	AS	B	555	362	310
8	900746	AS	B	557	342	303
8	900746	AS	B	574	363	323
8	900746	AS	B	586	373	321
8	900746	AS	B	c 525	e 300	-
8	900747	AS	B	467	313	262
8	900747	AS	B	574	365	315
8	900747	AS	B	709	428	393

Period	Box	Elem	TAX	GLl	Bd	Dl
8	900747	AS	B	c 676	c 390	c 373
9	861338	AS	B	-	391	-
9	861338	AS	B	587	-	c 328
9	861344	AS	B	-	-	288
9	861346	AS	B	507	c 332	288
9	900689	AS	B	605	364	-
9	900689	AS	B	607	370	330
9	900689	AS	B	635	420	346
9	900691	AS	B	594	408	333
9	900691	AS	B	616	c 380	336
9	900691	AS	B	639	416	363
9	900695	AS	B	563	359	306
9	900695	AS	B	646	419	356
9	900698	AS	B	559	393	320
9	900702	AS	B	686	434	382
9	900702	AS	B	699	c 466	385
9	900706	AS	B	665	433	379
9	900706	AS	B	c 645	439	-
9	900718	AS	B	650	423	364
9	900718	AS	B	c 531	349	c 296
9	900728	AS	B	640	-	-
9	900728	AS	B	c 670	c 431	-
9	900737	AS	B	-	c 404	-
9	900737	AS	B	627	426	346
9	900737	AS	B	c 562	c 343	-
9	900741	AS	B	612	-	c 337
9	900741	AS	B	636	391	c 344
9	900741	AS	B	679	447	381
9	900741	AS	B	c 738	c 507	-
9	900750	AS	B	669	-	366
9	900750	AS	B	672	407	369
9	900750	AS	B	751	488	415
9	900751	AS	B	675	397	353
9	900757	AS	B	-	425	-
9	900757	AS	B	486	c 311	269
9	900757	AS	B	614	401	353
9	900757	AS	B	645	427	-
9	900757	AS	B	648	414	354
9	900758	AS	B	-	410	-
9	900758	AS	B	652	397	354
9	900758	AS	B	672	451	379
9	900766	AS	B	-	374	322
9	900766	AS	B	645	-	-
9	900766	AS	B	655	390	355
9	900766	AS	B	689	402	385
10	900692	AS	B	620	-	-
10	900692	AS	B	638	c 374	351
10	900718	AS	B	625	400	352
10	900718	AS	B	666	401	376
10	900728	AS	B	567	-	309
10	900733	AS	B	-	476	c 445
10	900733	AS	B	-	c 408	-
10	900733	AS	B	669	431	382
10	900733	AS	B	723	451	404

Period	Box	Elem	TAX	GLl	Bd	Dl
10	900733	AS	B	761	477	-
10	900733	AS	B	c 682	444	-
10	900736	AS	B	601	404	339
10	900736	AS	B	630	-	-
10	900736	AS	B	633	c 403	350
10	900736	AS	B	643	413	349
10	900752	AS	B	735	444	410
10	900754	AS	B	-	-	352
10	900754	AS	B	-	379	343
10	900754	AS	B	567	354	315
10	900754	AS	B	582	353	318
10	900754	AS	B	609	379	351
10	900754	AS	B	623	407	352
10	900754	AS	B	647	413	358
10	900754	AS	B	669	c 435	-
10	900754	AS	B	697	437	390
10	900754	AS	B	711	446	387
10	900754	AS	B	725	438	405
10	900754	AS	B	c 690	449	387
10	900755	AS	B	-	407	-
10	900755	AS	B	-	430	408
10	900755	AS	B	598	360	336
10	900755	AS	B	644	420	362
10	900755	AS	B	654	-	356
10	900760	AS	B	-	c 395	-
10	900760	AS	B	-	c 436	-
10	900760	AS	B	648	404	e 380
10	900760	AS	B	661	427	385
10	900760	AS	B	688	418	375
10	900760	AS	B	c 591	374	341
10	900760	AS	B	c 625	c 404	-
10	900764	AS	B	601	-	339
10	900764	AS	B	652	440	c 360
11	900687	AS	B	582	338	309
11	900687	AS	B	595	c 375	335
11	900687	AS	B	636	e 420	-
11	900692	AS	B	717	454	399
11	900730	AS	B	536	c 357	295
11	900731	AS	B	-	462	-
11	900748	AS	B	-	406	-
11	900748	AS	B	616	364	340
11	900748	AS	B	632	390	356
11	900748	AS	B	634	409	363
11	900748	AS	B	662	409	e 360
11	900748	AS	B	c 615	374	e 340
11	900748	AS	B	c 706	c 424	396
11	900749	AS	B	-	c 390	-
11	900749	AS	B	-	c 443	-
11	900749	AS	B	686	e 430	383
11	900749	AS	B	707	434	399
11	900749	AS	B	c 670	-	-
11	900749	AS	B	c 680	425	374
11	900753	AS	B	-	418	-
11	900753	AS	B	-	c 406	-
11	900753	AS	B	603	387	350
11	900753	AS	B	623	399	341
11	900753	AS	B	646	c 396	-
11	900753	AS	B	650	-	359
11	900753	AS	B	662	427	368
11	900753	AS	B	c 715	468	397
11	900753	AS	B	c 744	e 500	-

Table 37. Cattle metatarsal measurements.

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
5	900701	MT	B	F	-	525	-	481	264	234	215	295	250	196	285	253
5	900724	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
5	900759	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
6	900699	MT	B	F	-	493	-	422	-	269	-	-	-	213	-	254
6	900699	MT	B	F	-	517	-	480	259	236	208	290	250	196	279	254
6	900703	MT	B	F	-	413	-	-	-	188	176	-	-	167	-	215
6	900704	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
6	900704	MT	B	F	e 1940	-	233	-	-	-	-	-	-	-	-	-
6	900704	MT	B	F	e 1960	490	241	451	236	224	207	-	248	188	-	253
6	900712	MT	B	F	-	c 523	-	457	c 266	c 234	216	c 281	250	191	-	251
6	900722	MT	B	F	-	462	-	422	223	212	181	245	215	166	242	224
6	900722	MT	B	F	1831	425	211	414	204	196	181	251	219	171	244	226
6	900738	MT	B	F	-	444	-	402	213	195	190	251	221	172	241	226

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
6	900738	MT	B	F	-	516	-	483	239	222	212	289	255	200	284	262
6	900738	MT	B	F	-	561	-	-	256	284	204	-	-	220	-	-
6	900738	MT	B	F	1826	455	216	430	211	210	182	250	226	177	c 244	c 224
6	900740	MT	B	F	-	548	-	500	269	250	220	285	253	211	280	256
6	900744	MT	B	F	1794	c 403	194	384	-	-	183	240	c 208	176	234	213
6	900745	MT	B	F	-	504	-	424	258	c 216	195	c 272	245	179	262	243
6	900738	MT	B	F	c 1848	-	218	-	-	-	-	-	-	-	-	-
8	900746	MT	B	F	e 1910	-	240	-	-	243	-	-	-	200	279	256
8	861302	MT	B	F	-	421	-	386	201	193	192	259	226	176	249	232
8	861339	MT	B	F	-	409	-	380	196	191	175	241	211	173	241	211
8	900694	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
8	900694	MT	B	F	-	452	-	418	216	209	203	267	236	188	c 257	239
8	900694	MT	B	F	-	491	-	432	244	222	198	268	237	187	258	243
8	900696	MT	B	F	e 1910	e 510	-	455	e 250	231	190	263	235	182	c 257	238
8	900697	MT	B	F	-	503	-	440	246	236	207	293	262	201	-	265
8	900697	MT	B	F	-	503	-	452	251	234	198	272	241	183	263	243
8	900697	MT	B	F	-	520	-	452	265	234	204	281	250	197	272	249
8	900697	MT	B	F	-	e 480	-	437	226	e 220	-	-	-	-	-	-
8	900700	MT	B	F	-	423	-	377	206	198	191	257	231	181	255	235
8	900700	MT	B	F	-	475	-	434	225	218	196	-	235	179	260	242
8	900700	MT	B	F	-	486	-	437	235	223	196	269	232	179	259	238
8	900700	MT	B	F	-	506	-	463	240	234	214	290	253	195	280	257
8	900700	MT	B	F	-	508	-	452	251	239	208	-	245	191	-	250
8	900700	MT	B	F	-	518	-	-	248	240	220	292	256	199	282	260
8	900700	MT	B	F	-	527	-	491	354	243	218	290	256	206	287	264
8	900700	MT	B	F	-	531	-	465	262	239	209	281	251	199	273	251
8	900700	MT	B	F	-	c 510	-	455	246	c 237	220	-	249	193	-	-
8	900700	MT	B	F	1981	526	236	458	265	234	216	294	261	200	283	262
8	900705	MT	B	F	-	395	-	360	192	180	183	245	217	164	233	217
8	900705	MT	B	F	-	452	-	420	220	207	184	-	216	167	-	224
8	900705	MT	B	F	2170	549	260	503	261	250	223	303	265	211	297	267
8	900707	MT	B	F	-	409	-	379	198	190	177	243	215	170	237	220
8	900707	MT	B	F	-	426	-	398	208	193	187	246	220	175	237	222
8	900707	MT	B	F	-	467	-	438	231	208	203	-	239	189	260	244
8	900707	MT	B	F	-	470	-	434	234	214	211	c 267	235	186	-	241
8	900707	MT	B	F	-	516	-	484	251	236	222	290	260	206	285	268
8	900707	MT	B	F	-	523	-	467	266	240	215	281	262	202	-	260
8	900707	MT	B	F	-	540	-	484	265	244	217	-	271	202	-	-
8	900707	MT	B	F	e 1790	e 440	206	413	228	e 200	201	-	238	192	-	247
8	900720	MT	B	F	1909	501	219	426	257	219	211	279	250	190	264	247
8	900720	MT	B	F	2048	515	235	456	260	228	-	-	-	-	-	-
8	900721	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
8	900721	MT	B	F	-	434	-	-	202	-	183	-	223	180	242	230
8	900721	MT	B	F	-	458	-	-	215	206	195	264	232	177	254	232
8	900721	MT	B	F	-	c 431	-	-	200	198	186	257	223	178	255	232
8	900729	MT	B	F	-	-	-	-	264	-	206	278	238	c 189	-	247
8	900729	MT	B	F	-	-	-	c 461	-	-	220	-	-	211	-	-
8	900729	MT	B	F	-	478	-	467	231	216	c 203	-	-	189	-	-
8	900729	MT	B	F	-	c 474	-	446	240	208	209	-	251	197	-	-
8	900729	MT	B	F	1991	510	241	-	254	c 225	-	-	-	194	-	-
8	900732	MT	B	F	-	-	-	-	-	-	-	-	-	-	-	-
8	900732	MT	B	F	-	423	-	397	207	193	182	246	217	267	237	222
8	900732	MT	B	F	-	453	-	413	222	215	189	253	225	173	246	224
8	900732	MT	B	F	-	471	-	441	234	215	200	270	235	188	-	238
8	900732	MT	B	F	-	475	-	407	221	236	182	252	233	200	265	236

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
8	900732	MT	B	F	-	475	-	432	227	213	192	257	233	183	254	233
8	900732	MT	B	F	-	478	-	429	228	221	198	276	235	188	267	243
8	900732	MT	B	F	-	525	-	493	248	c 245	216	303	264	209	294	265
8	900732	MT	B	F	-	526	-	474	261	240	222	301	262	207	-	264
8	900732	MT	B	F	e 1710	-	208	391	-	194	-	-	-	165	-	-
8	900734	MT	B	F	e 1930	493	234	445	238	225	198	268	231	181	c 256	236
8	900735	MT	B	F	-	517	-	468	254	236	206	279	247	197	274	250
8	900735	MT	B	F	-	548	-	495	268	250	218	-	277	211	-	278
8	900735	MT	B	F	-	c 450	-	424	c 211	-	c 195	-	-	187	c 262	240
8	900735	MT	B	F	-	e 440	-	412	c 208	201	199	264	233	186	257	248
8	900735	MT	B	F	-	e 550	-	511	-	c 253	215	292	256	200	282	258
8	900735	MT	B	F	2071	486	232	462	c 230	c 225	207	284	253	200	279	254
8	900742	MT	B	F	-	-	-	392	202	-	182	-	217	167	-	219
8	900742	MT	B	F	-	445	-	395	215	199	195	269	241	180	258	241
8	900742	MT	B	F	-	460	-	416	206	214	203	270	244	194	268	251
8	900742	MT	B	F	-	498	-	461	241	234	202	c 267	242	202	272	249
8	900742	MT	B	F	-	542	-	-	257	244	221	286	255	208	277	259
8	900742	MT	B	F	-	c 569	-	534	c 267	-	243	318	286	224	-	290
8	900743	MT	B	F	-	431	-	392	213	203	177	254	222	168	248	226
8	900743	MT	B	F	-	466	-	438	230	211	194	c 267	236	176	255	235
8	900743	MT	B	F	-	491	-	440	237	228	197	272	240	189	268	244
8	900743	MT	B	F	-	598	-	486	315	260	226	c 301	266	206	287	262
8	900743	MT	B	F	1740	431	c 202	386	215	198	177	-	211	168	-	215
8	900746	MT	B	F	-	453	-	411	222	207	189	255	231	174	243	227
8	900746	MT	B	F	-	508	-	448	252	241	214	286	256	201	278	258
8	900746	MT	B	F	-	528	-	464	256	248	210	287	249	194	278	255
8	900746	MT	B	F	1901	475	214	436	233	-	200	-	251	192	-	-
8	900746	MT	B	F	2029	504	218	461	245	234	214	286	257	204	280	262
8	900746	MT	B	F	e 1980	444	192	408	-	-	-	-	-	-	-	-
8	900746	MT	B	F	e 2020	c 499	218	456	c 235	c 223	214	-	257	203	-	264
8	900746	MT	B	F	e 2040	520	233	459	256	245	217	289	254	200	-	256
8	900746	MT	B	F	e 2060	526	236	458	264	243	219	-	257	202	280	254
8	900747	MT	B	F	-	-	-	426	c 218	217	205	-	240	189	262	243
8	900747	MT	B	F	-	-	-	462	-	271	-	-	-	215	-	251
8	900747	MT	B	F	-	474	-	420	217	233	182	253	236	197	263	236
8	900747	MT	B	F	-	492	-	451	234	229	211	280	247	197	273	253
8	900747	MT	B	F	-	496	-	438	252	225	193	261	228	178	258	230
8	900747	MT	B	F	-	506	-	444	c 260	-	195	-	-	176	-	230
8	900747	MT	B	F	-	523	-	500	c 244	240	230	300	273	223	300	285
8	900747	MT	B	F	-	530	-	490	248	247	228	300	268	216	294	273
8	900747	MT	B	F	-	c 482	-	445	232	220	192	266	234	185	-	239
8	900747	MT	B	F	-	c 549	-	481	-	c 287	198	279	256	220	-	261
8	900756	MT	B	F	-	504	-	469	c 242	240	207	-	-	198	-	-
8	900735	MT	B	G	-	410	-	397	198	188	177	241	211	165	233	214
9	861336	MT	B	F	2238	501	234	485	232	229	218	298	252	206	289	262
9	900689	MT	B	F	-	476	-	460	230	220	206	-	243	191	267	243
9	900689	MT	B	F	-	641	-	561	312	292	252	349	305	224	328	300
9	900689	MT	B	F	e 2030	474	228	445	228	217	202	282	249	188	274	252
9	900691	MT	B	F	-	458	-	424	220	208	207	277	242	186	266	244
9	900691	MT	B	F	2098	500	235	466	250	228	220	302	264	213	297	270
9	900695	MT	B	F	-	456	-	416	218	198	201	272	238	185	261	240
9	900695	MT	B	F	-	c 434	-	381	-	-	-	-	-	-	-	-
9	900698	MT	B	F	-	479	-	427	238	c 214	194	264	225	174	246	226
9	900698	MT	B	F	1873	435	189	391	204	199	187	252	214	176	244	223
9	900702	MT	B	F	2108	c 492	224	462	242	229	206	282	250	195	276	254

Per	Box	Elem	TAX	FUS	GL	Bd	SD	BatF	A	B	1	2	3	4	5	6
9	900706	MT	B	F	-	e 520	-	-	-	-	-	-	-	-	-	-
9	900706	MT	B	F	-	e 550	-	-	-	-	-	-	-	-	-	-
9	900718	MT	B	F	-	c 566	-	c 538	c 269	c 261	252	-	292	241	-	297
9	900737	MT	B	F	-	492	-	441	236	222	191	264	236	179	-	-
9	900741	MT	B	F	-	-	-	-	c 254	c 249	242	-	284	-	-	-
9	900741	MT	B	F	-	-	-	497	-	-	226	210	-	-	-	-
9	900741	MT	B	F	-	c 466	-	424	219	-	191	-	-	176	-	-
9	900756	MT	B	F	2020	c 469	232	449	c 224	c 206	209	276	249	197	266	249
9	900756	MT	B	F	2212	c 530	259	500	258	246	227	292	258	210	293	269
9	900756	MT	B	F	c 2126	466	227	437	228	217	214	282	244	199	277	250
9	900757	MT	B	F	-	555	-	525	251	280	215	304	283	240	322	290
10	900692	MT	B	F	-	477	-	462	e 220	224	-	-	-	206	c 279	263
10	900692	MT	B	F	-	535	-	c 520	253	248	229	-	-	221	-	-
10	900692	MT	B	F	-	543	-	528	260	243	239	c 324	292	223	-	286
10	900718	MT	B	F	-	-	-	501	-	-	-	-	-	-	-	-
10	900718	MT	B	F	-	495	-	466	238	226	227	292	264	206	c 280	264
10	900718	MT	B	F	-	c 560	-	-	-	-	-	-	-	-	-	-
10	900728	MT	B	F	-	c 441	-	404	207	205	189	-	227	184	-	230
10	900733	MT	B	F	-	449	-	422	224	208	189	-	230	178	-	230
10	900736	MT	B	F	-	492	-	461	239	226	210	-	240	195	266	247
10	900736	MT	B	F	-	501	-	465	252	c 222	196	c 275	244	180	c 260	c 243
10	900736	MT	B	F	-	505	-	459	248	c 224	209	c 285	254	191	275	256
10	900736	MT	B	F	-	553	-	518	267	251	230	310	275	214	299	272
10	900736	MT	B	F	-	661	-	593	339	c 290	263	340	298	241	332	310
10	900736	MT	B	F	-	c 465	-	454	-	-	216	c 285	257	207	287	263
10	900752	MT	B	F	-	512	-	467	243	240	224	-	272	212	c 290	274
10	900752	MT	B	F	-	549	-	528	269	252	243	326	284	231	316	286
10	900752	MT	B	F	-	581	-	577	277	273	255	335	306	247	326	306
10	900752	MT	B	F	2146	c 497	252	469	-	232	-	-	-	201	284	265
10	900752	MT	B	F	2287	529	261	500	252	243	236	322	286	226	315	291
10	900752	MT	B	F	e 2120	-	230	-	-	-	-	-	-	-	-	-
10	900754	MT	B	F	-	c 504	-	482	c 243	233	219	296	262	202	-	262
10	900760	MT	B	F	e 2570	-	307	627	381	e 320	280	-	c 341	263	383	336
10	900764	MT	B	F	e 1930	-	218	c 435	-	-	-	-	-	-	-	-
11	900687	MT	B	F	2184	c 478	237	461	c 227	c 222	209	286	253	203	278	255
11	900730	MT	B	F	-	431	-	374	213	203	187	262	228	173	-	234
11	900731	MT	B	F	-	581	-	541	275	278	246	332	290	228	320	293
11	900731	MT	B	F	-	614	-	572	292	278	266	c 345	314	253	c 343	317
11	900731	MT	B	F	-	614	-	589	296	283	280	381	332	264	375	340
11	900731	MT	B	F	2228	514	258	504	243	238	223	302	273	c 212	c 287	273
11	900731	MT	B	F	e 2240	531	280	518	256	242	224	c 306	272	216	c 296	271
11	900749	MT	B	F	-	575	-	566	-	-	-	-	-	-	-	-
11	900749	MT	B	F	e 2470	574	298	577	266	265	245	340	301	-	330	305
11	900753	MT	B	F	-	565	-	541	269	255	244	c 331	289	225	321	291
11	900753	MT	B	F	-	c 461	-	447	c 222	c 202	206	c 279	246	192	-	249
11	900753	MT	B	F	2199	-	245	-	-	-	-	-	-	-	-	-

Table 38. Sheep/goat humerus measurements.

Per	Box	Elem	TAX	FUS	BT	HTC
3	900688	HU	O/C	F	-	112
3	900688	HU	O/C	F	-	130
3	900688	HU	O/C	F	261	126
3	900688	HU	O/C	F	265	132
3	900688	HU	O/C	F	271	131
3	900688	HU	O/C	F	271	136
5	900701	HU	O/C	F	c 261	131
5	900739	HU	O/C	F	257	122
5	900739	HU	O/C	F	259	129
5	900759	HU	O/C	F	255	124
6	900745	HU	CAH	F	285	127
6	900690	HU	O/C	F	-	137
6	900690	HU	O/C	F	255	126
6	900690	HU	O/C	F	267	130
6	900699	HU	O/C	F	-	124
6	900699	HU	O/C	F	-	126
6	900699	HU	O/C	F	259	124
6	900699	HU	O/C	F	263	128
6	900699	HU	O/C	F	266	128
6	900701	HU	O/C	F	242	113
6	900703	HU	O/C	F	267	131
6	900703	HU	O/C	F	268	131
6	900713	HU	O/C	F	247	113
6	900713	HU	O/C	F	268	131
6	900722	HU	O/C	F	-	116
6	900722	HU	O/C	F	-	137
6	900722	HU	O/C	F	252	c 116
6	900722	HU	O/C	F	257	128
6	900722	HU	O/C	F	276	140
6	900722	HU	O/C	F	287	139
6	900722	HU	O/C	F	c 254	132
6	900738	HU	O/C	F	-	133
6	900738	HU	O/C	F	259	132
6	900738	HU	O/C	F	272	135
6	900739	HU	O/C	F	261	137
6	900740	HU	O/C	F	-	122
6	900740	HU	O/C	F	237	118
6	900740	HU	O/C	F	247	108
6	900740	HU	O/C	F	248	126
6	900740	HU	O/C	F	255	126
6	900744	HU	O/C	F	-	119
6	900744	HU	O/C	F	247	121
6	900744	HU	O/C	F	260	121
6	900744	HU	O/C	F	263	123
6	900744	HU	O/C	F	268	134
6	900744	HU	O/C	F	276	133
6	900744	HU	O/C	F	c 257	125
6	900745	HU	O/C	F	254	129
6	900745	HU	O/C	F	258	125
6	900745	HU	O/C	F	262	132
6	900750	HU	O/C	F	294	148
6	900704	HU	O/C	F	254	126
6	900712	HU	O/C	F	-	116
6	900712	HU	O/C	F	-	134
8	861337	HU	O/C	F	258	129
8	861337	HU	O/C	F	267	128
8	861343	HU	O/C	F	256	126
8	900694	HU	O/C	F	-	125
8	900696	HU	O/C	F	259	-
8	900696	HU	O/C	F	260	145
8	900697	HU	O/C	F	246	132
8	900697	HU	O/C	F	250	123
8	900697	HU	O/C	F	253	116
8	900697	HU	O/C	F	258	133
8	900697	HU	O/C	F	273	135
8	900697	HU	O/C	F	274	135
8	900697	HU	O/C	F	276	137
8	900697	HU	O/C	F	283	144
8	900700	HU	O/C	F	-	122
8	900700	HU	O/C	F	-	123
8	900700	HU	O/C	F	-	145
8	900705	HU	O/C	F	-	127
8	900705	HU	O/C	F	-	134
8	900718	HU	O/C	F	271	-
8	900719	HU	O/C	F	252	126
8	900719	HU	O/C	F	253	122
8	900719	HU	O/C	F	259	125
8	900719	HU	O/C	F	276	141
8	900719	HU	O/C	F	279	133
8	900720	HU	O/C	F	-	122
8	900720	HU	O/C	F	-	134
8	900720	HU	O/C	F	247	122
8	900720	HU	O/C	F	254	132
8	900720	HU	O/C	F	256	120
8	900720	HU	O/C	F	257	121
8	900720	HU	O/C	F	259	127
8	900721	HU	O/C	F	-	127
8	900721	HU	O/C	F	237	122
8	900721	HU	O/C	F	254	138
8	900721	HU	O/C	F	264	125
8	900721	HU	O/C	F	266	129
8	900721	HU	O/C	F	274	135
8	900723	HU	O/C	F	-	129
8	900723	HU	O/C	F	-	129
8	900723	HU	O/C	F	-	130
8	900723	HU	O/C	F	251	126
8	900723	HU	O/C	F	258	129
8	900723	HU	O/C	F	259	c 127
8	900729	HU	O/C	F	-	122
8	900729	HU	O/C	F	244	117
8	900729	HU	O/C	F	266	129
8	900729	HU	O/C	F	268	131
8	900732	HU	O/C	F	-	128
8	900732	HU	O/C	F	-	141
8	900732	HU	O/C	F	283	140
8	900732	HU	O/C	F	c 249	123
8	900732	HU	O/C	F	c 288	145

Per	Box	Elem	TAX	FUS	BT	HTC
8	900734	HU	O/C	F	278	134
8	900735	HU	O/C	F	-	122
8	900735	HU	O/C	F	-	125
8	900735	HU	O/C	F	-	126
8	900735	HU	O/C	F	-	130
8	900735	HU	O/C	F	251	121
8	900735	HU	O/C	F	260	130
8	900735	HU	O/C	F	260	133
8	900735	HU	O/C	F	276	130
8	900742	HU	O/C	F	274	146
8	900746	HU	O/C	F	-	126
8	900746	HU	O/C	F	-	126
8	900746	HU	O/C	F	257	127
8	900746	HU	O/C	F	265	133
8	900746	HU	O/C	F	270	124
8	900746	HU	O/C	F	284	136
8	900747	HU	O/C	F	256	-
8	900747	HU	O/C	F	259	125
8	900747	HU	O/C	F	267	125
8	900747	HU	O/C	F	277	138
8	900755	HU	O/C	F	-	128
8	900763	HU	O/C	F	269	-
8	861343	HU	O/C	F	240	123
8	861343	HU	O/C	F	265	127
8	900693	HU	O/C	F	-	125
8	900693	HU	O/C	F	-	131
8	900693	HU	O/C	F	250	119
8	900693	HU	O/C	F	254	120
8	900693	HU	O/C	F	263	126
8	900694	HU	O/C	F	-	143
8	900707	HU	O/C	F	-	131
8	900707	HU	O/C	F	252	122
9	861336	HU	O/C	F	240	124
9	861336	HU	O/C	F	245	127
9	861336	HU	O/C	F	282	137
9	861336	HU	O/C	F	c 280	126
9	861338	HU	O/C	F	247	114
9	861338	HU	O/C	F	255	122
9	861338	HU	O/C	F	263	-
9	861341	HU	O/C	F	245	-
9	861345	HU	O/C	F	246	119
9	861345	HU	O/C	F	266	130
9	900689	HU	O/C	F	-	136
9	900689	HU	O/C	F	265	140
9	900689	HU	O/C	F	272	125
9	900691	HU	O/C	F	254	137
9	900691	HU	O/C	F	273	136
9	900695	HU	O/C	F	262	125
9	900695	HU	O/C	F	c 231	124
9	900698	HU	O/C	F	263	170
9	900698	HU	O/C	F	263	183
9	900702	HU	O/C	F	-	145
9	900702	HU	O/C	F	269	132
9	900702	HU	O/C	F	274	150
9	900702	HU	O/C	F	276	141
9	900706	HU	O/C	F	-	135
9	900706	HU	O/C	F	266	126
9	900706	HU	O/C	F	276	145
9	900706	HU	O/C	F	301	144
9	900718	HU	O/C	F	273	132
9	900718	HU	O/C	F	279	139
9	900718	HU	O/C	F	307	153
9	900728	HU	O/C	F	263	125
9	900737	HU	O/C	F	-	113
9	900737	HU	O/C	F	-	127
9	900737	HU	O/C	F	-	136
9	900737	HU	O/C	F	-	140
9	900737	HU	O/C	F	-	142
9	900737	HU	O/C	F	244	121
9	900737	HU	O/C	F	259	131
9	900737	HU	O/C	F	262	133
9	900737	HU	O/C	F	268	138
9	900737	HU	O/C	F	281	141
9	900741	HU	O/C	F	-	130
9	900741	HU	O/C	F	-	133
9	900741	HU	O/C	F	-	145
9	900741	HU	O/C	F	258	132
9	900741	HU	O/C	F	262	132
9	900741	HU	O/C	F	267	127
9	900741	HU	O/C	F	279	132
9	900741	HU	O/C	F	282	135
9	900741	HU	O/C	F	284	140
9	900741	HU	O/C	F	c 240	121
9	900756	HU	O/C	F	-	127
9	900756	HU	O/C	F	-	128
9	900756	HU	O/C	F	-	137
9	900756	HU	O/C	F	-	138
9	900757	HU	O/C	F	-	150
9	900757	HU	O/C	F	245	-
9	861342	HU	O/C	F	252	124
9	861342	HU	O/C	F	282	135
9	900691	HU	O/C	F	269	136
9	900691	HU	O/C	F	279	131
9	900706	HU	O/C	F	245	121
9	900751	HU	O/C	F	-	144
9	900751	HU	O/C	F	272	148
9	900757	HU	O/C	F	-	127
9	900757	HU	O/C	F	248	125
9	900757	HU	O/C	F	264	128
9	900757	HU	O/C	F	265	134
9	900757	HU	O/C	F	276	133
9	900757	HU	O/C	F	278	-
9	900758	HU	O/C	F	-	137
9	900758	HU	O/C	F	241	119
9	900758	HU	O/C	F	256	125
9	900758	HU	O/C	F	275	140
9	900758	HU	O/C	F	286	145
9	900766	HU	O/C	F	274	138
9	900766	HU	O/C	F	277	132
9	900766	HU	O/C	F	277	137
9	900766	HU	O/C	F	299	156

Per	Box	Elem	TAX	FUS	BT	HTC
10	900718	HU	O/C	F	-	143
10	900718	HU	O/C	F	242	128
10	900718	HU	O/C	F	273	141
10	900718	HU	O/C	F	280	128
10	900718	HU	O/C	F	283	133
10	900718	HU	O/C	F	298	148
10	900718	HU	O/C	F	c 269	135
10	900728	HU	O/C	F	258	124
10	900728	HU	O/C	F	274	135
10	900733	HU	O/C	F	-	135
10	900733	HU	O/C	F	-	149
10	900733	HU	O/C	F	-	163
10	900733	HU	O/C	F	255	121
10	900733	HU	O/C	F	259	129
10	900733	HU	O/C	F	260	133
10	900733	HU	O/C	F	287	144
10	900733	HU	O/C	F	290	146
10	900733	HU	O/C	F	294	154
10	900733	HU	O/C	F	301	152
10	900733	HU	O/C	F	324	167
10	900733	HU	O/C	F	c 276	138
10	900736	HU	O/C	F	247	121
10	900736	HU	O/C	F	261	136
10	900736	HU	O/C	F	272	136
10	900736	HU	O/C	F	282	138
10	900736	HU	O/C	F	286	151
10	900736	HU	O/C	F	c 246	118
10	900752	HU	O/C	F	-	131
10	900752	HU	O/C	F	-	134
10	900752	HU	O/C	F	-	152
10	900752	HU	O/C	F	257	126
10	900752	HU	O/C	F	281	141
10	900752	HU	O/C	F	285	136
10	900752	HU	O/C	F	290	150
10	900752	HU	O/C	F	297	155
10	900752	HU	O/C	F	308	165
10	900752	HU	O/C	F	312	151
10	900752	HU	O/C	F	335	163
10	900754	HU	O/C	F	-	137
10	900754	HU	O/C	F	-	139
10	900754	HU	O/C	F	-	140
10	900754	HU	O/C	F	254	131
10	900754	HU	O/C	F	276	152
10	900755	HU	O/C	F	-	146
10	900755	HU	O/C	F	271	125
10	900755	HU	O/C	F	286	148
10	900755	HU	O/C	F	287	141
10	900755	HU	O/C	F	289	c 143
10	900755	HU	O/C	F	300	147
10	900760	HU	O/C	F	-	137
10	900760	HU	O/C	F	-	147
10	900760	HU	O/C	F	261	131
10	900760	HU	O/C	F	278	153
10	900760	HU	O/C	F	295	150
10	900760	HU	O/C	F	c 266	125
10	900760	HU	O/C	F	c 281	150
10	900760	HU	O/C	F	c 284	c 146
10	900764	HU	O/C	F	c 272	-
10	900692	HU	O/C	F	-	144
11	900687	HU	O/C	F	-	135
11	900687	HU	O/C	F	-	143
11	900730	HU	O/C	F	-	148
11	900730	HU	O/C	F	262	129
11	900731	HU	O/C	F	-	165
11	900748	HU	O/C	F	-	132
11	900748	HU	O/C	F	-	133
11	900748	HU	O/C	F	-	134
11	900748	HU	O/C	F	-	136
11	900748	HU	O/C	F	-	137
11	900748	HU	O/C	F	-	140
11	900748	HU	O/C	F	-	145
11	900748	HU	O/C	F	-	146
11	900748	HU	O/C	F	253	133
11	900748	HU	O/C	F	300	157
11	900749	HU	O/C	F	240	113
11	900749	HU	O/C	F	280	137
11	900749	HU	O/C	F	298	148
11	900753	HU	O/C	F	-	136
11	900753	HU	O/C	F	-	136
11	900753	HU	O/C	F	-	140
11	900753	HU	O/C	F	-	152
11	900753	HU	O/C	F	261	133
11	900753	HU	O/C	F	273	136
11	900753	HU	O/C	F	277	144
11	900753	HU	O/C	F	305	153
11	900753	HU	O/C	F	318	158
11	900692	HU	O/C	F	255	c 129

Table 39. Sheep/goat radius measurements.

Per	Box	Elem	TAX	FUS	GL
3	900716	RA	O/C	F	c 1378
4	900708	RA	O/C	F	1396
6	900738	RA	O/C	F	1349
6	900744	RA	O/C	F	1280
8	861337	RA	O/C	F	1395
8	900719	RA	O/C	F	1429
8	900729	RA	O/C	F	1290
8	900732	RA	O/C	F	1351
8	900732	RA	O/C	F	c 1431
8	900747	RA	O/C	F	1402
8	900759	RA	O/C	F	e 1380
8	900759	RA	O/C	F	e 1390
9	861345	RA	O/C	F	1386
9	900695	RA	O/C	F	1453
9	900758	RA	O/C	F	1450
10	861336	RA	O/C	F	1356
10	900692	RA	O/C	F	1391
10	900733	RA	O/C	F	1487
11	900731	RA	O/C	F	1346
11	900748	RA	O/C	F	e 1480

Table 40. Goat and sheep metacarpal measurements.

Period	Box	Elem	TAX	FUS	GL	Bd	Dd	SD	A	B	1	4
5	900759	MC	CAH	F	1015	273	156	145	129	128	84	83
5	900759	MC	OVA	F	-	c 243	c 148	-	122	110	95	91
6	900690	MC	OVA	F	-	230	146	-	102	106	93	98
6	900703	MC	OVA	F	-	245	148	-	109	112	95	97
6	900712	MC	OVA	F	1136	237	c 153	129	113	106	103	95
6	900722	MC	OVA	F	-	225	146	-	105	106	97	92
6	900722	MC	OVA	F	-	244	155	-	117	113	106	102
6	900738	MC	OVA	F	-	221	150	-	105	99	96	95
6	900738	MC	OVA	F	-	228	143	-	104	108	88	97
6	900738	MC	OVA	F	1011	214	138	111	102	98	91	86
6	900738	MC	OVA	F	1137	231	-	110	110	106	93	88
6	900738	MC	OVA	F	1161	219	141	120	103	100	91	84
6	900738	MC	OVA	F	1163	225	139	112	104	101	98	89
6	900738	MC	OVA	F	c 1150	217	140	120	103	98	90	85
6	900740	MC	OVA	F	-	228	141	-	107	106	95	88
6	900740	MC	OVA	F	-	230	157	-	109	104	112	104
6	900744	MC	OVA	F	-	236	147	-	107	105	95	102
6	900738	MC	OVA	G	-	236	144	-	113	105	98	93
8	900697	MC	OVA	F	-	226	-	-	103	106	94	99
8	900697	MC	OVA	F	-	234	-	-	108	111	94	102
8	900705	MC	OVA	F	1244	c 237	-	132	113	111	105	100
8	900707	MC	OVA	F	1243	250	-	134	116	117	98	94
8	900721	MC	OVA	F	-	239	150	-	-	-	-	-
8	900723	MC	OVA	F	-	c 228	146	-	111	c 107	95	86
8	900723	MC	OVA	F	1098	224	152	124	106	104	102	98
8	900729	MC	OVA	F	-	222	137	-	102	100	90	87
8	900735	MC	OVA	F	1131	c 234	154	122	107	105	99	95
8	900742	MC	OVA	F	1087	237	144	119	107	113	94	97
8	900742	MC	OVA	F	1180	247	157	127	112	118	104	108

Period	Box	Elem	TAX	FUS	GL	Bd	Dd	SD	A	B	1	4
8	900743	MC	OVA	F	-	243	-	-	109	112	99	106
8	900746	MC	OVA	F	977	212	-	112	102	c 96	89	80
9	861336	MC	OVA	F	1122	224	144	122	106	103	95	93
9	861342	MC	OVA	F	-	215	137	-	102	102	90	84
9	861344	MC	OVA	F	-	230	-	-	106	103	94	90
9	900691	MC	OVA	F	-	238	151	-	113	111	101	99
9	900695	MC	OVA	F	1119	239	-	132	110	107	91	87
9	900698	MC	OVA	F	-	c 236	c 151	-	106	106	96	103
9	900751	MC	OVA	F	-	240	c 156	-	108	114	98	103
9	900718	MC	OVA	G	-	259	-	-	115	119	111	112
9	900757	MC	OVA	F	1087	-	-	124	113	-	93	-
10	900754	MC	OVA	F	1204	-	-	139	-	109	-	104
10	861336	MC	OVA	F	-	c 240	151	126	107	112	92	99
10	900692	MC	OVA	F	-	229	-	-	108	110	94	100
10	900736	MC	OVA	F	-	233	142	-	-	-	-	-
10	900736	MC	OVA	F	-	243	151	-	118	c 114	103	98
10	900740	MC	OVA	F	1124	c 235	151	130	105	111	92	101
10	900752	MC	OVA	F	-	266	c 159	-	126	125	110	108
10	900752	MC	OVA	F	-	270	161	-	124	122	107	105
10	900752	MC	OVA	F	-	284	183	-	134	134	125	118
10	900752	MC	OVA	F	-	c 260	c 153	-	-	120	107	103
10	900752	MC	OVA	F	1100	c 226	-	127	c 107	-	96	-
10	900752	MC	OVA	F	1148	246	150	127	114	112	101	92
10	900752	MC	OVA	F	1222	260	157	154	124	c 117	107	100
10	900752	MC	OVA	F	1263	263	169	151	128	124	114	112
10	900752	MC	OVA	F	1285	262	170	142	123	123	118	107
10	900752	MC	OVA	F	1421	288	-	160	134	127	117	112
10	900752	MC	OVA	F	1470	285	184	171	136	135	125	121
10	900752	MC	OVA	F	1503	307	-	177	145	145	130	123
10	900752	MC	OVA	F	c 1170	220	147	120	108	103	96	91
10	900755	MC	OVA	F	-	237	-	-	110	112	93	105
10	900755	MC	OVA	F	1285	270	-	165	125	122	110	104
11	900692	MC	OVA	F	e 1270	e 290	-	161	-	-	122	115
11	900731	MC	OVA	F	1186	250	160	134	122	114	109	103
11	900731	MC	OVA	F	1251	287	169	154	128	127	118	108
11	900731	MC	OVA	F	1253	264	-	151	125	120	110	101
11	900731	MC	OVA	F	e 1290	279	-	161	c 131	127	112	107
11	900748	MC	OVA	F	1216	c 265	c 157	153	126	c 123	110	99
11	900749	MC	OVA	F	1278	249	e 160	131	123	112	101	97
11	900749	MC	OVA	F	1327	274	169	154	125	125	115	110
11	900749	MC	OVA	F	1339	298	-	168	139	142	116	111
11	900753	MC	OVA	F	-	c 236	-	-	-	-	-	-
11	900749	MC	OVA	F	1310	-	-	132	125	-	111	-

Table 41. Sheep/goat tibia measurements.

Period	Box	Elem	TAX	FUS	GL	Bd
1	900715	TI	O/C	F	-	c 206
3	900688	TI	O/C	F	-	238
3	900688	TI	O/C	F	-	240
3	900688	TI	O/C	F	-	250
3	900759	TI	O/C	F	-	219
4	900708	TI	O/C	F	-	225
4	900708	TI	O/C	F	-	225
4	900708	TI	O/C	F	-	238
4	900710	TI	O/C	F	-	233
4	900710	TI	O/C	F	-	243
5	900701	TI	O/C	F	-	231
5	900739	TI	O/C	F	-	249
5	900759	TI	O/C	F	-	291
5	900759	TI	O/C	G	-	248
6	900690	TI	O/C	F	-	230
6	900690	TI	O/C	F	-	243
6	900699	TI	O/C	F	-	214
6	900699	TI	O/C	F	-	233
6	900699	TI	O/C	F	-	236
6	900699	TI	O/C	F	-	237
6	900699	TI	O/C	F	-	247
6	900699	TI	O/C	F	-	c 240
6	900701	TI	O/C	F	-	213
6	900701	TI	O/C	F	-	223
6	900704	TI	O/C	F	-	241
6	900704	TI	O/C	F	-	244
6	900704	TI	O/C	F	-	244
6	900704	TI	O/C	F	-	255
6	900712	TI	O/C	F	-	238
6	900713	TI	O/C	F	-	226
6	900713	TI	O/C	F	-	228
6	900713	TI	O/C	F	-	235
6	900713	TI	O/C	F	-	241
6	900713	TI	O/C	F	-	271
6	900722	TI	O/C	F	-	222
6	900722	TI	O/C	F	-	232
6	900722	TI	O/C	F	-	232
6	900722	TI	O/C	F	-	235
6	900722	TI	O/C	F	-	244
6	900722	TI	O/C	F	-	246
6	900722	TI	O/C	F	-	247
6	900722	TI	O/C	F	-	247
6	900722	TI	O/C	F	-	248
6	900738	TI	O/C	F	-	219
6	900738	TI	O/C	F	-	223
6	900738	TI	O/C	F	-	237
6	900738	TI	O/C	F	-	239
6	900738	TI	O/C	F	-	243
6	900738	TI	O/C	F	-	256
6	900740	TI	O/C	F	-	222
6	900740	TI	O/C	F	-	226
6	900740	TI	O/C	F	-	233
6	900740	TI	O/C	F	-	233
6	900740	TI	O/C	F	-	234
6	900740	TI	O/C	F	-	238
6	900740	TI	O/C	F	-	239
6	900740	TI	O/C	F	-	243
6	900740	TI	O/C	F	-	251
6	900744	TI	O/C	F	-	209
6	900744	TI	O/C	F	-	218
6	900744	TI	O/C	F	-	223
6	900744	TI	O/C	F	-	228
6	900744	TI	O/C	F	-	229
6	900744	TI	O/C	F	-	230
6	900744	TI	O/C	F	-	230
6	900744	TI	O/C	F	-	231
6	900744	TI	O/C	F	-	231
6	900744	TI	O/C	F	-	231
6	900744	TI	O/C	F	-	232
6	900744	TI	O/C	F	-	236
6	900744	TI	O/C	F	-	244
6	900744	TI	O/C	F	-	245
6	900744	TI	O/C	F	-	248
6	900744	TI	O/C	F	-	256
6	900745	TI	O/C	F	-	223
6	900745	TI	O/C	F	-	225
6	900745	TI	O/C	F	-	226
6	900745	TI	O/C	F	-	233
6	900745	TI	O/C	F	-	234
6	900745	TI	O/C	F	-	237
6	900745	TI	O/C	F	-	240
6	900745	TI	O/C	F	-	241
6	900745	TI	O/C	F	-	249
6	900745	TI	O/C	F	-	260
6	900744	TI	O/C	G	-	233
8	861302	TI	O/C	F	-	238
8	861337	TI	O/C	F	-	232
8	861337	TI	O/C	F	-	235
8	861337	TI	O/C	F	-	239
8	861337	TI	O/C	F	-	251
8	861337	TI	O/C	F	-	253
8	861339	TI	O/C	F	-	237
8	861342	TI	O/C	F	-	249
8	900693	TI	O/C	F	-	231
8	900693	TI	O/C	F	-	234
8	900693	TI	O/C	F	-	238
8	900693	TI	O/C	F	-	240
8	900693	TI	O/C	F	-	243
8	900693	TI	O/C	F	-	255
8	900693	TI	O/C	F	-	261
8	900694	TI	O/C	F	-	238
8	900696	TI	O/C	F	-	211
8	900696	TI	O/C	F	-	237
8	900696	TI	O/C	F	-	253
8	900696	TI	O/C	F	-	254

Period	Box	Elem	TAX	FUS	GL	Bd
8	900696	TI	O/C	F	-	256
8	900696	TI	O/C	F	-	c 222
8	900696	TI	O/C	F	-	c 225
8	900696	TI	O/C	F	-	c 231
8	900697	TI	O/C	F	-	219
8	900697	TI	O/C	F	-	221
8	900697	TI	O/C	F	-	227
8	900697	TI	O/C	F	-	231
8	900697	TI	O/C	F	-	231
8	900697	TI	O/C	F	-	232
8	900697	TI	O/C	F	-	235
8	900697	TI	O/C	F	-	235
8	900697	TI	O/C	F	-	235
8	900697	TI	O/C	F	-	236
8	900697	TI	O/C	F	-	239
8	900697	TI	O/C	F	-	243
8	900697	TI	O/C	F	-	244
8	900697	TI	O/C	F	-	246
8	900697	TI	O/C	F	-	249
8	900697	TI	O/C	F	-	253
8	900700	TI	O/C	F	-	224
8	900700	TI	O/C	F	-	234
8	900700	TI	O/C	F	-	240
8	900700	TI	O/C	F	-	242
8	900700	TI	O/C	F	-	244
8	900700	TI	O/C	F	-	245
8	900700	TI	O/C	F	-	254
8	900700	TI	O/C	F	-	256
8	900700	TI	O/C	F	-	260
8	900705	TI	O/C	F	-	228
8	900705	TI	O/C	F	-	230
8	900705	TI	O/C	F	-	231
8	900705	TI	O/C	F	-	238
8	900705	TI	O/C	F	-	239
8	900705	TI	O/C	F	-	246
8	900705	TI	O/C	F	-	248
8	900705	TI	O/C	F	-	250
8	900705	TI	O/C	F	-	255
8	900705	TI	O/C	F	-	259
8	900707	TI	O/C	F	-	228
8	900707	TI	O/C	F	-	232
8	900707	TI	O/C	F	-	242
8	900707	TI	O/C	F	-	246
8	900707	TI	O/C	F	-	251
8	900719	TI	O/C	F	-	219
8	900719	TI	O/C	F	-	227
8	900719	TI	O/C	F	-	228
8	900719	TI	O/C	F	-	229
8	900719	TI	O/C	F	-	229
8	900719	TI	O/C	F	-	232
8	900719	TI	O/C	F	-	238
8	900719	TI	O/C	F	-	238
8	900719	TI	O/C	F	-	240
8	900719	TI	O/C	F	-	241
8	900719	TI	O/C	F	-	242
8	900719	TI	O/C	F	-	247

Period	Box	Elem	TAX	FUS	GL	Bd
8	900719	TI	O/C	F	-	c 211
8	900720	TI	O/C	F	-	218
8	900720	TI	O/C	F	-	222
8	900720	TI	O/C	F	-	224
8	900720	TI	O/C	F	-	225
8	900720	TI	O/C	F	-	227
8	900720	TI	O/C	F	-	228
8	900720	TI	O/C	F	-	233
8	900720	TI	O/C	F	-	234
8	900720	TI	O/C	F	-	235
8	900720	TI	O/C	F	-	236
8	900720	TI	O/C	F	-	239
8	900720	TI	O/C	F	-	242
8	900720	TI	O/C	F	-	244
8	900721	TI	O/C	F	-	222
8	900721	TI	O/C	F	-	226
8	900721	TI	O/C	F	-	227
8	900721	TI	O/C	F	-	227
8	900721	TI	O/C	F	-	230
8	900721	TI	O/C	F	-	231
8	900721	TI	O/C	F	-	235
8	900721	TI	O/C	F	-	237
8	900721	TI	O/C	F	-	242
8	900721	TI	O/C	F	-	242
8	900721	TI	O/C	F	-	242
8	900721	TI	O/C	F	-	243
8	900721	TI	O/C	F	-	250
8	900721	TI	O/C	F	-	253
8	900723	TI	O/C	F	-	222
8	900723	TI	O/C	F	-	224
8	900723	TI	O/C	F	-	228
8	900723	TI	O/C	F	-	230
8	900723	TI	O/C	F	-	232
8	900723	TI	O/C	F	-	237
8	900723	TI	O/C	F	-	237
8	900723	TI	O/C	F	-	239
8	900723	TI	O/C	F	-	242
8	900723	TI	O/C	F	-	244
8	900723	TI	O/C	F	-	245
8	900729	TI	O/C	F	-	227
8	900729	TI	O/C	F	-	231
8	900729	TI	O/C	F	-	236
8	900729	TI	O/C	F	-	241
8	900729	TI	O/C	F	-	242
8	900729	TI	O/C	F	-	254
8	900732	TI	O/C	F	-	232
8	900732	TI	O/C	F	-	240
8	900732	TI	O/C	F	-	241
8	900732	TI	O/C	F	-	244
8	900732	TI	O/C	F	-	245
8	900735	TI	O/C	F	-	225
8	900735	TI	O/C	F	-	230
8	900735	TI	O/C	F	-	233
8	900735	TI	O/C	F	-	235
8	900735	TI	O/C	F	-	235
8	900735	TI	O/C	F	-	248

Period	Box	Elem	TAX	FUS	GL	Bd
8	900735	TI	O/C	F	-	255
8	900742	TI	O/C	F	-	220
8	900742	TI	O/C	F	-	222
8	900742	TI	O/C	F	-	234
8	900742	TI	O/C	F	-	237
8	900742	TI	O/C	F	-	239
8	900742	TI	O/C	F	-	241
8	900742	TI	O/C	F	-	242
8	900742	TI	O/C	F	-	244
8	900742	TI	O/C	F	-	245
8	900743	TI	O/C	F	-	213
8	900743	TI	O/C	F	-	223
8	900743	TI	O/C	F	-	225
8	900743	TI	O/C	F	-	226
8	900743	TI	O/C	F	-	230
8	900743	TI	O/C	F	-	231
8	900743	TI	O/C	F	-	234
8	900743	TI	O/C	F	-	248
8	900743	TI	O/C	F	-	253
8	900743	TI	O/C	F	-	254
8	900743	TI	O/C	F	-	261
8	900746	TI	O/C	F	-	221
8	900746	TI	O/C	F	-	234
8	900746	TI	O/C	F	-	236
8	900746	TI	O/C	F	-	238
8	900746	TI	O/C	F	-	242
8	900746	TI	O/C	F	-	245
8	900746	TI	O/C	F	-	257
8	900747	TI	O/C	F	-	206
8	900747	TI	O/C	F	-	225
8	900747	TI	O/C	F	-	225
8	900747	TI	O/C	F	-	232
8	900747	TI	O/C	F	-	239
8	900747	TI	O/C	F	-	240
8	900747	TI	O/C	F	-	246
8	900747	TI	O/C	F	-	253
8	900755	TI	O/C	F	-	235
8	900759	TI	O/C	F	-	227
8	900759	TI	O/C	F	-	247
8	900707	TI	O/C	F	c 1143	216
9	861338	TI	O/C	F	-	250
9	861341	TI	O/C	F	-	228
9	861344	TI	O/C	F	-	230
9	861345	TI	O/C	F	-	254
9	900689	TI	O/C	F	-	242
9	900689	TI	O/C	F	-	244
9	900689	TI	O/C	F	-	247
9	900689	TI	O/C	F	-	253
9	900689	TI	O/C	F	-	257
9	900689	TI	O/C	F	-	259
9	900695	TI	O/C	F	-	237
9	900695	TI	O/C	F	-	254
9	900698	TI	O/C	F	-	228
9	900698	TI	O/C	F	-	235
9	900698	TI	O/C	F	-	272

Period	Box	Elem	TAX	FUS	GL	Bd
9	900702	TI	O/C	F	-	218
9	900702	TI	O/C	F	-	246
9	900702	TI	O/C	F	-	266
9	900706	TI	O/C	F	-	226
9	900706	TI	O/C	F	-	233
9	900706	TI	O/C	F	-	235
9	900706	TI	O/C	F	-	240
9	900706	TI	O/C	F	-	256
9	900706	TI	O/C	F	-	c 224
9	900718	TI	O/C	F	-	243
9	900718	TI	O/C	F	-	265
9	900728	TI	O/C	F	-	249
9	900737	TI	O/C	F	-	216
9	900737	TI	O/C	F	-	225
9	900737	TI	O/C	F	-	240
9	900737	TI	O/C	F	-	253
9	900737	TI	O/C	F	-	255
9	900737	TI	O/C	F	-	275
9	900741	TI	O/C	F	-	231
9	900741	TI	O/C	F	-	237
9	900741	TI	O/C	F	-	239
9	900741	TI	O/C	F	-	271
9	900741	TI	O/C	F	-	c 244
9	900750	TI	O/C	F	-	244
9	900750	TI	O/C	F	-	250
9	900750	TI	O/C	F	-	266
9	900751	TI	O/C	F	-	231
9	900751	TI	O/C	F	-	242
9	900755	TI	O/C	F	-	240
9	900757	TI	O/C	F	-	231
9	900757	TI	O/C	F	-	240
9	900757	TI	O/C	F	-	242
9	900757	TI	O/C	F	-	247
9	900757	TI	O/C	F	-	261
9	900758	TI	O/C	F	-	257
9	900765	TI	O/C	F	-	229
9	900766	TI	O/C	F	-	243
9	900766	TI	O/C	F	-	264
10	861345	TI	O/C	F	-	238
10	900692	TI	O/C	F	-	252
10	900692	TI	O/C	F	-	269
10	900718	TI	O/C	F	-	254
10	900718	TI	O/C	F	-	258
10	900728	TI	O/C	F	-	221
10	900728	TI	O/C	F	-	232
10	900733	TI	O/C	F	-	228
10	900733	TI	O/C	F	-	233
10	900733	TI	O/C	F	-	245
10	900733	TI	O/C	F	-	252
10	900733	TI	O/C	F	-	255
10	900733	TI	O/C	F	-	261
10	900733	TI	O/C	F	-	262
10	900733	TI	O/C	F	-	268
10	900733	TI	O/C	F	-	293
10	900736	TI	O/C	F	-	227

Period	Box	Elem	TAX	FUS	GL	Bd
10	900736	TI	O/C	F	-	234
10	900736	TI	O/C	F	-	238
10	900736	TI	O/C	F	-	238
10	900736	TI	O/C	F	-	250
10	900736	TI	O/C	F	-	252
10	900736	TI	O/C	F	-	253
10	900752	TI	O/C	F	-	256
10	900752	TI	O/C	F	-	258
10	900752	TI	O/C	F	-	260
10	900752	TI	O/C	F	-	263
10	900752	TI	O/C	F	-	266
10	900752	TI	O/C	F	-	269
10	900752	TI	O/C	F	-	270
10	900752	TI	O/C	F	-	271
10	900752	TI	O/C	F	-	278
10	900752	TI	O/C	F	-	278
10	900752	TI	O/C	F	-	281
10	900752	TI	O/C	F	-	306
10	900754	TI	O/C	F	-	251
10	900754	TI	O/C	F	-	252
10	900754	TI	O/C	F	-	257
10	900754	TI	O/C	F	-	261
10	900755	TI	O/C	F	-	239
10	900755	TI	O/C	F	-	258
10	900755	TI	O/C	F	-	269
10	900755	TI	O/C	F	-	269
10	900755	TI	O/C	F	-	274
10	900760	TI	O/C	F	-	267
10	900760	TI	O/C	F	-	286
10	900762	TI	O/C	F	-	256
10	900762	TI	O/C	F	-	286
10	900764	TI	O/C	F	-	252
11	900687	TI	O/C	F	-	236
11	900687	TI	O/C	F	-	241
11	900687	TI	O/C	F	-	247
11	900687	TI	O/C	F	-	253
11	900687	TI	O/C	F	-	261
11	900687	TI	O/C	F	-	279
11	900692	TI	O/C	F	-	c 245
11	900730	TI	O/C	F	-	243
11	900730	TI	O/C	F	-	245
11	900730	TI	O/C	F	-	269
11	900731	TI	O/C	F	-	259
11	900731	TI	O/C	F	-	274
11	900731	TI	O/C	F	-	275
11	900731	TI	O/C	F	-	282
11	900748	TI	O/C	F	-	256
11	900748	TI	O/C	F	-	267
11	900748	TI	O/C	F	-	267
11	900748	TI	O/C	F	-	273
11	900748	TI	O/C	F	-	286
11	900748	TI	O/C	F	1963	296
11	900749	TI	O/C	F	-	267
11	900749	TI	O/C	F	-	276
11	900753	TI	O/C	F	-	249
11	900753	TI	O/C	F	-	253
11	900753	TI	O/C	F	-	255
11	900753	TI	O/C	F	-	255
11	900753	TI	O/C	F	-	274

Table 42. Sheep, goat and sheep/goat astragalus measurements.

Period	Box	Elem	TAX	GLl	Bd	Dl
3	911967	AS	O/C	-	158	-
3	900688	AS	OVA	270	174	149
5	900759	AS	OVA	279	190	150
6	900699	AS	CAH	271	179	145
6	900703	AS	O/C	247	158	c 129
6	900744	AS	O/C	248	171	143
6	900744	AS	O/C	260	170	-
6	900745	AS	O/C	281	176	-
6	900745	AS	O/C	c 267	180	-
6	900690	AS	OVA	250	173	146
6	900699	AS	OVA	257	165	142
6	900701	AS	OVA	253	c 169	143
6	900704	AS	OVA	259	-	-
6	900704	AS	OVA	276	179	151
6	900722	AS	OVA	243	169	135
6	900722	AS	OVA	248	159	136
6	900722	AS	OVA	254	163	143
6	900740	AS	OVA	259	164	144
6	900740	AS	OVA	266	171	143
6	900744	AS	OVA	233	156	130
6	900744	AS	OVA	245	162	133
6	900744	AS	OVA	251	167	136
6	900744	AS	OVA	259	163	138
6	900744	AS	OVA	259	167	142
6	900744	AS	OVA	259	172	146
6	900744	AS	OVA	260	169	147
6	900744	AS	OVA	269	176	150
6	900745	AS	OVA	-	172	-
8	900694	AS	O/C	270	-	-
8	900696	AS	O/C	c 258	c 169	c 146
8	900705	AS	O/C	243	161	138
8	900705	AS	O/C	249	-	-

Period	Box	Elem	TAX	GLl	Bd	Dl
8	900719	AS	O/C	c 237	c 160	-
8	900721	AS	O/C	265	172	146
8	900721	AS	O/C	c 266	c 190	c 151
8	900732	AS	O/C	250	172	144
8	900734	AS	O/C	284	-	151
8	900742	AS	O/C	267	176	147
8	900743	AS	O/C	244	c 158	135
8	900743	AS	O/C	276	167	157
8	900693	AS	OVA	244	168	139
8	900693	AS	OVA	248	161	136
8	900693	AS	OVA	257	172	140
8	900693	AS	OVA	263	168	146
8	900693	AS	OVA	282	179	157
8	900694	AS	OVA	247	162	135
8	900694	AS	OVA	250	170	139
8	900696	AS	OVA	253	163	137
8	900696	AS	OVA	274	-	151
8	900697	AS	OVA	240	c 163	135
8	900697	AS	OVA	245	165	135
8	900697	AS	OVA	255	169	149
8	900700	AS	OVA	273	173	149
8	900707	AS	OVA	241	164	137
8	900718	AS	OVA	162	175	148
8	900719	AS	OVA	238	158	c 131
8	900719	AS	OVA	252	166	142
8	900719	AS	OVA	259	173	145
8	900719	AS	OVA	266	181	154
8	900720	AS	OVA	246	162	133
8	900720	AS	OVA	254	166	140
8	900720	AS	OVA	254	175	146
8	900720	AS	OVA	256	163	144
8	900720	AS	OVA	266	170	142
8	900721	AS	OVA	239	159	132
8	900721	AS	OVA	249	161	138
8	900721	AS	OVA	262	c 160	142
8	900721	AS	OVA	265	173	151
8	900721	AS	OVA	267	177	153
8	900721	AS	OVA	281	189	158
8	900723	AS	OVA	240	-	-
8	900723	AS	OVA	260	176	145
8	900729	AS	OVA	269	177	159
8	900742	AS	OVA	259	158	139
8	900742	AS	OVA	277	180	154
8	900746	AS	OVA	252	172	149
8	900746	AS	OVA	279	180	152
8	900747	AS	OVA	-	c 170	c 143
8	900747	AS	OVA	255	-	144
8	900747	AS	OVA	266	177	144
8	900755	AS	OVA	245	170	143
9	900737	AS	O/C	264	163	146
9	900702	AS	OVA	261	c 176	145
9	900706	AS	OVA	-	167	150
9	900706	AS	OVA	-	177	147
9	900718	AS	OVA	229	153	128
9	900718	AS	OVA	279	184	154
9	900728	AS	OVA	268	174	147
9	900737	AS	OVA	278	186	-
9	900751	AS	OVA	288	182	160
9	900757	AS	OVA	256	172	143
9	900757	AS	OVA	289	186	158
9	900766	AS	OVA	305	195	163
10	900760	AS	O/C	-	c 198	-
10	861345	AS	OVA	275	168	146
10	900718	AS	OVA	258	170	141
10	900728	AS	OVA	c 245	160	134
10	900736	AS	OVA	266	178	141
10	900736	AS	OVA	294	215	172
10	900736	AS	OVA	305	199	164
10	900754	AS	OVA	276	176	147
10	900760	AS	OVA	268	-	148
11	900731	AS	OVA	336	227	c 191
11	900748	AS	OVA	280	-	
11	900748	AS	OVA	290	193	165
11	900748	AS	OVA	312	207	-
11	900749	AS	OVA	283	186	157
11	900753	AS	OVA	274	178	155

Table 43. Sheep and sheep/goat metatarsal measurements.

Per	Box	Elem	TAX	FUS	GL	Bd	Dd	SD
3	900716	MT	OVA	F	-	c 208	-	-
6	900738	MT	O/C	F	-	221	142	-
6	900690	MT	OVA	F	-	207	138	-
6	900690	MT	OVA	F	-	224	149	-
6	900690	MT	OVA	F	-	232	161	-
6	900703	MT	OVA	F	-	211	138	-
6	900713	MT	OVA	F	-	227	151	-
6	900722	MT	OVA	F	-	-	160	-
6	900722	MT	OVA	F	-	187	125	-
6	900738	MT	OVA	F	-	214	145	-
6	900738	MT	OVA	F	-	217	140	-
6	900738	MT	OVA	F	-	219	142	-
6	900738	MT	OVA	F	1199	-	-	104
6	900740	MT	OVA	F	-	206	134	-

Per	Box	Elem	TAX	FUS	GL	Bd	Dd	SD
6	900740	MT	OVA	F	1333	233	148	113
6	900744	MT	OVA	F	-	194	128	-
6	900744	MT	OVA	F	-	223	145	-
6	900744	MT	OVA	F	-	228	145	-
6	900745	MT	OVA	F	-	228	154	-
8	861342	MT	OVA	F	-	215	145	-
8	900696	MT	OVA	F	-	226	156	-
8	900696	MT	OVA	F	1285	229	c 147	113
8	900697	MT	OVA	F	-	222	139	-
8	900700	MT	OVA	F	-	229	142	-
8	900721	MT	OVA	F	-	c 205	134	-
8	900723	MT	OVA	F	-	227	160	-
8	900735	MT	OVA	F	1168	228	138	113
8	900742	MT	OVA	F	-	221	147	-
8	900743	MT	OVA	F	-	217	c 150	-
8	900743	MT	OVA	F	-	220	142	-
8	900743	MT	OVA	F	-	231	153	-
8	900743	MT	OVA	F	1321	235	149	115
9	861343	MT	OVA	F	1263	234	151	113
9	900737	MT	OVA	F	-	227	147	-
9	900741	MT	OVA	F	c 1185	c 224	-	114
9	900751	MT	OVA	F	-	218	141	-
9	900751	MT	OVA	F	1129	223	-	106
9	900755	MT	OVA	F	-	218	148	-
9	900757	MT	OVA	F	1276	216	-	106
9	900750	MT	OVA	F	1450	-	-	126
9	900758	MT	OVA	F	1316	c 239	-	122
9	900766	MT	OVA	F	-	247	-	-
10	900733	MT	OVA	F	-	c 229	-	-
10	900752	MT	OVA	F	-	218	-	-
10	900752	MT	OVA	F	1224	245	150	126
10	900752	MT	OVA	F	1271	237	162	110
10	900752	MT	OVA	F	1287	224	158	109
10	900752	MT	OVA	F	1296	232	153	125
10	900752	MT	OVA	F	1488	c 278	179	140
10	900752	MT	OVA	F	e 1190	220	149	106
10	900754	MT	OVA	F	-	238	160	-
10	900755	MT	OVA	F	1225	269	155	133
10	900755	MT	OVA	F	1348	237	158	117
10	900755	MT	OVA	F	1447	c 250	-	127
10	900755	MT	OVA	F	c 1326	c 218	-	106
10	900755	MT	OVA	F	e 1330	253	153	124
10	900760	MT	OVA	F	1314	c 241	160	108
10	900760	MT	OVA	F	1341	241	159	115
10	900760	MT	OVA	F	c 1242	-	-	110
10	900760	MT	OVA	F	c 1342	c 249	-	124
10	900764	MT	OVA	F	1436	280	173	142
10	900752	MT	OVA	F	1434	-	-	152
10	900752	MT	OVA	F	e 1390	-	-	120
11	900731	MT	OVA	F	1338	-	-	125
11	900753	MT	OVA	F	e 1450	-	-	134
11	900687	MT	OVA	F	1495	279	-	156
11	900731	MT	OVA	F	-	230	-	-
11	900731	MT	OVA	F	-	242	158	-
11	900731	MT	OVA	F	-	c 270	-	-
11	900731	MT	OVA	F	1242	227	-	116
11	900731	MT	OVA	F	1284	236	152	114
11	900731	MT	OVA	F	e 1260	-	-	c 123
11	900748	MT	OVA	F	-	256	-	-
11	900748	MT	OVA	F	-	266	-	-
11	900748	MT	OVA	F	1198	216	-	-
11	900748	MT	OVA	F	1370	-	-	-
11	900749	MT	OVA	F	-	c 256	-	-
11	900753	MT	OVA	F	-	227	-	-
11	900753	MT	OVA	F	-	235	-	-

Table 44. Pig teeth measurements.

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
1	900715	S	-	-	-	-	-	-	-	-	-	-	-	-
1	900715	S	-	173	81	-	-	-	-	-	-	-	-	-
3	900688	S	-	-	-	-	-	-	-	-	-	314	148	143
3	900717	S	-	-	-	-	-	-	c 198	-	119	342	143	142
3	900688	S	-	-	-	163	101	109	205	134	134	-	-	-
3	900716	S	-	-	-	157	93	98	201	120	122	-	-	-
3	900688	S	-	-	-	-	110	108	203	139	132	344	154	145
3	900716	S	-	175	75	164	88	97	-	-	-	-	-	-

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
4	900710	S	-	-	-	-	-	-	-	-	-	317	-	144
4	911967	S	-	-	-	-	-	-	-	-	-	296	135	133
4	900708	S	-	-	-	-	-	-	-	-	-	300	149	144
4	900727	S	-	-	-	-	-	-	199	112	110	-	-	-
4	911967	S	-	-	-	-	-	-	212	138	138	327	163	151
4	900727	S	-	-	-	-	-	-	196	116	119	-	-	-
4	911967	S	-	-	-	154	121	122	-	-	-	-	-	-
4	900727	S	M	-	-	144	98	101	193	126	125	309	146	139
4	900708	S	-	175	82	157	96	99	-	-	-	-	-	-
5	900724	S	-	-	-	-	-	-	-	-	-	310	144	138
5	900739	S	-	-	-	-	-	-	-	-	-	-	145	-
5	900739	S	-	-	-	168	96	104	199	121	128	-	-	-
5	900739	S	-	-	-	c 168	104	105	c 211	132	131	-	-	-
6	900704	S	-	-	-	-	-	-	-	-	-	356	152	149
6	900745	S	-	-	-	-	-	-	-	-	-	310	131	c 122
6	900744	S	-	-	-	-	-	-	-	-	-	c 304	c 140	c 138
6	900699	S	-	-	-	-	-	-	-	-	-	328	142	137
6	900703	S	-	-	-	-	-	-	-	-	-	315	145	137
6	900738	S	-	-	-	-	-	-	-	-	-	-	135	134
6	900738	S	-	-	-	-	-	-	-	-	-	-	137	132
6	900738	S		-	-	-	-	-	-	-	-	-	143	137
6	900703	S	-	-	-	-	-	-	-	-	-	360	151	145
6	900712	S	-	-	-	-	-	-	-	-	-	308	148	142
6	900744	S	-	-	-	-	-	-	-	-	-	338	159	150
6	900744	S	-	-	-	-	-	-	-	-	-	319	153	141
6	900740	S	–	-	-	-	-	-	-	-	-	310	160	141
6	900703	S	-	-	-	-	-	-	222	134	136	-	-	-
6	900738	S	-	-	-	-	-	-	-	128	-	-	-	-
6	900744	S	-	-	-	-	-	-	194	125	128	-	-	-
6	900744	S	-	-	-	-	-	-	202	135	130	-	-	-
6	900740	S	-	-	-	-	-	-	205	125	128	-	-	-
6	900699	S	-	-	-	-	-		c 203	139	138	323	167	157
6	900713	S	-	-	-	-	-	-	193	-	131	332	139	143
6	900744	S	-	-	-	-	-	-	187	-	135	-	-	-
6	900744	S	-	-	-	-	-	-	-	-	132	315	148	141
6	900744	S	-	-	-	-	-	-	187	c 130	131	-	-	-
6	900738	S	-	-	-	-	-	-	-	-	-	c 289	134	130
6	900703	S	-	-	-	-	-	-	c 207	-	134	-	-	-
6	900738	S	-	-	-	-	-	-	197	123	128	-	-	-
6	900744	S	-	-	-	167	105	105	-	-	-	-	-	-
6	900722	S	AM	-	-	96	-	101	-	-	-	-	-	-
6	900722	S	M	-	-	142	-	99	-	-	-	-	-	-
6	900738	S	-	-	-	175	97	106	-	-	-	-	-	-
6	900690	S	M	-	-	162	93	101	211	122	125	-	-	-
6	900699	S	-	-	-	166	92	99	184	115	118	-	-	-
6	900744	S	-	-	-	175	104	108	222	135	134	-	-	-
6	900755	S	AM	-	-	164	96	107	c 217	127	134	-	-	-
6	900690	S	-	-	-	163	100	101	207	129	125	-	-	-
6	900744	S	-	-	-	161	96	98	-	126	126	-	-	-
6	900713	S	-	-	-	164	103	110	206	135	144	-	-	-
6	900722	S	M	-	-	160	95	101	199	122	126	-	-	-
6	900744	S	-	-	-	157	97	99	-	124	126	-	-	-
6	900722	S	-	-	-	161	98	102	194	114	117	-	-	-

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
6	900722	S	-	-	-	161	106	113	206	135	135	-	-	-
6	900745	S	-	-	-	169	98	110	210	130	135	-	-	-
6	900744	S	M	-	-	154	105	102	-	-	-	-	-	-
6	861302	S	-	-	-	162	98	-	201	131	133	-	-	-
6	900738	S	-	-	-	163	101	105	211	131	-	-	-	-
6	900740	S	-	-	-	162	98	99	196	131	125	c 348	-	-
6	900701	S	-	-	-	135	99	100	184	125	128	312	155	144
6	900738	S	-	-	-	c 162	102	109	222	127	133	-	-	-
6	900745	S	M	-	-	c 168	-	111	-	133	131	-	-	-
6	900745	S	-	-	-	-	95	96	c 200	119	122	-	-	-
6	900690	S	-	-	-	147	97	96	185	113	121	-	-	-
6	900699	S	AM	-	-	-	92	95	184	119	121	-	-	-
6	900738	S	AM	-	-	c 150	92	-	100	-	121	-	-	-
6	900738	S	M	-	-	-	93	100	-	118	-	-	-	-
6	900745	S	-	-	-	-	94	-	c 179	118	119	c 292	136	134
6	861302	S	-	-	-	c 165	100	109	203	133	128	325	148	136
6	900722	S	-	-	-	161	-	105	207	132	130	-	-	-
6	900745	S	-	-	-	-	103	112	215	130	134	-	-	-
6	900712	S	-	-	-	147	97	105	198	124	127	242	134	145
6	900703	S	-	-	-	-	89	-	c 192	114	123	e 300	c 146	129
6	900690	S	-	-	-	-	105	-	225	136	138	316	154	147
6	900690	S	-	-	-	c 146	98	-	198	121	123	282	135	130
6	900690	S	-	-	-	-	-	-	165	-	121	272	145	137
6	900703	S	-	-	-	-	-	-	-	117	-	315	148	132
6	900713	S	-	187	86	-	-	-	-	-	-	-	-	-
6	900690	S	-	173	80	174	98	104	-	-	-	-	-	-
6	900703	S	-	c 173	75	c 173	100	-	c 226	c 132	-	-	-	-
6	900745	S	M	178	82	172	103	110	-	-	-	-	-	-
6	900722	S	-	180	-	178	114	115	-	-	-	-	-	-
7	900711	S	-	-	-	-	-	-	-	-	-	346	-	-
8	900743	S	-	-	-	-	-	-	-	-	-	311	140	132
8	900755	S	-	-	-	-	-	-	-	-	-	-	-	-
8	900697	S	-	-	-	-	-	-	-	-	-	316	140	134
8	900718	S	-	-	-	-	-	-	-	-	-	316	141	136
8	900720	S	-	-	-	-	-	-	-	-	-	278	131	131
8	900720	S	-	-	-	-	-	-	-	-	-	305	154	147
8	900720	S	-	-	-	-	-	-	-	-	-	338	151	148
8	900732	S	-	-	-	-	-	-	-	-	-	289	141	136
8	900732	S	-	-	-	-	-	-	-	-	-	311	144	135
8	900732	S	-	-	-	-	-	-	-	-	-	322	152	139
8	900742	S	-	-	-	-	-	-	-	-	-	348	150	140
8	900746	S	-	-	-	-	-	-	-	-	-	332	145	146
8	900747	S	-	-	-	-	-	-	-	-	-	320	152	140
8	900755	S	-	-	-	-	-	-	-	-	-	320	145	142
8	900763	S	-	-	-	-	-	-	-	-	-	325	150	136
8	900742	S	-	-	-	-	-	-	-	-	-	-	141	133
8	900743	S	-	-	-	-	-	-	-	-	-	324	145	143
8	900746	S	-	-	-	-	-	-	-	-	-	318	138	133
8	900746	S	-	-	-	-	-	-	-	-	-	330	140	149
8	900747	S	-	-	-	-	-	-	-	-	-	-	153	147
8	900723	S	-	-	-	-	-	-	-	-	-	-	-	141
8	900697	S	-	-	-	-	-	-	-	-	-	c 305	-	137
8	900732	S	-	-	-	-	-	-	-	-	-	c 333	-	-

Per	Box	Tax	C	dP4 l	dP4 w	M1 l	M1 wa	M1 wp	M2 l	M2 wa	M2 wp	M3 l	M3 wa	M3 wc
8	900705	S	-	-	-	-	-	-	199	122	122	-	-	-
8	900705	S	-	-	-	-	-	-	204	120	129	-	-	-
8	900723	S		-	-	-	-	-	196	111	119	-	-	-
8	900697	S	-	-	-	-	-	-	210	123	127	-	-	-
8	900720	S	-	-	-	-	-	-	206	139	140	-	-	-
8	900693	S	-	-	-	-	-	-	213	131	132	-	-	-
8	900697	S	-	-	-	-	-	-	200	-	130	-	-	-
8	900705	S	-	-	-	-	-	-	-	120	-	-	-	-
8	900743	S	-	-	-	-	-	-	196	120	125	-	-	-
8	900732	S	-	-	-	-	-	-	195	135	140	-	-	-
8	900693	S	-	-	-	-	-	-	-	-	120	-	-	-
8	900746	S	-	-	-	-	-	-	-	-	130	-	-	-
8	900697	S	-	-	-	-	-	-	203	125	127	-	-	-
8	900743	S	-	-	-	-	-	-	193	125	115	-	-	-
8	900696	S	-	-	-	-	-	-	193	128	-	-	-	-
8	900696	S	-	-	-	-	-	-	212	124	c 128	-	-	-
8	900723	S	-	-	-	-	-	-	201	131	116	326	163	-
8	900723	S	-	-	-	-	-	-	205	127	136	-	153	-
8	900715	S	-	-	-	-	-	-	197	125	-	287	145	138
8	900742	S	-	-	-	-	-	-	c 204	136	139	331	151	147
8	861302	S	-	-	-	-	-	-	-	137	132	-	152	-
8	900720	S	-	-	-	-	-	-	c 195	124	133	c 334	147	144
8	900743	S	-	-	-	-	-	-	191	127	128	-	-	-
8	900700	S	-	-	-	-	-	-	198	-	128	309	-	136
8	900697	S	-	-	-	-	-	-	164	-	-	327	-	-
8	900735	S	M	-	-	208	128	135	-	-	-	-	-	-
8	900742	S	-	-	-	-	-	-	c 203	128	131	-	142	-
8	900714	S	-	-	-	165	-	-	-	-	-	-	-	-
8	900746	S	-	-	-	180	-	114	-	-	-	-	-	-
8	900694	S	-	-	-	170	106	107	213	135	c 131	-	-	-
8	900696	S	-	-	-	165	98	105	e 190	122	124	-	-	-
8	900746	S	-	-	-	165	96	100	200	127	122	-	-	-
8	900746	S	-	-	-	171	96	101	205	123	131	-	-	-
8	900747	S	-	-	-	163	88	95	204	115	123	-	-	-
8	900693	S	-	-	-	-	-	101	-	-	-	-	-	-
8	900693	S	-	-	-	163	94	102	-	-	-	-	-	-
8	900696	S	-	-	-	155	86	95	-	-	-	-	-	-
8	900721	S	-	-	-	176	97	105	-	-	-	-	-	-
8	900721	S	M	-	-	-	99	103	-	-	-	-	-	-
8	900723	S	-	-	-	171	100	99	-	-	-	-	-	-
8	900694	S	-	-	-	177	96	100	218	122	130	-	-	-
8	900720	S	-	-	-	c 185	110	-	212	139	146	-	-	-
8	900723	S	-	-	-	186	106	119	219	144	141	-	-	-
8	900735	S	AF	-	-	173	99	110	c 218	134	134	-	-	-
8	900746	S	-	-	-	-	-	-	214	131	130	-	-	-
8	900696	S	-	-	-	c 172	103	107	211	135	137	-	-	-
8	900700	S	-	-	-	186	109	119	223	140	145	-	-	-
8	900732	S	-	-	-	c 161	108	109	197	141	139	-	-	-
8	900746	S	-	-	-	164	100	102	217	132	130	-	-	-
8	900693	S	-	-	-	168	100	106	193	116	124	-	-	-
8	900723	S	-	-	-	152	101	102	193	125	129	-	-	-
8	900697	S	-	-	-	162	-	-	-	-	-	-	-	-
8	900721	S	-	-	-	177	108	113	-	-	-	-	-	-
8	900734	S	-	-	-	c 162	97	96	c 203	131	125	-	-	-
8	900755	S	-	-	-	166	102	106	211	137	129	-	-	-

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
8	900714	S	-	-	-	169	96	102	201	119	121	-	-	-
8	900707	S	-	-	-	167	99	104	205	134	134	-	-	-
8	900707	S	-	-	-	172	105	110	205	132	134	-	-	-
8	900743	S	-	-	-	157	-	105	195	124	130	-	-	-
8	900746	S	-	-	-	-	-	96	192	116	125	-	-	-
8	900697	S	-	-	-	165	-	-	200	133	128	-	-	-
8	900707	S	-	-	-	151	88	89	191	107	101	-	-	-
8	861337	S	AM	-	-	c 164	103	-	-	-	-	-	-	-
8	900705	S	-	-	-	149	90	90	185	114	115	-	-	-
8	900732	S	-	-	-	c 155	103	102	202	127	126	-	-	-
8	900729	S	-	-	-	c 168	100	107	c 210	134	128	-	-	-
8	900720	S	-	-	-	-	-	106	c 207	130	137	-	-	-
8	900693	S	-	-	-	154	94	-	188	116	122	-	-	-
8	900742	S	-	-	-	161	99	103	217	128	133	-	-	-
8	900732	S	-	-	-	c 160	90	98	-	127	125	-	-	-
8	900707	S	-	-	-	171	102	106	209	133	139	-	-	-
8	900693	S	-	-	-	157	97	-	203	136	139	-	-	-
8	900732	S	M	-	-	c 157	96	102	c 197	122	129	-	-	-
8	900700	S	-	-	-	169	105	110	-	-	-	-	-	-
8	900721	S	-	-	-	171	100	103	-	135	135	-	-	-
8	900697	S	-	-	-	162	-	102	-	128	-	-	-	-
8	900719	S	-	-	-	c 165	97	101	201	122	124	-	-	-
8	900693	S	-	-	-	151	94	101	188	114	106	-	-	-
8	900696	S	-	-	-	182	110	115	229	140	147	-	-	-
8	900734	S	-	-	-	c 154	92	96	c 190	117	127	-	-	-
8	900735	S	-	-	-	c 156	94	103	c 203	130	139	-	-	-
8	900746	S	-	-	-	-	-	-	203	124	122	-	-	-
8	900763	S	M	-	-	173	98	102	c 208	128	135	-	-	-
8	900720	S	-	-	-	-	100	-	-	-	-	-	-	-
8	900723	S	-	-	-	169	99	103	-	-	-	-	-	-
8	900732	S	M	-	-	-	105	114	-	-	-	-	-	-
8	861302	S	-	-	-	171	103	112	-	-	133	-	-	-
8	900696	S	-	-	-	c 164	94	103	c 199	122	131	-	-	-
8	900719	S	F	-	-	c 154	101	107	210	130	133	-	-	-
8	900732	S	-	-	-	c 160	104	106	c 203	130	131	-	-	-
8	900746	S	-	-	-	151	96	-	197	122	123	-	-	-
8	900732	S	-	-	-	-	-	106	202	133	139	-	-	-
8	900742	S	-	-	-	c 152	96	103	c 193	125	123	-	-	-
8	900705	S	-	-	-	164	101	105	202	129	130	c 306	150	136
8	900723	S	-	-	-	149	93	94	189	117	120	-	143	-
8	900693	S	-	-	-	164	98	-	208	127	129	-	-	-
8	900705	S	M	-	-	146	94	97	198	118	121	-	-	-
8	900697	S	-	-	-	167	113	113	235	149	150	358	167	151
8	900742	S	M	-	-	c 158	-	-	219	136	141	e 370	-	-
8	900721	S	-	-	-	c 160	104	101	201	129	125	-	149	-
8	900734	S	-	-	-	-	-	107	209	124	-	-	-	-
8	900743	S	-	-	-	137	96	-	-	-	-	-	-	-
8	900697	S	-	-	-	156	106	108	205	137	132	-	-	-
8	900734	S	-	-	-	170	c 105	-	223	135	133	352	164	-
8	900694	S	-	-	-	155	98	100	196	128	126	346	c 152	-
8	900696	S	-	-	-	-	102	103	201	130	115	-	-	-
8	900705	S	-	-	-	138	102	-	189	131	132	318	152	147
8	900743	S	-	-	-	c 142	105	-	191	129	126	294	139	134
8	900696	S	-	-		-	95	100	-	-	-	-	-	-
8	900697	S	-	-	-	154	-	-	208	124	132	-	-	-

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
8	900719	S	AM	-	-	-	-	101	195	124	c 132	e 340	152	151
8	900718	S	-	-	-	-	-	-	c 194	123	-	c 304	134	138
8	900746	S	-	-	-	-	-	-	177	121	130	-	-	-
8	900700	S	-	-	-	-	-	-	193	-	-	288	-	-
8	900694	S	-	-	-	-	-	-	184	121	121	319	142	143
8	900743	S	-	197	88	-	-	-	-	-	-	-	-	-
8	900723	S	-	189	80	-	-	-	-	-	-	-	-	-
8	900739	S	-	182	81	-	-	-	-	-	-	-	-	-
8	900746	S	-	180	81	176	100	109	-	-	-	-	-	-
8	900732	S	M	183	83	-	-	-	-	-	-	-	-	-
8	900721	S	-	175	82	-	-	-	-	-	-	-	-	-
8	900743	S	-	184	c 87	169	102	107	-	-	-	-	-	-
8	900693	S	-	185	92	178	105	115	-	-	-	-	-	-
8	900743	S	-	180	86	174	102	106	-	-	-	-	-	-
8	861343	S	M	174	86	-	102	110	-	-	-	-	-	-
8	861343	S	M	175	88	-	97	107	-	-	-	-	-	-
8	900723	S	-	c 177	86	-	-	-	-	-	-	-	-	-
8	900746	S	M	178	-	164	99	-	207	123	124	-	-	-
8	900759	S	-	c 176	86	176	108	114	-	-	-	-	-	-
9	900695	S	-	-	-	-	-	-	-	-	-	-	151	-
9	861345	S	-	-	-	-	-	-	-	-	-	330	144	144
9	900698	S	-	-	-	-	-	-	-	-	-	-	142	-
9	900698	S	-	-	-	-	-	-	-	-	-	297	147	140
9	900737	S	-	-	-	-	-	-	-	-	-	305	148	133
9	900757	S	-	-	-	-	-	-	-	-	-	-	-	140
9	861338	S	-	-	-	-	-	-	-	-	-	-	-	132
9	900737	S	-	-	-	-	-	-	-	-	-	308	142	140
9	861342	S	-	-	-	-	-	-	-	-	-	338	157	149
9	900737	S	-	-	-	-	-	-	219	-	-	-	-	-
9	861344	S	-	-	-	-	-	-	-	119	119	-	-	-
9	861344	S	-	-	-	-	-	-	196	117	126	-	138	145
9	861346	S	-	-	-	178	97	104	-	-	-	-	-	-
9	861338	S	-	-	-	173	94	103	208	124	125	-	-	-
9	900737	S	-	-	-	177	98	101	199	114	122	-	-	-
9	861344	S	-	-	-	174	91	-	206	118	128	-	-	-
9	861345	S	-	-	-	c 180	96	102	196	124	125	-	-	-
9	900718	S	-	-	-	173	97	106	-	-	-	-	-	-
9	861344	S	-	-	-	158	94	99	201	123	129	-	-	-
9	900706	S	-	-	-	182	111	c 117	218	134	140	-	-	-
9	861345	S	-	-	-	158	88	91	191	109	112	-	-	-
9	861345	S	-	-	-	163	95	99	188	115	117	-	-	-
9	900737	S	-	-	-	-	-	c 102	196	122	134	-	-	-
9	900698	S	-	-	-	-	90	94	c 179	113	118	-	139	-
9	900737	S	-	-	-	153	101	112	203	136	143	c 348	149	-
9	900706	S	-	-	-	150	94	98	-	-	-	-	-	-
9	900689	S	-	-	-	162	-	108	218	136	138	-	-	-
9	861346	S	F	-		-	92	98	198	109	116	299	130	131
9	861345	S	F	-	-	-	99	-	196	c 133	c 141	-	146	-
9	861344	S	-	-	-	-	90	98	-	-	-	-	-	-
9	900698	S	-	-	-	-	94	-	-	119	-	-	133	133
9	861341	S	-	-	-	-	-	-	206	127	127	-	-	138
9	900757	S	-	-	-	-	-	-	194	-	135	317	155	148
9	900689	S	-	-	-	-	-	-	222	134	139	c 307	158	160
9	900758	S	-	189	84	-	-	-	-	-	-	-	-	-

Per	Box	Tax	C	dP4 L	dP4 W	M1 L	M1 WA	M1 WP	M2 L	M2 WA	M2 WP	M3 L	M3 WA	M3 WC
9	900756	S	-	182	83	-	-	-	-	-	-	-	-	-
9	861338	S	-	179	87	174	95	103	-	-	-	-	-	-
9	900691	S	-	184	84	179	93	93	-	-	-	-	-	-
9	900758	S	-	169	79	154	95	100	-	-	-	-	-	-
9	900757	S	-	-	-	184	109	114	c 243	-	-	-	-	-
10	900755	S	-	-	-	-	-	-	-	-	-	404	186	174
10	900762	S	-	-	-	-	-	-	-	-	-	337	161	150
10	900733	S	-	-	-	-	-	-	-	-	-	310	c 146	143
10	900733	S	-	-	-	-	-	-	217	128	127	-	-	-
10	900733	S	-	-	-	-	-	-	218	141	145	-	-	-
10	900728	S	-	-	-	-	-	-	c 186	-	119	c 300	140	134
10	900733	S	-	-	-	-	-	-	-	-	-	329	155	149
10	900728	S	-	-	-	c 166	104	112	c 214	136	139	-	-	-
10	900728	S	M	-	-	168	104	109	224	135	138	-	-	-
10	900733	S	-	-	-	166	109	113	221	144	148	-	-	-
10	900736	S	-	-	-	155	96	101	190	125	126	-	-	-
10	900728	S	-	-	-	c 152	96	-	c 185	113	110	-	-	-
10	900754	S	-	-	-	166	106	-	230	-	147	-	174	-
10	900762	S	-	-	-	162	109	-	217	137	139	-	-	-
10	900762	S	AF	-	-	164	107	-	208	135	138	325	153	149
10	900764	S	-	178	82	172	98	105	-	-	-	-	-	-
10	900728	S	-	182	80	189	101	110	-	-	-	-	-	-
11	900687	S	-	-	-	-	-	-	185	121	117	265	132	123
11	900730	S	-	-		164	99	106	-	-	-	-	-	-
11	900753	S	-	-	-	198	122	133	256	c 161	c 167	-	-	-
11	900687	S	-	-	-	164	100	108	-	-	-	-	-	-
11	900730	S	-	-	-	146	99	98	195	126	129	311	145	143
11	900731	S	-	206	89	-	-	-	-	-	-	-	-	-

Table 45. Pig humerus measurements.

Per	Box	Elem	TAX	FUS	BT	HTC
3	900688	HU	S	F	293	207
4	900708	HU	S	F	-	191
4	900710	HU	S	F	c 276	175
4	900709	HU	S	G	e 290	190
6	861302	HU	S	F	-	156
6	861302	HU	S	F	267	185
6	900690	HU	S	F	-	169
6	900690	HU	S	F	-	190
6	900690	HU	S	F	258	192
6	900690	HU	S	F	264	172
6	900690	HU	S	F	275	179
6	900690	HU	S	F	291	181
6	900704	HU	S	F	217	148
6	900713	HU	S	F	281	174
6	900722	HU	S	F	284	199
6	900738	HU	S	F	265	157
6	900738	HU	S	F	287	-
6	900738	HU	S	F	c 298	182
6	900740	HU	S	F	281	180
6	900744	HU	S	F	254	177
6	900745	HU	S	F	278	179
6	900704	HU	S	G	-	173
8	861343	HU	S	F	-	192
8	900693	HU	S	F	-	167
8	900694	HU	S	F	298	200
8	900697	HU	S	F	265	179
8	900697	HU	S	F	c 262	-
8	900700	HU	S	F	-	c 196
8	900700	HU	S	F	273	182
8	900719	HU	S	F	283	193
8	900720	HU	S	F	278	189

Per	Box	Elem	TAX	FUS	BT	HTC
8	900723	HU	S	F	287	190
8	900729	HU	S	F	-	175
8	900735	HU	S	F	-	177
8	900742	HU	S	F	276	181
8	900742	HU	S	F	280	184
8	900742	HU	S	F	c 317	222
8	900743	HU	S	F	275	192
8	900743	HU	S	F	285	189
8	900747	HU	S	F	350	218
8	861337	HU	S	G	-	196
8	900694	HU	S	G	261	196
8	900742	HU	S	G	298	192
9	861336	HU	S	F	c 338	212
9	861344	HU	S	F	279	188
9	861346	HU	S	F	332	229
9	900689	HU	S	F	324	212
9	900698	HU	S	F	291	185
9	900698	HU	S	F	c 323	-
9	900706	HU	S	F	274	190
9	900737	HU	S	F	e 280	183
9	900758	HU	S	F	-	200
9	900758	HU	S	F	-	211
10	900728	HU	S	F	289	186
10	900752	HU	S	F	-	236
10	900754	HU	S	F	-	221
10	900754	HU	S	F	261	182
10	900754	HU	S	F	293	203
10	900762	HU	S	F	287	215
10	900764	HU	S	G	255	165
10	900764	HU	S	G	259	183
11	900748	HU	S	F	-	242
11	900748	HU	S	F	296	192

Table 46. Pig tibia measurements.

Per	Box	Elem	TAX	FUS	Bd
6	900690	TI	S	F	264
6	900712	TI	S	F	271
6	900740	TI	S	F	289
6	900699	TI	S	G	275
8	900693	TI	S	F	269
8	900707	TI	S	F	264
8	900707	TI	S	F	324
8	900723	TI	S	F	300
8	861335	TI	S	G	269
9	861344	TI	S	F	257
9	900741	TI	S	G	309
10	900733	TI	S	F	366
10	900754	TI	S	F	311
11	900753	TI	S	G	356

Table 47. Pig astragalus measurements.

Per	Box	Elem	TAX	GLl
5	900739	AS	S	355
5	900739	AS	S	c 376
6	900690	AS	S	396
6	900690	AS	S	e 380
6	900701	AS	S	376
6	900703	AS	S	376
6	900703	AS	S	382
6	900703	AS	S	399
6	900703	AS	S	410
6	900738	AS	S	373
6	900738	AS	S	c 370
6	900744	AS	S	386
6	900744	AS	S	395
6	900745	AS	S	401
8	900696	AS	S	391
8	900700	AS	S	e 450
8	900720	AS	S	c 399
8	900723	AS	S	380
8	900723	AS	S	393
8	900729	AS	S	373
8	900732	AS	S	394
8	900734	AS	S	383
8	900734	AS	S	389
8	900742	AS	S	404
8	900743	AS	S	391
8	900746	AS	S	383
9	861345	AS	S	411
9	861346	AS	S	380
9	900706	AS	S	365
10	900718	AS	S	491
10	900733	AS	S	481
10	900736	AS	S	468
10	900754	AS	S	459
10	900754	AS	S	c 470

Table 48. Red deer: measurements of various elements.

Period	Box	Elem	TAX	FUS	GL/GLl	Bd	Dl	BT	HTC	SD
9	900706	HU	CEE	F	-	-	-	545	314	-
8	900693	RA	CEE	F	2522	-	-	-	-	-
6	900703	TI	CEE	F	-	443	-	-	-	-
4	900709	AS	CEE	-	c 528	326	-	-	-	-
5	900739	AS	CEE	-	540	c 349	290			
5	900739	AS	CEE	-	c 533	c 310	291	-	-	-
6	900703	AS	CEE	-	517	320	-	-	-	-
8	900734	AS	CEE	-	c 513	316	285	-	-	-
10	900728	AS	CEE	-	c 300	-	-	-	-	-
8	900732	MT	CEE	F	e 2600	-	-	-	-	181

Table 49. Fallow deer humerus measurements.

Per	Box	Elem	TAX	FUS	BT	HTC
6	900722	HU	DAD	F	333	184
8	900697	HU	DAD	-	-	177
8	900720	HU	DAD	F	382	212
8	900723	HU	DAD	F	-	212
8	900742	HU	DAD	F	382	216
9	900689	HU	DAD	F	360	208
9	900737	HU	DAD	F	c 369	c 205
10	900760	HU	DAD	F	-	193
11	900730	HU	DAD	F	373	214

Table 50. Fallow deer metacarpal measurements.

Per	Box	Elem	TAX	FUS	GL	Bd	Dd	SD
8	900719	MC	DAD	F	1812	269	177	155
8	900720	MC	DAD	F	1809	275	178	159
8	900721	MC	DAD	F	e 1910	-	-	164
8	900723	MC	DAD	F	1974	298	c 196	175
8	900729	MC	DAD	F	-	277	c 175	-
8	900735	MC	DAD	F	1786	c 267	-	153
8	900743	MC	DAD	F	-	271	174	-
8	900742	MC	DAD	UE	-	264	172	-
9	900698	MC	DAD	F	1995	306	199	175
9	900758	MC	DAD	F	-	309	-	-

Table 51. Fallow deer tibia measurements.

Period	Box	Elem	TAX	FUS	Bd
6	900699	TI	DAD	F	315
6	900699	TI	DAD	F	332
6	900699	TI	DAD	F	358
6	900703	TI	DAD	F	348
6	900722	TI	DAD	F	323
6	900722	TI	DAD	F	348
6	900738	TI	DAD	F	373
6	900738	TI	DAD	F	c 334
6	900744	TI	DAD	F	323
6	900745	TI	DAD	F	315
6	900745	TI	DAD	F	337
8	861302	TI	DAD	F	328
8	861302	TI	DAD	F	349
8	861302	TI	DAD	F	c 310
8	861337	TI	DAD	F	348
8	900694	TI	DAD	F	320
8	900694	TI	DAD	F	324

Period	Box	Elem	TAX	FUS	Bd
8	900694	TI	DAD	F	366
8	900697	TI	DAD	F	313
8	900697	TI	DAD	F	321
8	900697	TI	DAD	F	347
8	900697	TI	DAD	F	352
8	900697	TI	DAD	F	360
8	900700	TI	DAD	F	317
8	900705	TI	DAD	F	310
8	900705	TI	DAD	F	333
8	900707	TI	DAD	F	336
8	900707	TI	DAD	F	342
8	900707	TI	DAD	F	349
8	900714	TI	DAD	F	352
8	900719	TI	DAD	F	299
8	900719	TI	DAD	F	308
8	900719	TI	DAD	F	313
8	900719	TI	DAD	F	319
8	900719	TI	DAD	F	c 348
8	900720	TI	DAD	F	355
8	900720	TI	DAD	F	356
8	900721	TI	DAD	F	309
8	900721	TI	DAD	F	319
8	900721	TI	DAD	F	354
8	900723	TI	DAD	F	327
8	900723	TI	DAD	F	348
8	900723	TI	DAD	F	351
8	900729	TI	DAD	F	366
8	900729	TI	DAD	F	c 335
8	900732	TI	DAD	F	310
8	900735	TI	DAD	F	337
8	900735	TI	DAD	F	344
8	900735	TI	DAD	F	348
8	900742	TI	DAD	F	318
8	900742	TI	DAD	F	358
8	900742	TI	DAD	F	368
8	900746	TI	DAD	F	321
8	900746	TI	DAD	F	322
8	900746	TI	DAD	F	e 340
8	900747	TI	DAD	F	289
8	900747	TI	DAD	F	323
8	900747	TI	DAD	F	326
8	900747	TI	DAD	F	330
8	900747	TI	DAD	F	341
8	900747	TI	DAD	F	351
8	900755	TI	DAD	F	359
8	861302	TI	DAD	G	308
8	861302	TI	DAD	G	336
8	900720	TI	DAD	G	288
8	900720	TI	DAD	G	328
9	861338	TI	DAD	F	c 345
9	861344	TI	DAD	F	348
9	861344	TI	DAD	F	349
9	900689	TI	DAD	F	317
9	900698	TI	DAD	F	343
9	900698	TI	DAD	F	357
9	900698	TI	DAD	F	359
9	900706	TI	DAD	F	353
9	900737	TI	DAD	F	325
9	900737	TI	DAD	F	351
9	900741	TI	DAD	F	353
9	900750	TI	DAD	F	328
10	900733	TI	DAD	F	342
10	900736	TI	DAD	F	327
10	900736	TI	DAD	F	337
10	900736	TI	DAD	F	338
10	900754	TI	DAD	F	325
10	900754	TI	DAD	F	337
10	900760	TI	DAD	F	298
10	900760	TI	DAD	F	339
11	900687	TI	DAD	F	311
11	900687	TI	DAD	F	332
11	900753	TI	DAD	F	302

Table 52. Fallow deer astragalus measurements.

Per	Box	Elem	TAX	GLl	Bd	Dl
5	900701	AS	DAD	357	229	189
6	900690	AS	DAD	348	231	188
6	900690	AS	DAD	375	249	204
6	900690	AS	DAD	381	257	207
6	900690	AS	DAD	393	259	214
6	900699	AS	DAD	350	232	189
6	900699	AS	DAD	358	229	198
6	900703	AS	DAD	357	233	189
6	900703	AS	DAD	362	234	191
6	900712	AS	DAD	394	256	218
6	900713	AS	DAD	367	235	195
6	900722	AS	DAD	334	223	183
6	900722	AS	DAD	357	225	192
6	900738	AS	DAD	361	228	194
6	900738	AS	DAD	384	258	212
6	900744	AS	DAD	354	228	193
6	900744	AS	DAD	357	229	191
6	900744	AS	DAD	374	233	196
6	900744	AS	DAD	382	259	210
6	900744	AS	DAD	384	261	211

Per	Box	Elem	TAX	GLl	Bd	Dl
8	861339	AS	DAD	360	237	195
8	900694	AS	DAD	382	250	209
8	900696	AS	DAD	329	224	176
8	900696	AS	DAD	352	235	188
8	900696	AS	DAD	366	245	202
8	900696	AS	DAD	369	240	206
8	900697	AS	DAD	376	250	206
8	900700	AS	DAD	354	229	193
8	900705	AS	DAD	385	244	211
8	900705	AS	DAD	390	252	211
8	900707	AS	DAD	324	214	178
8	900707	AS	DAD	345	219	187
8	900707	AS	DAD	347	232	187
8	900707	AS	DAD	357	237	194
8	900715	AS	DAD	382	268	213
8	900719	AS	DAD	362	231	195
8	900719	AS	DAD	382	255	210
8	900719	AS	DAD	386	260	214
8	900720	AS	DAD	356	225	189
8	900720	AS	DAD	363	232	191
8	900720	AS	DAD	374	257	207
8	900720	AS	DAD	396	253	214
8	900723	AS	DAD	336	220	183
8	900723	AS	DAD	373	255	194
8	900735	AS	DAD	375	252	201
8	900735	AS	DAD	380	253	c 208
8	900742	AS	DAD	362	232	196
8	900742	AS	DAD	367	236	-
8	900742	AS	DAD	367	252	197
8	900742	AS	DAD	388	258	206
8	900743	AS	DAD	-	233	-
8	900743	AS	DAD	365	242	203
8	900743	AS	DAD	376	242	208
8	900743	AS	DAD	377	255	206
8	900746	AS	DAD	358	234	197
8	900746	AS	DAD	366	247	200
8	900746	AS	DAD	384	248	205
8	900747	AS	DAD	356	238	-
8	900747	AS	DAD	379	c 254	208
8	900747	AS	DAD	393	c 251	212
9	861344	AS	DAD	373	248	208
9	861344	AS	DAD	380	244	209
9	900698	AS	DAD	-	247	-
9	900698	AS	DAD	369	233	196
9	900702	AS	DAD	c 392	253	216
9	900737	AS	DAD	352	236	195
9	900737	AS	DAD	353	c 234	195
9	900757	AS	DAD	370	256	204
10	861345	AS	DAD	370	236	196
10	900736	AS	DAD	c 362	254	198
10	900736	AS	DAD	e 340	c 221	c 192
11	900730	AS	DAD	363	-	-

Table 53. Fallow deer metatarsal measurements.

Per	Box	Elem	TAX	FUS	GL	Bd	Dd	SD
6	900690	MT	DAD	F	2270	315	c 202	184
6	900699	MT	DAD	F	2206	316	200	172
6	900722	MT	DAD	F	-	280	179	-
6	900740	MT	DAD	F	2181	304	194	174
6	900744	MT	DAD	F	2065	c 285	c 186	151
8	900693	MT	DAD	F	e 2040	276	c 178	-
8	900694	MT	DAD	F	2004	277	-	150
8	900694	MT	DAD	F	2131	300	186	157
8	900696	MT	DAD	F	-	315	c 199	-
8	900697	MT	DAD	F	-	288	-	-
8	900700	MT	DAD	F	-	271	178	-
8	900700	MT	DAD	F	-	274	173	-
8	900700	MT	DAD	F	-	282	-	-
8	900700	MT	DAD	F	-	293	188	-
8	900700	MT	DAD	F	-	e 290	-	-
8	900700	MT	DAD	F	1995	271	174	150
8	900700	MT	DAD	F	2040	284	180	149
8	900707	MT	DAD	F	-	305	c 190	-
8	900707	MT	DAD	F	-	312	197	-
8	900707	MT	DAD	F	2056	285	180	155
8	900720	MT	DAD	F	-	305	c 193	-
8	900720	MT	DAD	F	c 2095	294	187	155
8	900721	MT	DAD	F	-	291	c 186	-
8	900721	MT	DAD	F	-	310	195	-
8	900721	MT	DAD	F	-	311	200	-
8	900721	MT	DAD	F	-	312	196	-
8	900721	MT	DAD	F	2122	297	186	162
8	900723	MT	DAD	F	-	290	188	-
8	900723	MT	DAD	F	2182	306	197	169
8	900729	MT	DAD	F	-	296	192	-
8	900729	MT	DAD	F	-	302	195	-
8	900729	MT	DAD	F	-	c 305	194	-
8	900729	MT	DAD	F	2028	-	191	156
8	900732	MT	DAD	F	-	281	185	-
8	900732	MT	DAD	F	2123	293	188	152
8	900732	MT	DAD	F	2212	304	198	171
8	900735	MT	DAD	F	-	305	191	-
8	900735	MT	DAD	F	-	c 306	-	-
8	900739	MT	DAD	F	2242	316	198	169

Per	Box	Elem	TAX	FUS	GL	Bd	Dd	SD
8	900742	MT	DAD	F	-	c 317	207	-
8	900742	MT	DAD	F	-	e 300	-	-
8	900742	MT	DAD	F	2062	c 277	183	152
8	900743	MT	DAD	F	-	282	c 182	-
8	900743	MT	DAD	F	-	312	202	-
8	900743	MT	DAD	F	-	c 273	-	-
8	900743	MT	DAD	F	-	c 273	176	-
8	900743	MT	DAD	F	-	c 296	186	-
8	900743	MT	DAD	F	2222	322	c 215	168
8	900746	MT	DAD	F	-	278	183	-
8	900746	MT	DAD	F	-	306	194	-
8	900746	MT	DAD	F	2024	284	187	-
8	900721	MT	DAD	G	2122	287	188	164
8	900697	MT	DAD	UE	-	313	203	-
9	900689	MT	DAD	F	-	312	c 195	-
9	900691	MT	DAD	F	1990	279	c 177	155
9	900728	MT	DAD	F	2197	305	195	183
9	900737	MT	DAD	F	-	308	193	-
9	900737	MT	DAD	F	-	308	198	-
9	900741	MT	DAD	F	2264	322	202	171
9	900758	MT	DAD	F	2165	306	196	165
10	900736	MT	DAD	F	-	302	191	-
10	900736	MT	DAD	F	-	303	-	-
10	900736	MT	DAD	F	-	324	206	-
10	900736	MT	DAD	UE	-	308	c 199	-

Table 54. Roe deer: measurements of various elements.

Period	Box	Elem	TAX	FUS	GL/GLl	Bd	Dd	BT	HTC	SD	Dl
4	900715	HU	CAC	F	-	-	-	245	151	-	-
5	900701	HU	CAC	F	-	-	-	-	137	-	-
6	900738	HU	CAC	F	-	-	-	237	137	-	-
6	900745	HU	CAC	F	1540	-	-	237	146	-	-
7	900726	HU	CAC	F	-	-	-	c 247	-	-	-
8	900696	HU	CAC	F	-	-	-	229	241	-	-
8	900721	HU	CAC	F	-	-	-	245	149	-	-
8	900746	HU	CAC	F	-	-	-	254	148	-	-
9	861344	HU	CAC	F	-	-	-	234	144	-	-
9	861346	HU	CAC	F	-	-	-	254	150	-	-
9	900698	HU	CAC	F	-	-	-	237	149	-	-
9	900756	HU	CAC	F	-	-	-	c 247	141	-	-
6	900738	MC	CAC	F	-	e 210	134	-	-	-	-
6	900755	MC	CAC	F	-	209	137	-	-	-	-
8	900696	MC	CAC	F	1494	200	126	-	-	111	-
8	900747	MC	CAC	F	1484	202	126	-	-	110	-
5	900701	TI	CAC	F	-	223	-	-	-	-	-
8	900721	TI	CAC	F	-	255	-	-	-	-	-
9	861346	TI	CAC	F	-	255	-	-	-	-	-
10	900728	TI	CAC	F	-	258	-	-	-	-	-
6	900738	AS	CAC		279	184	-	-	-	-	156
3	900688	MT	CAC	F	-	218	142	-	-	-	-
4	900708	MT	CAC	F	1789	217	142	-	-	104	-
5	900701	MT	CAC	F	-	230	152	-	-	-	-
6	900704	MT	CAC	F	-	-	-	231	153	-	-
6	900738	MT	CAC	F	1657	206	140	-	-	102	-
6	900738	MT	CAC	F	1790	223	144	-	-	108	-
8	900732	MT	CAC	F	-	231	147	-	-	-	-
8	900734	MT	CAC	F	-	210	-	-	-	-	-

Table 55. Equid teeth measurements.

Period	Box	Elem	TAX	L1	L2	L3	Wa	Wb	Wc	Wd
8	900696	M_3	EQC	291	120	105	132	121	108	36
8	900696	M_3	EQC	348	139	111	132	121	122	40
8	900723	P_2	EQ	307	161	164	114	135	126	-
8	900693	P_2	EQC	316	139	160	111	144	144	76
8	900693	P_3	EQC	285	174	136	158	167	148	72
9	900691	P_2	EQ	-	-	-	-	-	-	-
9	900691	M_1	EQC	-	-	-	-	-	-	-
9	900691	M_2	EQC	-	-	-	-	-	-	-
9	900691	M_3	EQC	-	-	-	-	-	-	-
9	900706	P_2	EQ	292	134	149	101	119	120	-

Table 56. Equids: measurements of various elements.

Period	Box	Elem	TAX	FUS	GL	Bd	Dd	BT	HTC	SD
4	900709	HU	EQ	F	-	-	-	-	248	-
8	900696	HU	EQ	F	-	-	-	781	408	-
8	900700	HU	EQ	F	-	-	-	718	361	-
9	900691	HU	EQ	F	-	-	-	629	325	-
9	900691	HU	EQ	F	-	-	-	657	328	-
9	900702	HU	EQ	F	-	-	-	c 644	323	-
9	900737	HU	EQ	F	-	-	-	e 69	360	-
9	900741	HU	EQ	F	-	-	-	-	350	-
9	900750	HU	EQ	F	-	-	-	696	351	-
9	900756	HU	EQ	F	-	-	-	718	365	-
9	900756	HU	EQ	F	-	-	-	e 680	333	-
10	900733	HU	EQ		-	-	-	-	364	-
11	900749	HU	EQ	F	-	-	-	e 700	365	-
4	900709	RA	EQ	F	-	730	-	-	-	361
4	900709	MC	EQ	F	2234	e 490	356	-	-	322
4	900709	MC	EQ	F	2322	479	c 358	-	-	320
6	900722	MC	EQ	F	2018	439	323	-	-	275
8	900705	MC	EQ	F	e 2090	e 430	-	-	-	c 325
8	900714	MC	EQ	F	-	451	325	-	-	-
8	900759	MC	EQ	F	2138	456	339	-	-	316
9	900695	MC	EQ	F	2275	515	-	-	-	337
9	900702	MC	EQ	F	1951	436	331	-	-	319
9	900702	MC	EQ	F	1979	e 450	c 328	-	-	281
9	900737	MC	EQ	F	-	e 490	381	-	-	-
6	861302	TI	EQ	F	-	641	-	-	-	-
9	900689	TI	EQ	F	-	602	-	-	-	-
9	900695	TI	EQ	F	-	647	-	-	-	-
9	900695	TI	EQ	F	-	775	-	-	-	-
9	900702	TI	EQ	F	-	775	-	-	-	-
10	900733	TI	EQ		-	e 685	-	-	-	-
11	900687	TI	EQ	F	-	597	-	-	-	-

Period	Box	Elem	TAX	FUS	GL	Bd	Dd	BT	HTC	SD
11	900687	TI	EQ	F	-	664	-	-	-	-
11	900687	TI	EQ	F	-	729	-	-	-	-
11	900687	TI	EQ	F	-	745	-	-	-	-
11	900748	TI	EQ	F	-	695	-	-	-	-
9	900756	CA	EQ	F	1021	-	-	-	-	-
9	900756	CA	EQ	F	1062	-	-	-	-	-
1	900725	MT	EQ	F	e 2730	-	-	-	-	-
7	900726	MT	EQ	F	-	c 423	-	-	-	-
8	900693	MT	EQ	F	-	563	468	-	-	-
8	900694	MT	EQ	F	2509	e 430	-	-	-	249
9	900702	MT	EQ	F	2399	447	c 355	-	-	263
9	900737	MT	EQ	F	c 2585	-	-	-	-	304
9	900755	MT	EQ	F	-	466	367	-	-	-
9	900755	MT	EQ	F	-	472	381	-	-	-
6	900738	MP	EQ	F	-	c 443	-	-	-	-
8	900697	MP	EQ	F	-	512	402	-	-	-
8	900723	MP	EQ	F	-	433	316	-	-	-
9	900728	MP	EQ	F	-	467	-	-	-	-

Table 57. Dog teeth measurements.

Per	Box	Tax	P2 L	P2 W	P3 L	P3 W	P4 L	P4 W	M1 L	M1 W	M2 L	M2 W	P1-M3 L	P2-M3 L	P1-P4 L	P2-P4 L	M1-M3 L	H
2	900715	CAF	-	-	-	-	-	-	215	88	-	-	-	-	-	-	-	-
3	900688	CAF	-	-	-	-	-	-	216	87	-	-	-	-	-	-	-	-
4	900710	CAF	86	44	101	49	108	59	208	80	90	65	712	666	-	-	-	225
6	900699	CAF	50	24	98	48	-	-	-	-	95	73	714	662	-	-	-	238
6	900703	CAF	82	42	97	45	105	52	209	81	88	67	712	663	-	-	-	223
8	900694	CAF	-	-	-	-	-	-	205	78	-	-	-	-	-	-	-	-
8	900696	CAF	84	41	97	48	98	55	209	83	-	-	691	642	-	-	-	197
9	900698	CAF	-	-	-	-	-	-	220	85	-	-	-	-	-	-	-	-
9	900698	CAF	65	36	80	40	91	46	170	67	74	53	599	556	331	286	-	177
9	900702	CAF	-	-	-	-	-	-	212	84	-	-	-	-	-	-	-	-
9	900737	CAF	-	-	-	-	-	-	-	-	-	-	-	-	326	289	-	-
9	900741	CAF	-	-	-	-	121	69	-	-	-	-	-	-	-	-	-	-
9	900741	CAF	-	-	91	44	-	-	187	75	74	57	653	-	-	-	-	173
9	900741	CAF	-	-	109	55	-	-	208	89	100	75	-	-	-	-	-	265
9	900741	CAF	93	49	114	53	127	65	247	104	c 104	74	889	820	-	-	-	269
10	900736	CAF	-	-	84	38	98	47	177	65	-	-	-	-	-	-	-	-
10	900736	CAF	66	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	900736	CAF	83	44	98	51	116	63	213	84	80	61	716	663	-	-	-	232
10	900762	CAF	-	-	-	-	-	-	175	72	-	-	611	572	331	291	279	-
10	900762	CAF	-	-	-	-	-	-	242	96	-	-	-	-	414	369	-	-

Table 58. Dog: measurements of various elements.

Period	Box	Elem	TAX	FUS	GL	Bd	BT	HTC	SD
4	900710	HU	CAF	F	c 1568	-	-	112	-
6	900699	HU	CAF	F	-	296	-	124	-
6	900699	HU	CAF	F	-	297	-	123	-
6	900722	HU	CAF	F	-	254	-	95	-
8	900693	HU	CAF	F	-	204	-	81	-
8	900693	HU	CAF	F	-	272	-	106	-
8	900732	HU	CAF	F	-	-	-	130	-
8	900732	HU	CAF	F	-	324	-	129	-
9	900689	HU	CAF	F	-	279	-	102	-
9	900695	HU	CAF	F	2220	411	-	170	157
9	900698	HU	CAF	F	-	226	-	86	-
9	900702	HU	CAF	F	-	205	-	79	-
9	900702	HU	CAF	F	-	256	-	111	-
9	900737	HU	CAF	F	-	302	-	115	-
9	900751	HU	CAF	F	-	330	-	138	-
10	900736	HU	CAF	F	943	221	-	87	81
10	900736	HU	CAF	F	1505	313	-	123	116
10	900752	HU	CAF	F	-	-	-	106	-
10	900760	HU	CAF	F	-	305	-	105	-
10	900762	HU	CAF	F	-	-	-	130	-
10	900762	HU	CAF	F	-	345	-	127	-
11	900687	HU	CAF	F	-	-	e 320	226	-
11	900749	HU	CAF	F	1416	256	-	103	-
11	900753	HU	CAF	F	-	241	-	85	-
8	900729	RA	CAF	F	-	205	-	-	-
11	900753	RA	CAF	F	804	158	-	-	92
4	900710	FE	CAF	F	1653	-	-	-	-
8	900732	FE	CAF	F	1491	-	-	-	-
4	900710	TI	CAF	F	1712	-	-	-	-
6	900699	TI	CAF	F	-	167	-	-	-
8	900732	TI	CAF	F	-	210	-	-	-
9	900698	TI	CAF	F	1212	-	-	-	-
9	900741	TI	CAF	F	-	174	-	-	-
9	900741	TI	CAF	F	-	178	-	-	-
9	900741	TI	CAF	F	-	205	-	-	-
10	900762	TI	CAF	F	1923	243	-	-	-
10	900764	TI	CAF	F	e 2230	-	-	-	127
4	900710	AS	CAF		224	-	-	-	-
6	900699	AS	CAF		256	-	-	-	-
10	900754	AS	CAF		332	-	-	-	-
10	900764	AS	CAF		316	-	-	-	-
10	900764	CA	CAF	F	538	-	-	-	-

Table 59. Cat and fox: teeth measurements.

Per	Box	Tax	P3 L	P3 W	P4 L	P4 W	M1 L	M1 W	M2 L	M2 W	P1-M3 L	P1-P4 L	P2-P4 L	H
4	900708	FEC	-	-	-	-	80	31	-	-	204	-	-	107
8	900715	FEC	56	28	-	-	79	36	-	-	202	-	-	105
8	900719	FEC	48	23	-	-	79	32	-	-	194	-	-	100
10	900755	FEC	-	-	-	-	73	31	-	-	-	-	-	-
6	900703	VUV	89	31	90	38	148	59	68	54	-	-	-	151
8	900720	VUV	-	-	-	-	148	68	75	54	-	-	-	147
8	900747	VUV	-	-	-	-	150	60	-	-	-	324	275	-
9	900737	VUV	-	-	-	-	154	63	-	-	-	-	-	-

Table 60. Cat: measurements of various elements.

Per	Box	Elem	TAX	FUS	GL	Bd	HTC
8	861337	HU	FEC	F	-	156	50
8	900747	HU	FEC	F	-	179	-
10	900736	HU	FEC	F	-	171	58
10	900764	HU	FEC	F	-	155	52
11	900731	FE	FEC	F	935	-	-
8	900721	TI	FEC	F	-	146	-
9	861345	TI	FEC	F	1059	-	-

Table 61. Fox: measurements of various elements.

Per	Box	Elem	TAX	FUS	GL	Bd	HTC	SD
8	900700	HU	VUV	F	-	202	81	-
8	900720	HU	VUV	F	1106	200	72	73
8	900732	HU	VUV	F	-	189	74	-
8	900747	HU	VUV	F	-	216	-	-
8	900732	TI	VUV	F	-	141	-	-
8	900747	CA	VUV	F	325	-	-	-

Table 62. Hare and brown hare: measurements of various elements.

Per	Box	Elem	TAX	FUS	GL	Bd	HTC
6	900745	HU	LE	F	-	108	59
8	861337	HU	LE	F	-	-	65
8	900732	HU	LE	F	-	-	67
8	900735	HU	LE	F	-	122	-
8	900747	HU	LE	F	-	121	-
6	900690	HU	LEE	F	-	119	63
6	900690	HU	LEE	F	-	120	66
6	900690	HU	LEE	F	-	125	c 68
6	900722	HU	LEE	F	-	126	-
6	900740	HU	LEE	F	-	120	-
8	900697	HU	LEE	F	-	122	-
8	900697	HU	LEE	F	1038	122	-
8	900707	HU	LEE	F	-	119	-
8	900721	HU	LEE	F	-	123	66
8	900721	HU	LEE	F	-	124	65
8	900729	HU	LEE	F	-	123	-
9	900737	HU	LEE	F	-	124	-
10	900728	HU	LEE	F	-	121	63
1	900715	TI	LE	F	-	154	-
6	900690	TI	LE	F	-	157	-
8	900721	TI	LE	F	-	149	-
8	900721	TI	LE	F	-	155	-
8	900720	TI	LE	F	-	151	-
8	900735	TI	LE	F	-	151	-
8	900742	TI	LE	F	-	142	-
8	900747	TI	LE	F	-	c 138	-
10	900733	TI	LE	F	-	156	-
10	900760	TI	LE	F	-	150	-
8	900719	AS	LE		162	-	-
8	900743	AS	LE		164	-	-
8	900723	CA	LE		321	-	-
8	900743	CA	LE	F	297	-	-
8	900743	CA	LE	F	318	-	-

Table 63. Rabbit: measurements of various elements.

Per	Box	Elem	TAX	FUS	GL	Bd	HTC
6	900690	HU	ORC	F	-	88	-
6	900722	HU	ORC	F	-	89	-
6	900722	HU	ORC	F	-	90	-
6	900740	HU	ORC	F	-	89	-
6	900740	HU	ORC	F	-	89	-
6	900744	HU	ORC	F	-	87	43
6	900744	HU	ORC	F	-	90	42
8	900697	HU	ORC	F	618	c 92	-
8	900705	HU	ORC	F	634	-	-
8	900719	HU	ORC	F	-	90	44
8	900739	HU	ORC	F	-	94	-
9	900698	HU	ORC	F	-	c 88	-
9	900765	HU	ORC	F	-	82	-
10	900736	HU	ORC	F	-	83	40
9	900751	RA	ORC	F	540	-	-
6	900722	FE	ORC	F	813	-	-
8	900694	FE	ORC	F	772	127	-
8	900694	TI	ORC	F	858	114	-
8	900742	TI	ORC	F	-	113	-
10	900736	TI	ORC	F	-	107	-

Table 64. Chicken/guinea fowl/pheasant humerus measurements.

Per	Box	Elem	TAX	GL	Bd	Dd	SC
4	900715	HU	GNP	627	141	-	65
5	900739	HU	GNP	-	141	-	-
5	900739	HU	GNP	-	147	-	-
5	900739	HU	GNP	615	126	-	56
6	861302	HU	GNP	-	127	-	60
6	900690	HU	GNP	-	156	-	-
6	900690	HU	GNP	-	157	-	-
6	900690	HU	GNP	-	158	-	-
6	900690	HU	GNP	-	162	-	-
6	900690	HU	GNP	-	167	-	-
6	900690	HU	GNP	601	129	-	60
6	900690	HU	GNP	706	-	-	67
6	900690	HU	GNP	731	-	-	65
6	900699	HU	GNP	-	142	-	65
6	900699	HU	GNP	-	154	-	-
6	900699	HU	GNP	613	127	-	58
6	900699	HU	GNP	653	137	-	64
6	900703	HU	GNP	-	135	-	-
6	900703	HU	GNP	740	159	-	71
6	900704	HU	GNP	-	141	-	-
6	900713	HU	GNP	-	157	-	-
6	900722	HU	GNP	-	129	-	-
6	900722	HU	GNP	-	133	-	-
6	900722	HU	GNP	-	146	-	-
6	900722	HU	GNP	-	147	-	-
6	900722	HU	GNP	-	154	-	-
6	900722	HU	GNP	-	155	-	-
6	900722	HU	GNP	637	129	-	56
6	900722	HU	GNP	639	137	-	62
6	900722	HU	GNP	651	134	-	57
6	900722	HU	GNP	653	139	-	58
6	900722	HU	GNP	699	154	-	71
6	900738	HU	GNP	-	-	-	70
6	900738	HU	GNP	-	132	-	-
6	900738	HU	GNP	-	136	-	63
6	900738	HU	GNP	-	150	-	66
6	900738	HU	GNP	-	154	-	78
6	900738	HU	GNP	-	157	-	66
6	900738	HU	GNP	-	164	-	-
6	900738	HU	GNP	-	170	-	76
6	900738	HU	GNP	601	c 125	-	61
6	900738	HU	GNP	643	139	-	61
6	900738	HU	GNP	645	139	-	59
6	900738	HU	GNP	657	136	-	63
6	900738	HU	GNP	733	152	-	73
6	900738	HU	GNP	766	170	-	76
6	900738	HU	GNPc	636	129	-	56
6	900739	HU	GNP	647	134	-	62
6	900740	HU	GNP	-	176	-	-
6	900740	HU	GNP	606	128	-	60
6	900740	HU	GNP	730	156	-	64
6	900744	HU	GNP	-	-	-	74
6	900744	HU	GNP	-	126	-	-
6	900744	HU	GNP	-	130	-	61
6	900744	HU	GNP	-	133	-	59
6	900744	HU	GNP	-	136	-	59
6	900744	HU	GNP	-	139	-	-
6	900744	HU	GNP	-	143	-	63
6	900744	HU	GNP	-	146	-	67
6	900744	HU	GNP	-	150	-	-
6	900744	HU	GNP	-	154	-	-
6	900744	HU	GNP	-	155	-	72
6	900744	HU	GNP	-	160	-	69
6	900744	HU	GNP		c 155	-	71
6	900744	HU	GNP	618	134	-	59

Per	Box	Elem	TAX	GL	Bd	Dd	SC
6	900744	HU	GNP	623	137	-	55
6	900744	HU	GNP	625	135	-	56
6	900744	HU	GNP	626	131	-	60
6	900744	HU	GNP	663	139	-	63
6	900744	HU	GNP	773	163	-	73
6	900745	HU	GNP	-	132	-	-
6	900745	HU	GNP	-	140	-	-
6	900745	HU	GNP	668	151	-	69
6	900745	HU	GNP	759	168	-	75
7	900726	HU	GNP	-	135	-	-
8	900693	HU	GNP	-	126	-	-
8	900693	HU	GNP	-	154	-	-
8	900693	HU	GNP	643	135	-	61
8	900693	HU	GNP	745	159	-	73
8	900694	HU	GNP	-	137	-	-
8	900696	HU	GNP	-	142	-	-
8	900696	HU	GNP	-	158	-	-
8	900696	HU	GNP	627	c 129	-	65
8	900696	HU	GNP	650	135	-	60
8	900697	HU	GNP	-	131	-	-
8	900697	HU	GNP	-	137	-	-
8	900697	HU	GNP	-	138	-	-
8	900697	HU	GNP	-	156	-	-
8	900697	HU	GNP	-	160	-	-
8	900697	HU	GNP	619	128	-	59
8	900697	HU	GNP	647	139	-	62
8	900700	HU	GNP	-	136	-	-
8	900700	HU	GNP	692	147	-	72
8	900707	HU	GNP	-	134	-	63
8	900707	HU	GNP	-	146	-	65
8	900707	HU	GNP	-	155	-	-
8	900707	HU	GNP	-	156	-	68
8	900707	HU	GNP	673	139	-	62
8	900707	HU	GNP	707	152	-	67
8	900707	HU	GNP	711	154	-	70
8	900707	HU	GNP	718	153	-	66
8	900707	HU	GNP	735	158	-	76
8	900714	HU	GNP	-	156	-	-
8	900719	HU	GNP	-	129	-	60
8	900719	HU	GNP	-	138	-	-
8	900719	HU	GNP	-	154	-	68
8	900719	HU	GNP	-	155	-	-
8	900719	HU	GNP	-	156	-	65
8	900719	HU	GNP	-	160	-	74
8	900719	HU	GNP	-	162	-	73
8	900719	HU	GNP	725	160	-	65
8	900720	HU	GNP	-	129	-	-
8	900720	HU	GNP	-	136	-	-
8	900720	HU	GNP	-	137	-	-
8	900720	HU	GNP	-	140	-	-
8	900720	HU	GNP	-	144	-	-
8	900720	HU	GNP	-	149	-	-
8	900720	HU	GNP	-	157	-	-
8	900720	HU	GNP	-	164	-	-
8	900720	HU	GNP	624	131	-	58
8	900720	HU	GNP	692	c 135	-	63
8	900721	HU	GNP	-	154	-	74
8	900721	HU	GNP	-	155	-	69
8	900723	HU	GNP	-	126	-	-
8	900723	HU	GNP	-	129	-	-
8	900723	HU	GNP	-	132	-	-
8	900723	HU	GNP	-	132	-	-
8	900723	HU	GNP	-	134	-	-
8	900723	HU	GNP	-	137	-	-
8	900723	HU	GNP	-	145	-	-
8	900723	HU	GNP	-	148	-	-
8	900723	HU	GNP	-	153	-	-
8	900723	HU	GNP	-	156	-	-
8	900723	HU	GNP	-	159	-	-
8	900723	HU	GNP	654	138	-	57
8	900723	HU	GNP	664	133	-	67
8	900729	HU	GNP	-	147	-	65
8	900729	HU	GNP	-	157	-	57
8	900729	HU	GNP	-	161	-	71
8	900729	HU	GNP	593	132	-	60
8	900729	HU	GNP	752	166	-	80
8	900732	HU	GNP	-	140	-	-
8	900732	HU	GNP	-	144	-	-
8	900732	HU	GNP	-	153	-	-
8	900732	HU	GNP	-	155	-	-
8	900732	HU	GNP	-	165	-	-
8	900732	HU	GNP	-	168	-	-
8	900732	HU	GNP	590	130	-	57
8	900732	HU	GNP	625	139	-	62
8	900732	HU	GNP	698	-	-	67
8	900732	HU	GNP	715	158	-	70
8	900732	HU	GNP	724	158	-	73
8	900734	HU	GNP	-	138	-	-
8	900734	HU	GNP	625	-	-	63
8	900735	HU	GNP	-	131	-	-
8	900735	HU	GNP	-	156	-	-
8	900742	HU	GNP	-	128	-	-
8	900742	HU	GNP	-	133	-	-
8	900742	HU	GNP	-	137	-	-
8	900742	HU	GNP	-	144	-	-
8	900742	HU	GNP	-	146	-	-
8	900742	HU	GNP	-	152	-	-
8	900742	HU	GNP	-	154	-	-
8	900742	HU	GNP	-	162	-	-
8	900742	HU	GNP	658	144	-	64
8	900743	HU	GNP	-	131	-	-
8	900743	HU	GNP	-	160	-	-
8	900743	HU	GNP	-	165	-	-
8	900743	HU	GNP	-	166	-	-
8	900743	HU	GNP	636	133	-	61
8	900746	HU	GNP	-	131	-	-
8	900746	HU	GNP	-	134	-	-
8	900746	HU	GNP	-	136	-	-
8	900746	HU	GNP	-	142	-	-
8	900746	HU	GNP	-	143	-	-

Per	Box	Elem	TAX	GL	Bd	Dd	SC
8	900746	HU	GNP	-	154	-	-
8	900746	HU	GNP	-	161	-	-
8	900746	HU	GNP	644	138	-	61
8	900746	HU	GNP	698	152	-	68
8	900747	HU	GNP	-	150	-	-
8	900759	HU	GNP J	670	137	-	64
9	900698	HU	GNP	-	-	-	62
9	900698	HU	GNP	-	157	-	65
9	900702	HU	GNP	747	157	-	71
9	900706	HU	GNP	644	135	-	61
9	900757	HU	GNP	586	134	-	59

Per	Box	Elem	TAX	GL	Bd	Dd	SC
10	900728	HU	GNP	-	140	-	-
10	900728	HU	GNP	-	143	-	-
10	900728	HU	GNP	657	137	-	62
10	900728	HU	GNP	732	-	-	71
10	900733	HU	GNP	-	175	-	78
10	900736	HU	GNP	-	153	-	68
10	900736	HU	GNP	-	173	-	76
10	900762	HU	GNP	644	143	-	62
10	900762	HU	GNP	815	181	-	77
10	900764	HU	GNP	-	149	-	59
11	900748	HU	GNP	-	145	-	-

Table 65. Chicken/guinea fowl/pheasant femur measurements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
3	900688	FE	GN	c 680	-	-	-	-
3	911967	FE	GNP	-	130	-	-	-
4	900715	FE	GNP	-	136	114	62	-
4	900727	FE	GNP	-	c 124	-	-	-
5	900739	FE	GN	830	162	134	72	783
6	900690	FE	GN	697	137	114	57	648
6	900690	FE	GN	c 786	c 140	c 124	65	743
6	900690	FE	GN	e 740	140	122	61	689
6	900690	FE	GN	e 760	153	131	68	706
6	900690	FE	GN	e 790	157	134	68	c 734
6	900699	FE	GN	684	128	110	57	631
6	900699	FE	GN	719	134	120	66	678
6	900703	FE	GN	-	c 148	c 118	67	751
6	900703	FE	GN	c 778	155	128	64	725
6	900704	FE	GN	738	144	120	64	689
6	900704	FE	GN	769	153	134	69	731
6	900704	FE	GN	c 764	154	-	65	712
6	900712	FE	GN	704	141	120	60	659
6	900738	FE	GN	709	136	117	59	656
6	900738	FE	GN	c 717	134	116	64	667
6	900740	FE	GN	-	137	120	63	670
6	900740	FE	GN	714	141	126	53	668
6	900740	FE	GN	810	162	135	69	772
6	900740	FE	GN	814	-	-	67	765
6	900744	FE	GN	682	139	117	62	639
6	900744	FE	GN	804	168	148	75	756
6	900744	FE	GN	812	-	-	73	-
6	900744	FE	GN	900	176	164	84	845
6	900744	FE	GN	920	175	150	81	859
6	900745	FE	GN	-	166	-	74	-
6	861302	FE	GNP	-	155	-	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
6	900690	FE	GNP	-	145	-	-	-
6	900690	FE	GNP	-	157	-	-	-
6	900699	FE	GNP	-	139	117	-	-
6	900699	FE	GNP	-	142	-	-	-
6	900699	FE	GNP	-	c 128	-	-	-
6	900704	FE	GNP	-	c 164	136	-	-
6	900713	FE	GNP	-	142	-	-	-
6	900713	FE	GNP	-	171	-	-	-
6	900713	FE	GNP	-	c 161	-	-	-
6	900722	FE	GNP	-	-	-	69	704
6	900722	FE	GNP	-	121	-	-	-
6	900722	FE	GNP	-	128	-	-	-
6	900722	FE	GNP	-	130	-	-	-
6	900722	FE	GNP	-	134	-	-	-
6	900722	FE	GNP	-	134	-	63	653
6	900722	FE	GNP	-	136	-	66	648
6	900722	FE	GNP	-	150	-	-	-
6	900722	FE	GNP	-	155	-	-	-
6	900722	FE	GNP	-	156	-	-	-
6	900722	FE	GNP	-	164	-	-	-
6	900722	FE	GNP	697	130	-	62	-
6	900722	FE	GNP	732	133	-	56	680
6	900722	FE	GNP	753	145	-	62	701
6	900722	FE	GNP	c 666	-	-	64	-
6	900738	FE	GNP	-	129	c 112	-	-
6	900738	FE	GNP	-	c 129	-	-	-
6	900740	FE	GNP	-	154	130	-	-
6	900744	FE	GNP	-	132	-	-	-
6	900744	FE	GNP	-	135	119	-	-
6	900745	FE	GNP	-	127	-	-	-
6	900745	FE	GNP	-	158	127	-	-
6	900745	FE	GNP	-	165	-	-	-
6	900745	FE	GNP	-	c 132	c 112	-	-
8	861302	FE	GN	689	129	115	59	646
8	900693	FE	GN	c 763	c 150	-	66	c 722
8	900696	FE	GN	-	145	-	62	654
8	900696	FE	GN	804	163	133	68	758
8	900696	FE	GN	895	184	147	84	834
8	900707	FE	GN	-	139	-	61	660
8	900707	FE	GN	-	156	135	67	710
8	900707	FE	GN	-	c 160	-	73	766
8	900707	FE	GN	805	164	145	77	746
8	900707	FE	GN	c 829	172	142	75	774
8	900720	FE	GN	711	132	c 116	60	667
8	900720	FE	GN	763	155	c 125	70	721
8	900720	FE	GN	c 746	143	128	65	694
8	900720	FE	GN	c 784	173	c 141	75	737
8	900721	FE	GN	-	142	127	69	684
8	900721	FE	GN	719	138	-	63	c 671
8	900729	FE	GN	-	-	-	58	-
8	900729	FE	GN	-	-	-	71	724
8	900729	FE	GN	834	174	148	76	774
8	900729	FE	GN	c 686	136	-	63	634
8	900732	FE	GN	-	130	113	60	673
8	900732	FE	GN	-	155	-	70	739

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
8	900734	FE	GN	750	145	-	62	704
8	900734	FE	GN	752	142	119	66	705
8	900734	FE	GN	c 703	-	-	64	-
8	900747	FE	GN	c 676	131	115	56	c 636
8	900693	FE	GNP	-	132	-	-	-
8	900693	FE	GNP	-	141	-	-	-
8	900694	FE	GNP	-	136	-	-	-
8	900694	FE	GNP	-	144	124	-	-
8	900694	FE	GNP	-	c 135	118	-	-
8	900696	FE	GNP	-	162	c 138	-	-
8	900696	FE	GNP	-	165	-	-	-
8	900696	FE	GNP	-	185	150	-	-
8	900697	FE	GNP	-	156	-	-	-
8	900697	FE	GNP	-	159	-	-	-
8	900697	FE	GNP	697	132	-	65	638
8	900697	FE	GNP	723	135	-	59	684
8	900697	FE	GNP	c 688	134	-	59	e 640
8	900700	FE	GNP	-	145	-	-	-
8	900700	FE	GNP	770	-	-	70	718
8	900714	FE	GNP	-	135	-	-	-
8	900718	FE	GNP	-	173	138	-	-
8	900719	FE	GNP	-	147	130	-	-
8	900720	FE	GNP	-	126	c 109	-	-
8	900721	FE	GNP	-	-	120	-	-
8	900721	FE	GNP	-	-	c 116	-	-
8	900721	FE	GNP	-	134	114	-	-
8	900723	FE	GNP	-	157	-	-	-
8	900723	FE	GNP	-	c 132	-	-	-
8	900732	FE	GNP	-	130	115	-	-
8	900732	FE	GNP	-	134	119	-	-
8	900732	FE	GNP	-	149	134	-	-
8	900732	FE	GNP	-	155	148	-	-
8	900732	FE	GNP	-	165	142	-	-
8	900732	FE	GNP	-	172	141	-	-
8	900732	FE	GNP	-	c 155	-	-	-
8	900734	FE	GNP	-	136	116	-	-
8	900734	FE	GNP	-	154	127	-	-
8	900735	FE	GNP	-	156	-	-	-
8	900742	FE	GNP	-	138	117	-	-
8	900742	FE	GNP	-	139	122	-	-
8	900742	FE	GNP	-	162	141	-	-
8	900742	FE	GNP	-	162	c 133	-	-
8	900743	FE	GNP	-	131	-	-	-
8	900743	FE	GNP	-	134	-	-	-
8	900743	FE	GNP	-	168	-	-	-
8	900743	FE	GNP	-	184	-	-	-
8	900743	FE	GNP	-	c 140	-	-	-
8	900743	FE	GNP	-	c 141	-	-	-
8	900746	FE	GNP	-	142	-	-	-
8	900746	FE	GNP	-	145	-	-	-
8	900746	FE	GNP	-	c 125	-	-	-
8	900746	FE	GNP	c 686	-	-	57	-
8	900747	FE	GNP	-	132	115	-	-
8	900747	FE	GNP	-	135	108	-	-
8	900747	FE	GNP	-	143	125	-	-
8	900747	FE	GNP	-	c 135	-	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
9	900706	FE	GN	-	167	-	77	749
9	900737	FE	GN	701	c 130	-	60	c 657
9	900755	FE	GN	686	-	-	58	-
9	900758	FE	GNP	-	c 156	-	-	-
10	900754	FE	GN	-	126	-	-	-
10	900764	FE	GN	900	-	79	-	-
10	900728	FE	GNP	-	166	142	-	-
11	900730	FE	GNP	716	133	117	64	676

Table 66. Chicken/guinea fowl/pheasant tibio-tarsus measurements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
4	900709	TI-T	GNP	-	96	c 90	-	-
4	900727	TI-T	GNP	-	109	112	-	-
5	900701	TI-T	GNP	-	95	102	-	-
5	900701	TI-T	GNP	-	107	c 95	-	-
5	900701	TI-T	GNP	-	113	101	-	-
5	900701	TI-T	GNP	-	120	120	-	-
5	900739	TI-T	GNP	-	109	104	57	-
6	900690	TI-T	GNP	-	100	-	-	-
6	900690	TI-T	GNP	-	102	108	-	-
6	900690	TI-T	GNP	-	119	c 125	-	-
6	900690	TI-T	GNP	-	129	131	-	-
6	900690	TI-T	GNP	c 1152	120	c 127	66	1103
6	900699	TI-T	GNP	-	96	97	-	-
6	900703	TI-T	GNP	-	96	-	-	-
6	900703	TI-T	GNP	-	96	86	-	-
6	900703	TI-T	GNP	-	110	107	-	-
6	900704	TI-T	GNP	-	102	c 104	-	-
6	900704	TI-T	GNP	-	103	101	-	-
6	900704	TI-T	GNP	-	108	-	-	-
6	900704	TI-T	GNP	-	118	-	-	-
6	900712	TI-T	GNP	-	99	97	-	-
6	900712	TI-T	GNP	-	125	134	66	1122
6	900712	TI-T	GNP	-	c 104	-	-	-
6	900713	TI-T	GNP	-	124	131	-	-
6	900713	TI-T	GNP	-	128	122	-	-
6	900722	TI-T	GNP	-	-	-	65	1116
6	900722	TI-T	GNP	-	97	104	-	-
6	900722	TI-T	GNP	-	100	96	-	-
6	900722	TI-T	GNP	-	101	102	-	-
6	900722	TI-T	GNP	-	101	105	-	-
6	900722	TI-T	GNP	-	104	107	-	-
6	900722	TI-T	GNP	-	106	111	-	-
6	900722	TI-T	GNP	-	107	-	-	-
6	900722	TI-T	GNP	-	107	c 108	-	-
6	900722	TI-T	GNP	-	108	106	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
6	900722	TI-T	GNP	-	110	-	-	-
6	900722	TI-T	GNP	-	114	-	-	-
6	900722	TI-T	GNP	-	115	-	-	-
6	900722	TI-T	GNP	-	117	118	-	-
6	900722	TI-T	GNP	-	127	122	-	-
6	900722	TI-T	GNP	-	127	125	-	-
6	900722	TI-T	GNP	-	135	c 134	-	-
6	900722	TI-T	GNP	896	93	c 96	50	864
6	900722	TI-T	GNP	928	92	101	49	896
6	900722	TI-T	GNP	929	104	105	55	908
6	900738	TI-T	GNP	-	101	101	-	-
6	900738	TI-T	GNP	-	104	-	-	-
6	900738	TI-T	GNP	-	105	-	-	-
6	900738	TI-T	GNP	-	106	106	-	-
6	900739	TI-T	GNP	-	100	104	-	-
6	900739	TI-T	GNP	939	101	95	53	895
6	900740	TI-T	GNP	-	103	-	-	-
6	900740	TI-T	GNP	-	108	109	-	-
6	900740	TI-T	GNP	-	121	-	-	-
6	900740	TI-T	GNP	-	121	121	-	-
6	900740	TI-T	GNP	1193	134	125	69	1147
6	900744	TI-T	GNP	-	-	-	53	-
6	900744	TI-T	GNP	-	-	-	61	-
6	900744	TI-T	GNP	-	97	104	-	-
6	900744	TI-T	GNP	-	99	97	-	-
6	900744	TI-T	GNP	-	99	99	-	-
6	900744	TI-T	GNP	-	101	c 95	55	-
6	900744	TI-T	GNP	-	103	106	58	-
6	900744	TI-T	GNP	-	108	116	-	-
6	900744	TI-T	GNP	-	112	116	63	-
6	900744	TI-T	GNP	-	114	-	61	-
6	900744	TI-T	GNP	-	119	127	-	-
6	900744	TI-T	GNP	1096	118	125	62	1065
6	900744	TI-T	GNP	1236	125	138	72	1205
6	900744	TI-T	GNP	1300	131	136	71	1264
6	900745	TI-T	GNP	-	106	103	-	-
6	900745	TI-T	GNP	-	115	124	-	-
6	900745	TI-T	GNP	-	116	c 128	-	-
8	900693	TI-T	GNP	-	126	126	-	-
8	900696	TI-T	GNP	-	100	106	-	-
8	900696	TI-T	GNP	-	c 127	129	-	-
8	900697	TI-T	GNP	-	-	-	-	c 1042
8	900697	TI-T	GNP	-	96	-	-	-
8	900697	TI-T	GNP	-	113	-	-	-
8	900700	TI-T	GNP	-	94	-	-	-
8	900707	TI-T	GNP	-	97	c 99	-	-
8	900707	TI-T	GNP	-	102	109	-	-
8	900707	TI-T	GNP	-	133	c 126	-	-
8	900707	TI-T	GNP	-	c 130	c 125	-	-
8	900719	TI-T	GNP	-	-	98	-	-
8	900719	TI-T	GNP	-	91	94	-	-
8	900719	TI-T	GNP	-	95	-	-	-
8	900719	TI-T	GNP	-	104	112	-	-
8	900719	TI-T	GNP	-	107	110	-	-
8	900720	TI-T	GNP	-	101	97	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
8	900720	TI-T	GNP	-	118	109	-	-
8	900720	TI-T	GNP	-	128	130	-	-
8	900720	TI-T	GNP	-	131	131	66	1053
8	900720	TI-T	GNP	-	c 98	-	-	-
8	900721	TI-T	GNP	-	-	c 98	-	-
8	900721	TI-T	GNP	-	104	110	-	-
8	900721	TI-T	GNP	-	110	c 112	-	-
8	900721	TI-T	GNP	-	c 105	-	-	-
8	900723	TI-T	GNP	-	118	125	-	-
8	900723	TI-T	GNP	-	126	-	-	-
8	900723	TI-T	GNP	-	128	-	-	-
8	900729	TI-T	GNP	-	97	100	-	-
8	900729	TI-T	GNP	-	102	105	-	-
8	900729	TI-T	GNP	-	123	126	-	-
8	900729	TI-T	GNP	-	130	127	-	-
8	900729	TI-T	GNP	-	c 99	-	-	-
8	900732	TI-T	GNP	-	98	-	-	-
8	900732	TI-T	GNP	c 1165	115	124	68	1131
8	900734	TI-T	GNP	-	106	c 105	56	-
8	900734	TI-T	GNP	-	110	111	57	-
8	900734	TI-T	GNP	-	120	-	-	-
8	900734	TI-T	GNP	-	c 119	c 130	-	-
8	900735	TI-T	GNP	-	-	-	-	e 1080
8	900735	TI-T	GNP	-	94	-	-	-
8	900735	TI-T	GNP	-	c 103	-	-	-
8	900742	TI-T	GNP	-	96	105	-	-
8	900742	TI-T	GNP	-	102	101	-	-
8	900742	TI-T	GNP	-	103	108	-	-
8	900742	TI-T	GNP	-	104	111	-	-
8	900742	TI-T	GNP	-	115	122	-	-
8	900742	TI-T	GNP	-	119	127	-	-
8	900743	TI-T	GNP	-	95	101	-	-
8	900743	TI-T	GNP	-	105	110	-	-
8	900743	TI-T	GNP	-	112	c 114	-	-
8	900743	TI-T	GNP	-	c 105	c 99	-	-
8	900746	TI-T	GNP	-	99	c 95	-	-
8	900746	TI-T	GNP	-	107	106	-	-
8	900746	TI-T	GNP	-	107	121	-	-
8	900746	TI-T	GNP	-	115	c 122	-	-
8	900746	TI-T	GNP	-	116	-	-	-
8	900746	TI-T	GNP	1154	128	131	-	1116
8	900747	TI-T	GNP	-	-	-	56	-
8	900747	TI-T	GNP	-	100	99	-	-
8	900747	TI-T	GNP	-	115	118	-	-
9	900756	TI-T	GNP	-	108	c 108	-	-
9	900756	TI-T	GNP	1288	147	c 137	-	1234
9	900765	TI-T	GNP	-	c 112	-	-	-
9	900765	TI-T	GNP	-	c 125	-	-	-
10	900728	TI-T	GNP	-	120	121	-	-
10	900733	TI-T	GNP	-	95	-	-	-
10	900736	TI-T	GNP	1090	116	-	63	1051
10	900752	TI-T	GNP	e 1070	-	-	-	e 1030
10	900755	TI-T	GNP	-	109	114	58	-
10	900764	TI-T	GNP	-	114	119	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
10	900764	TI-T	GNP	-	127	c 121	-	-
10	900764	TI-T	GNP	1136	109	119	65	1097

Table 67. Chicken/guinea fowl/pheasant tarso-metatarsus measurements.

Period	Box	Elem	TAX	SPUR	GL	Bd	SC
5	900739	T-MT	GAG	P	-	141	75
6	900701	T-MT	GN		612	105	54
6	900690	T-MT	GNP		-	137	-
6	900690	T-MT	GNP		-	143	-
6	900701	T-MT	GNP		-	114	-
6	900703	T-MT	GNP		-	126	-
6	900722	T-MT	GNP		-	108	-
6	900738	T-MT	GNP		-	113	-
6	900738	T-MT	GNP		-	129	-
6	900722	T-MT	GN	A	633	115	56
6	900722	T-MT	GN	A	638	115	52
6	900722	T-MT	GN	A	657	116	55
6	900722	T-MT	GN	A	668	123	57
6	900722	T-MT	GN	A	689	126	58
6	900740	T-MT	GN	A	681	131	58
6	900690	T-MT	GNP	A	-	122	-
6	900690	T-MT	GNP	A	654	116	54
6	900699	T-MT	GNP	A	631	-	52
6	900699	T-MT	GNP	A	685	123	58
6	900699	T-MT	GNP	A	687	120	58
6	900722	T-MT	GNP	A	-	116	-
6	900722	T-MT	GNP	A	-	116	-
6	900722	T-MT	GNP	A	-	150	-
6	900738	T-MT	GNP	A	-	122	-
6	900738	T-MT	GNP	A	-	c 109	-
6	900738	T-MT	GNP	A	708	-	-
6	900744	T-MT	GNP	A	-	112	50
6	900744	T-MT	GNP	A	-	118	-
6	900744	T-MT	GNP	A	-	119	53
6	900744	T-MT	GNP	A	-	127	-
6	900744	T-MT	GNP	A	660	126	54
6	900744	T-MT	GNP	A	663	122	58
6	900744	T-MT	GNP	A	668	121	53
6	900744	T-MT	GNP	A	673	118	53
6	900744	T-MT	GNP	A	700	120	57
6	900744	T-MT	GNP	A	717	117	58
6	900690	T-MT	GAG	P	-	141	-
6	900690	T-MT	GAG	P	-	142	-
6	900690	T-MT	GAG	P	855	149	76
6	900704	T-MT	GAG	P	809	134	c 86
6	900738	T-MT	GAG	P	788	-	-
6	900740	T-MT	GAG	P	-	137	-
6	900740	T-MT	GAG	P	-	140	-
6	900740	T-MT	GAG	P	628	111	54

Period	Box	Elem	TAX	SPUR	GL	Bd	SC
6	900740	T-MT	GAG	P	870	144	77
6	900744	T-MT	GAG	P	-	148	-
6	900744	T-MT	GAG	P	-	149	-
6	900744	T-MT	GAG	P	744	134	65
6	900744	T-MT	GAG	P	807	147	76
6	900745	T-MT	GAG	P	778	161	84
6	900722	T-MT	GP	P	-	143	-
6	900738	T-MT	GAG	R	795	141	68
6	900699	T-MT	GNP	R	-	145	-
6	900744	T-MT	GNP	R	-	142	64
6	900744	T-MT	GNP	R	-	146	70
8	900693	T-MT	GNP		-	110	-
8	900697	T-MT	GNP		-	138	-
8	900700	T-MT	GNP		-	119	-
8	900700	T-MT	GNP		-	143	-
8	900720	T-MT	GNP		-	106	-
8	900720	T-MT	GNP		-	116	-
8	900720	T-MT	GNP		-	148	-
8	900721	T-MT	GNP		-	118	-
8	900721	T-MT	GNP		-	120	-
8	900734	T-MT	GNP		-	-	49
8	900734	T-MT	GNP		-	-	62
8	900734	T-MT	GNP		-	119	52
8	900734	T-MT	GNP		-	121	50
8	900734	T-MT	GNP		577	117	52
8	900734	T-MT	GNP		664	c 118	56
8	900734	T-MT	GNP		681	117	56
8	900735	T-MT	GNP		-	129	-
8	900742	T-MT	GNP		-	105	-
8	900742	T-MT	GNP		-	108	-
8	900742	T-MT	GNP		-	116	-
8	900742	T-MT	GNP		-	121	-
8	900742	T-MT	GNP		-	124	-
8	900742	T-MT	GNP		-	125	-
8	900743	T-MT	GNP		-	109	-
8	900743	T-MT	GNP		-	111	-
8	900743	T-MT	GNP		-	130	-
8	900743	T-MT	GNP		-	138	-
8	900743	T-MT	GNP		-	142	-
8	900747	T-MT	GNP		-	118	-
8	900747	T-MT	GNP		-	120	-
8	900697	T-MT	GN	A	-	114	-
8	900707	T-MT	GN	A	-	111	-
8	900707	T-MT	GN	A		113	-
8	900707	T-MT	GN	A	-	117	-
8	900707	T-MT	GN	A	-	119	-
8	900707	T-MT	GN	A	620	111	54
8	900707	T-MT	GN	A	663	122	57
8	900746	T-MT	GN	A	664	116	58
8	861302	T-MT	GNP	A	613	121	57
8	900696	T-MT	GNP	A	691	125	56
8	900705	T-MT	GNP	A	666	115	55
8	900732	T-MT	GNP	A	595	111	53
8	900742	T-MT	GNP	A	-	111	-
8	900742	T-MT	GNP	A	-	117	-

Period	Box	Elem	TAX	SPUR	GL	Bd	SC
8	900742	T-MT	GNP	A	-	118	-
8	900743	T-MT	GNP	A	-	123	-
8	900743	T-MT	GNP	A	669	112	52
8	900743	T-MT	GNP	A	675	122	59
8	900696	T-MT	GAG	P	787	141	71
8	900697	T-MT	GAG	P	791	138	71
8	900707	T-MT	GAG	P	-	e 150	-
8	900707	T-MT	GAG	P	752	-	72
8	900707	T-MT	GAG	P	772	141	64
8	900707	T-MT	GAG	P	c 762	-	75
8	900707	T-MT	GAG	P	e 740	-	-
8	900719	T-MT	GAG	P	-	135	75
8	900732	T-MT	GAG	P	-	141	75
8	900732	T-MT	GAG	P	774	138	67
8	900743	T-MT	GAG	P	-	132	-
8	900743	T-MT	GAG	P	-	144	-
8	900697	T-MT	GP	P	-	131	-
8	900697	T-MT	GP	P	-	138	-
8	900743	T-MT	GP	P	-	136	-
9	900737	T-MT	GNP		-	115	-
9	900737	T-MT	GNP		626	117	54
9	900757	T-MT	GNP		666	117	60
9	900757	T-MT	GNP		c 664	117	56
9	900698	T-MT	GN	A	577	-	52
10	900728	T-MT	GNP		778	139	65
11	900730	T-MT	GNP		-	120	-
11	900748	T-MT	GNP		-	141	-
11	900730	T-MT	GNP	A	637	111	53
11	900748	T-MT	GAG	P	742	135	68

Table 68. Goose: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
6	900690	HU	ANS	-	247	-	-	-
6	900722	HU	ANS	-	242	-	-	-
6	900740	HU	ANS	-	c 243	-	-	-
8	900693	HU	ANS	-	231	-	-	-
8	900694	HU	ANS	-	239	-	-	-
8	900721	HU	ANS	-	c 245	-	-	-
8	900723	HU	ANS	-	274	-	-	-
8	900729	HU	ANS	-	247	-	111	-
8	900735	HU	ANS	-	248	-	-	-
8	900743	HU	ANS	-	249	-	-	-
8	900746	HU	ANS	-	c 242	-	-	-
4	900708	FE	ANS	755	c 192	-	83	712
6	900690	FE	ANS	819	206	-	85	c 772
6	900712	FE	ANS	-	-	-	92	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm
6	900712	FE	ANS	-	209	-	-	-
6	900712	FE	ANS	-	c 202	-	-	-
6	900739	FE	ANS	816	c 218	-	86	c 757
8	900720	FE	ANS	-	207	-	-	-
8	900720	FE	ANS	-	c 210	-	c 83	-
8	900721	FE	ANS	-	c 186	c 152	-	-
9	900737	FE	ANS	e 790	c 195	-	86	e 750
6	900690	TI-T	ANS	-	165	171	-	-
6	900690	TI-T	ANS	-	180	180	-	-
6	900699	TI-T	ANS	-	c 172	c 171	-	-
6	900712	TI-T	ANS	-	184	184	-	-
6	900712	TI-T	ANS	-	c 168	-	-	-
6	900722	TI-T	ANS	-	c 179	-	-	-
6	900722	TI-T	ANS	-	e 160	-	-	-
6	900740	TI-T	ANS	-	170	163	-	-
6	900744	TI-T	ANS	-	170	165	83	-
6	900744	TI-T	ANS	-	179	175	-	-
6	900744	TI-T	ANS	-	c 178	-	92	-
6	900745	TI-T	ANS	-	c 169	-	-	-
8	900696	TI-T	ANS	-	182	c 165	-	-
8	900697	TI-T	ANS	-	171	-	-	-
8	900707	TI-T	ANS	-	172	173	-	-
8	900721	TI-T	ANS	-	168	c 164	-	-
8	900732	TI-T	ANS	-	c 170	-	-	-
8	900735	TI-T	ANS	-	173	-	-	-
8	900742	TI-T	ANS	-	185	176	-	-
6	900690	T-MT	ANS	843	-	-	78	-
6	900690	T-MT	ANS	868	183	-	84	-
6	900690	T-MT	ANS	e 805	-	-	81	-
6	900699	T-MT	ANS	-	194	-	-	-
6	900712	T-MT	ANS	849	197	-	82	-
6	900722	T-MT	ANS	816	188	-	82	-
6	900738	T-MT	ANS	-	c 195	-	-	-
8	900693	T-MT	ANS	884	200	-	88	-
8	900697	T-MT	ANS	875	-	-	83	-
8	900705	T-MT	ANS	-	167	-	-	-
8	900714	T-MT	ANS	-	196	-	-	-
8	900715	T-MT	ANS	-	c 210	-	-	-
8	900720	T-MT	ANS	-	-	-	79	-
8	900723	T-MT	ANS	910	195	-	89	-
8	900742	T-MT	ANS	-	189	-	-	-
8	900742	T-MT	ANS	c 810	-	-	78	-
8	900742	T-MT	ANS	c 862	c 205	-	84	-
8	900743	T-MT	ANS	-	202	-	-	-
9	900702	T-MT	ANS	c 888	-	-	84	-
9	900737	T-MT	ANS	910	193	-	79	-
10	900728	T-MT	ANS	-	c 201	-	-	-

Table 69. Duck: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La	Comments
6	900745	TI-T	ANA	c 876	-	-	48	-	
6	900690	T-MT	ANA	302	57	-	28	-	*Anas crecca/querquedula*
8	900721	T-MT	ANA	-	65	-	25	-	*Anas crecca/querquedula*
8	900739	T-MT	ANA	-	-	-	41	-	

Table 70. Woodcock: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm	La
3	911967	HU	SCR	-	c 97	-	-	-	-
5	900739	HU	SCR	-	-	-	46	-	-
6	900690	HU	SCR	-	99	-	-	-	-
6	900699	HU	SCR	555	100	-	42	-	-
6	900722	HU	SCR	-	106	-	-	-	-
6	900722	HU	SCR	557	-	-	-	-	-
6	900722	HU	SCR	576	c 103	-	44	-	-
6	900738	HU	SCR	573	105	-	42	-	-
6	900744	HU	SCR	-	106	-	46	-	-
6	900745	HU	SCR	555	c 97	-	44	-	-
6	900745	HU	SCR	557	100	-	44	-	-
8	900697	HU	SCR	562	c 103	-	44	-	-
8	900700	HU	SCR	-	101	-	-	-	-
8	900707	HU	SCR	-	103	-	-	-	-
8	900720	HU	SCR	-	98	-	-	-	-
8	900720	HU	SCR	-	c 99	-	-	-	-
8	900735	HU	SCR	-	101	-	-	-	-
9	900706	HU	SCR	513	85	-	36	-	-
10	900736	HU	SCR	535	100	-	41	-	-
4	900708	FE	SCR	-	84	c 67	36	421	-
5	900739	FE	SCR	447	83	-	35	421	-
6	900690	FE	SCR	-	80	-	-	-	-
8	900723	FE	SCR	-	78	64	-	-	-
4	900709	TI-T	SCR	-	68	73	38	-	-
5	900739	TI-T	SCR	-	66	-	-	-	-
5	900739	TI-T	SCR	617	61	56	32	-	602
6	900690	TI-T	SCR	-	63	64	-	-	-
6	900690	TI-T	SCR	643	64	62	-	-	622
6	900722	TI-T	SCR	-	64	62	-	-	-
6	900744	TI-T	SCR	-	64	67	32	-	643
9	900765	TI-T	SCR	-	65	64	-	-	-
3	900688	T-MT	SCR	378		-	-	-	-
3	900716	T-MT	SCR	-	72	-	-	-	-
6	900690	T-MT	SCR	375	73	-	27	-	-
6	900738	T-MT	SCR	-	71	-	29	-	-
6	900738	T-MT	SCR	376	69	-	28	-	-
6	900738	T-MT	SCR	382	74	-	33	-	-

Period	Box	Elem	TAX	GL	Bd	Dd	SC	Lm	La
6	900744	T-MT	SCR	397	74	-	28	-	-
9	900706	T-MT	SCR	392	67	-	29	-	-
9	900757	T-MT	SCR	407	75	-	31	-	-

Table 71. Partridge: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
6	900690	HU	PEP	488	96	-	46	-
6	900738	HU	PEP	-	96	-	42	-
6	900740	HU	PEP	466	92	-	39	-
6	900744	HU	PEP	475	95	-	43	-
8	900720	HU	PEP	-	101	-	43	-
6	900690	TI-T	PEP	726	72	71	37	701
8	900707	TI-T	PEP	-	71	69	-	-
8	900721	TI-T	PEP	-	70	71	-	-
6	900690	T-MT	PEP	-	80	-	-	-
6	900690	T-MT	PEP	-	80	-	-	-
6	900690	T-MT	PEP	406	81	-	34	-
6	900690	T-MT	PEP	413	81	-	33	-
6	900690	T-MT	PEP	415	81	-	35	-
6	900690	T-MT	PEP	427	84	-	33	-
6	900722	T-MT	PEP	-	75	-	-	-
6	900722	T-MT	PEP	410	79	-	34	-
6	900744	T-MT	PEP	415	81	-	34	-
6	900744	T-MT	PEP	433	84	-	35	-
8	900697	T-MT	PEP	433	c 80	-	34	-
8	900719	T-MT	PEP	-	81	-	33	-
8	900720	T-MT	PEP	-	82	-	-	-
8	900721	T-MT	PEP	-	83	-	-	-
8	900721	T-MT	PEP	422	78	-	34	-
8	900743	T-MT	PEP	-	77	-	-	-
8	900743	T-MT	PEP	-	84	-	-	-
8	900743	T-MT	PEP	422	81	-	34	-

Table 72. ?Magpie: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC	La
9	900756	HU	?PIP	456	108	-	46	-
9	900756	HU	?PIP	456	108	-	47	-
9	900756	FE	?PIP	377	78	-	-	-
9	900756	FE	?PIP	382	78	-	-	-
6	900690	TI-T	?PIP	-	69	65	-	-
9	900706	TI-T	?PIP	-	64	64	-	-

Table 73. Grey/Golden plover: measurements of various elements.

Period	Box	Elem	TAX	GL	Bd	Dd	SC
3	900688	HU	PL	-	84	-	35
4	900709	HU	PL	-	83	-	-
5	900739	HU	PL	-	78	-	-
6	900738	HU	PL	-	-	-	36
8	900719	HU	PL	-	84	-	35
8	900723	HU	PL	-	c 84	-	35
8	900732	HU	PL	-	86	-	36
6	900738	T-MT	PL	-	56	-	22
4	900709	HU	PLA	502	c 86	-	36
6	900745	HU	PLA	504	81	-	36
6	900690	HU	PLA	498	82	-	37
9	900689	HU	PLA	502	83	-	37
10	900736	HU	PLA	496	-	-	33
6	900722	T-MT	PLA	436	59	-	23
6	900739	T-MT	PLA	407	58	-	21
6	900744	T-MT	PLA	431	55	-	20
6	900690	HU	PLS	515	76	-	35

Table 74. Manx shearwater: measurements of various elements.

Per	Box	Elem	TAX	GL	Bd	Dd	SC	La	Lm	Comments
6	900690	FE	PUP	304	67	-	-	-	289	-
6	900690	TI-T	PUP	-	53	62	-	633	-	-
6	900690	TI-T	PUP	-	56	61	-	-	-	-
6	900740	TI-T	PUP	-	58	64	32	-	-	-
6	900740	TI-T	PUP	-	60	63	34	-	-	-
6	900744	TI-T	PUP	-	57	62	32	671	-	-
6	900744	TI-T	PUP	-	58	65	33	666	-	-
6	900744	TI-T	PUP	c 735	53	57	33	647	-	-
6	900744	TI-T	PUP	c 743	51	60	30	654	-	-
6	900722	TI-T	PUP J	-	-	-	31	-	-	prox. epiphysis unfused
8	900721	TI-T	PUP	-	-	-	30	-	-	-

Table 75.Other birds: measurements of various elements. 'p' after T-MT = proximal.

Period	Box	Identification	Elem	GL	Bd	Dd	SC	Lm
8	900734	small/medium Galliformes: *Alectoris/Lagopus/Perdix*	TI-T	-	79	69	39	-
11	900753	*Meleagris gallopavo*	HU	1384	331	-	146	-
8	900721	*Columba* cf. *livia*	T-MT	306	77	-	31	-
6	900722	*Columba* cf. *livia*	HU	-	-	-	-	-
6	900722	*Columba* cf. *livia*	HU	463	106	-	54	-
6	900722	*Columba* cf. *livia*	HU	472	-	-	50	-
6	900699	*Grus grus* (probably chopped)	TI-T	-	208	193	-	-
8	900693	*Grus grus*	T-MT p	-	-	-	95	Bp = 260
8	900732	*Grus grus*	T-MT p	-	-	-	86	Bp = 254
6	900744	*Gallinago gallinago*	HU	388	66	-	29	-
9	900689	*Numenius* cf. *arquata*	TI-T	-	92	c 87	-	-
2	900725	*Tringa* cf. *totanus*	HU	-	84	-	-	-
6	900722	*Vanellus vanellus*	HU	-	86	-	-	-
8	900743	*Vanellus vanellus*	TI-T	-	53	55	-	-
8	900721	*Milvus milvus* (larger than *M. migrans*)	HU	-	-	-	84	-
4	900709	*Falco tinnunculus*	FE	454	80	66	39	-
8	900721	*Morus (=Sula) bassanus*	T-MT	615	174	-	89	-
8	900696	*Morus (=Sula) bassanus*	T-MT	c 591	-	-	79	-
8	900743	*Ardea cinerea*	T-MT J	-	c 143	-	-	-
8	900746	*Ardea cinerea*	T-MT	-	148	-	-	-
8	900693	*Ardea cinerea*	TI-T	-	124	-	-	-
8	900721	*Ardea cinerea*	T-MT	-	139	-	-	-
8	900742	*Ardea* cf. *cinerea*	T-MT	-	-	-	56	-
8	900747	*Ardea* cf. *cinerea*	T-MT J	-	133	-	-	-
6	900699	*Corvus corax*	T-MT	c 689	c 89	-	53	-
8	900697	*Corvus corax*	HU	-	c 209	-	91	-
8	900696	*Corvus corax*	FE	669	140	111	60	643
4	900708	*Corvus corone/frugilegus*	HU	-	160	-	-	-
6	900703	*Corvus corone/frugilegus*	HU	710	164	-	68	-
8	900707	*Corvus corone/frugilegus*	HU	-	137	-	-	-
8	900743	*Corvus corone/frugilegus*	HU	-	147	-	-	-
8	900734	*Corvus corone/frugilegus*	HU	-	141	-	-	-
6	900703	*Corvus corone/frugilegus*	FE	-	116	-	-	-
6	900703	*Corvus corone/frugilegus*	FE	570	115	92	46	540
6	900703	small corvid (cf. *Corvus monedula*)	HU	-	-	-	-	-
6	900740	small corvid (cf. *Corvus monedula*)	HU	-	-	-	42	-
6	900722	small corvid (cf. *Garrulus glandarius*)	T-MT	418	53	-	31	-
8	900723	small corvid (*Garrulus/Pica/Corvus monedula*)	FE J	380	73	-	31	-
2	900725	*?Lanius*	HU	-	48	-	21	-

Period	Box	Identification	Elem	GL	Bd	Dd	SC	Lm
8	900721	*Turdus* cf. *merula*	T-MT	-	42	-	19	-
8	900746	*Turdus* cf. *philomelos*	HU	-	65	-	-	-
8	900743	*Turdus* cf. *iliacus*	TI-T	-	36	36	-	-
6	900744	*Turdus*	T-MT	293	32	-	14	-
6	900744	*Turdus*	T-MT	336	35	-	14	-
9	900765	*Turdus*	HU	268	65	-	29	-

Table 76. Measurements of mammal bones from sieved samples.

Period	Box	Elem	TAX	FUS	Bd	A	B	1	4
6	900740	MC	OVA	F	c 226	106	c 102	96	97
6	900740	TI	ORC	F	121	-	-	-	-

Table 77. Measurements of bird bones from sieved samples.

Period	Box	Elem	TAX	SPUR	GL	Bd	Dd	SC	Lm	La
8	900734	HU	GNP		-	128	-	-	-	-
8	900734	HU	GNP		-	136	-	-	-	-
8	900734	HU	GNP		689	159	-	71	-	-
8	900734	FE	GN		822	163	-	69	-	-
6	900703	FE	GNP		-	139	124	-	-	-
6	900703	FE	GNP		-	144	118	-	-	-
6	900703	TI-T	GNP		-	137	-	-	-	-
6	900740	TI-T	GNP		-	121	124	-	-	-
6	900740	TI-T	GNP		-	130	127	-	-	-
8	900734	TI-T	GNP		936	97	-	57	-	906
6	900740	T-MT	GAG	P	-	115	-	-	-	-
6	900740	T-MT	GNP		-	114	-	-	-	-
8	900743	T-MT	GNP		-	138	-	-	-	-
8	900743	T-MT	GNP	A	-	107	-	-	-	-
6	900740	HU	PEP?		-	102	-	-	-	-
8	900734	FE	PEP		-	104	-	-	-	-
6	900740	TI-T	PEP		-	68	67	-	-	-
6	900744	TI-T	PEP		-	70	c 66	-	-	-
8	900743	T-MT	PEP		-	78	-	-	-	-
8	900743	T-MT	PEP		-	85	-	-	-	-
8	900743	T-MT	PEP		421	80	-	33	-	-
1	900725	HU	SCR		-	105	-	-	-	-
1	900725	HU	SCR		c 555	-	-	45	-	-
1	900725	HU	SCR		e 550	102	-	45	-	-
6	900703	HU	SCR		564	102	-	42	-	-
1	900725	FE	SCR		-	85	74	38	432	-
1	900725	FE	SCR		-	c 81	-	-	-	-
8	900734	FE	SCR		-	82	-	-	-	-

Period	Box	Elem	TAX SPUR	GL	Bd	Dd	SC	Lm	La
6	900740	TI-T	SCR	-	61	58	-	-	-
6	900703	T-MT	SCR	-	76	-	-	-	-
6	900744	T-MT	SCR	-	c 76	-	-	-	-
8	900743	TI-T	PL	-	50	49	-	-	-
8	900743	TI-T	PL	-	54	54	-	-	-
6	900703	T-MT	PL	-	61	-	24	-	-
6	900740	T-MT	PL	-	67	-	-	-	-
8	900743	T-MT	PL	c 412	-	-	-	-	-
6	900744	TI-T	PUP	-	55	61	33	-	645
6	900740	T-MT	*Gallinago gallinago*	328	45	-	18	-	-
6	900703	T-MT	*Corvus corone/frugilegus*	-	78	-	-	-	-
6	900703	HU	*Corvus ?monedula*	-	106	-	-	-	-
6	900703	TI-T	CO	-	65	63	-	-	-
6	900740	HU	*Turdus* cf. *philomelos*	-	67	-	-	-	-
1	900725	TI	*Turdus* cf. *merula*	-	44	43	21	-	-
6	900740	T-MT	*Turdus* cf. *merula*	350	43	-	-	-	-
1	900725	HU	TU	228	54	-	22	-	-
1	900725	HU	TU	253	66	-	27	-	-
6	900740	TI-T	TU	-	44	-	-	-	-
8	900743	TI-T	TU	-	37	-	-	-	-

Notes for Contributors

Articles for *Circaea* should be typed double-spaced on A4 paper with generous margins. Line drawings should be in black ink on white paper or drawing film, to fit within a frame 153 x 250 mm maximum. Captions should be supplied on a separate sheet of paper, and labelling on figures should either be in 'Letraset' (or an equivalent) or should be in soft pencil. Half-tone photographs can be accommodated, but authors wishing to make extensive use of photographs, or colour, should note that they may be asked to contribute towards the high cost of production. The editors will modify short contributions to fit the layout and convention of *Circaea*. The same principle will be applied to idiosyncrasies of spelling and punctuation. Scientific articles will be submitted to referees; authors may, if they wish, suggest suitable referees for their articles.

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Contents

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