Ancient Monuments Laboratory
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# PRUDHOE CASTLE: A REPORT ON THE ANIMAL REMAINS.

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Summary

This report describes animal remains from the eleventh to nineteenth centuries AD at Prudhoe Castle, Northumberland, England. Most are cattle, sheep, and pig and are probably kitchen/ butchery waste.

Sheep became more common during and after the mid-sixteenth - 1630 and pig "apparently" declined in importance after the late fourteenth - late fifteenth century.

There was an unexplained abundance of pig heads throughout, and of cattle ankle bones in the early periods at Prudhoe. A lack of sheep foot bones is also noteworthy.

Many of the cattle were probably retired work/ milk animals, and several deformed distal metatarsals reflect the excessive stress to which these animals had been put. The proportion of young cattle slaughtered increased slightly in the sixteenth century and afterwards, while in the later periods the number of older sheep increased - perhaps ( together with their increased numbers) reflecting the growth of the wool industry in England.

The sheep at Prudhoe were small, and together with the pigs, did not undergo any average size change. However, between the fourteenth and seventeenth centuries cattle increased in size.

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# PRUDHOE CASTLE - A REPORT ON THE ANIMAL REMAINS

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Prudhoe castle is situated south of the river Tyne in Northumberland, northern England. The first construction at Prudhoe dates from the late eleventh century AD when it was probably settled by a Norman family, the Umfravilles, and it has been in more or less continuous occupation since then. The castle has resisted two attacks by William of Scotland.

Laurence Keen and David Thackray, at the request of the Inspectorate of Ancient Monuments, Department of the Environment, excavated the Inner Ward of the castle between 1972 and 1981 (see for example Keen, 1983). 12 occupation "phases" have been recognised at Prudhoe and their dates are given below. I was asked to examine the animal remains, and what follows is a report of my findings.

The aims of this report are to document 1) the proportions of different animal species, and for the three common ones, 2) the frequencies of different parts of their anatomy, 3) the age groups represented, and 4) any change of body size which may have occurred during the 800 years of occupation at Prudhoe.

MATERIAL AND METHODS

The Prudhoe faunal remains comprise approximately 8 cubic metres. Most bones had been chopped and fragmented in antiquity. The paucity of small elements such as isolated teeth, sesamoids, and phalanges, as well as remains of small animals, suggests that little sieving had been undertaken to recover these faunal remains. For this reason the data I present of frequencies of species and parts of the anatomy must be treated with caution.

I examined all bones and teeth, and (for the ungulates) in order to count, measure, and estimate "age at death", recorded the following parts of the skeleton:

Mandible - posterior part/isolated third molar tooth
- anterior part (used only for age-analysis)
Scapula - glenoid articulation
Humerus - distal epiphysis
Radius - distal epiphysis
Metacarpal - distal epiphysis
Femur - distal epiphysis
Tibia - distal epiphysis
Astragalus
Calcaneum
Metatarsal - distal epiphysis

Figure 1 shows how I took the measurements of certain bones.

The 12 phases at Prudhoe with their dates are as follows (I am grateful to Mr. Peter Bellamy for this information):

| Phase | Date/century AD |
|---|---|
| 12 | 19th (1808-1818) - 20th |
| 11 | 18th |
| 10 | 17th (1630 onwards) |
| 9 | mid 16th - early 17th (1630) |
| 8 | early - mid 16th |
| 7 | late 15th - early 16th |
| 6 | late 14th - late 15th |
| 5 | late 13th - mid 14th |
| 4 | 13th |
| 3 | mid - late 12th |
| 2 | early - mid 12th |
| 1 | mid 11th - early 12th |

The Prudhoe assemblages are compared with the eleventh to seventeenth century assemblages from Barnards castle in Co. Durham, studied by Jones et al. (1985).

ANIMALS FOUND AND THEIR ABUNDANCE

Most of the bones and teeth are probably derived from butchery/kitchen waste since (with the exception of the horse bones) they bear marks of the butcher's knife and chopper.

Table 1 and figure 1 give the numbers of bones and teeth of the more common animals represented in the Prudhoe sequence. (In view of the probable biassed recovery during excavation and discrepancies in the body-part frequencies [see below], these data - calculated from the sum of all skeletal elements - do not necessarily reflect the relative importance of these animals to the inhabitants of Prudhoe.) Cattle, sheep and pig are the most abundant. Although many sheep and goat bones are difficult to distinguish, I could find no evidence for goat. Three species of deer (roe, fallow, and red), horse, dog, fox, chicken, goose, and an unidentifiable fragment of fish-bone were also found.

While cattle remains are well represented throughout the sequence, sheep became more common during and after phase 9 (mid sixteenth century - 1630). Jones et al. (1985) report a "dramatic" increase of sheep from below 10% in 1095-1292 to circa 30% of the total ungulates in 1471-1569 at Barnards castle. At both Flaxengate, Lincoln, and Exeter, sheep numbers had increased some one or two hundred years earlier (O'Connor, 1982; Maltby, 1979). Is this increase of sheep evidence for a nationwide preference for mutton which started earlier in southern England, or does it reflect the growing importance of wool production?

At Prudhoe pig numbers declined after phase 6 (late fourteenth to late fifteenth centuries). At Barnards castle pig numbers also declined at about the same time - between 1330-1471 and 1471-1569.

Deer bones are present throughout the sequence at Prudhoe, but unlike Barnards castle are found in very small quantities - roe deer being the most common of the three species.

Several bones of dog were found throughout the Prudhoe sequence (phases 9, 7, 6, and 4). It is not possible to determine to which breed they belonged, but most were fairly large individuals, some equivalent in size to a border collie, and one to an alsation. In most phases I also observed small ungulate (sheep and pig) bones which had been corroded in a manner reminiscent of animal (eg; carnivore) digestion (Payne and Munson, 1985). They could be bones which had been swallowed and subsequently vomited or defecated by dogs. These were found in the following contexts: 300, 275, 93, 320, 14, 325, 19, 703, 1068, 673, 180, 1100, 1296, 411, 793, 115 and 1043.

In contexts 200 (phase 8), 418 (phase 6) and 1157 (phase 1) I observed cattle ankle bones (distal tibia, calcaneum, astragalus) which had been severely corroded. These are probably too large to be swallowed by a dog, and they did not bear any tooth marks. They had probably been subjected to some kind of acid corrosion.

BODY-PART FREQUENCY (figure 2)

Due to the rather small numbers of bones within each phase, I have had to pool data from several adjacent phases. A consideration of the representation of different parts of the anatomy reveals several interesting patterns:

a) Cattle. In phases 1-6 there was a preference for hind-limb elements, for which I cannot provide an explanation.

b) Sheep. A marked lack of sheep phalanges and metapodials is unlikely to be due solely to their poor preservation and recovery during excavation. Their low numbers may signify the import of sheep carcasses without the distal parts of their feet. Two possible explanations come to mind. a) Sheep feet may have been sold off to the poor for preparing soup/sheep-foot jelly, or b) sheepskins were removed elsewhere with foot-bones in situ for despatch to the tannery. O'Connor (1984) reports a "mirror-image" assemblage of sheep bones at Walmgate, York, where in a late seventeenth/early eighteenth century deposit he found large quantities of sheep metapodials and phalanges. These, he suggests, represent refuse from the leather industry.

c) Pig. Pig mandibles (and broken skulls) are common throughout the Prudhoe sequence. (Despite the smallness of the assemblages, the same is probably true of phases 10 and 11.) Pig mandibles and skull-bones are very robust - much more so than bovid mandibles and skulls for instance, but this cannot be the sole explanation for their high frequency at Prudhoe. Was pig's head a popular dish at Prudhoe?

d) Deer. While antlers and mandibles of roe deer were found, these elements from the head, and even isolated teeth of fallow and red deer were rare. The possibility that skulls of these two larger species of deer were retained within the castle as trophies should be borne in mind.

AGE AT SLAUGHTER

Cattle. As at Barnards castle, all age groups of cattle are represented, although there are very few veal bones. Despite the small sample-sizes, it is possible to observe that the proportion of young cattle slaughtered increased very slightly in the sixteenth century onwards: in phases 1-8 there are relatively fewer cattle calcanea with tuber calcis unfused, and fewer mandibles with unerupted third molars (see figure 4 and table 26). Many of the older cattle consumed at Prudhoe were undoubtedly retired dairy cows and work animals. Several distal metatarsals are asymmetric (ie: one condyle is wider than the other) and several phalanges were found with exostoses around their proximal articular surface (see plates). These pathologies suggest that some of the cattle were subjected to excessive strain. They probably belonged to work animals. Affected cattle metatarsals were present in small numbers in most of the phases at Prudhoe (see also table 29).

Sheep. In phases 9-11 the number of older sheep increased slightly compared with the preceeding phases (table 2). This may indicate that greater emphasis was placed upon milk and/or wool production in the sixteenth-eighteenth centuries. A shift both in the age distribution and the small increase in numbers of sheep compared with other ungulates may be reflecting the "growing profitableness of the sheep industry in Tudor times" (Orwin, 1949: 36). At King's Lynn, Noddle (1977) found that the age of slaughter of sheep had risen by the thirteenth century, while at Exeter, Maltby (1979) found a marked age-increase in the sixteenth century. It is possible that Lincolnshire became an important wool-producing region before Devon and Northumberland did.

Pig. A consideration of the most posterior mandibular tooth cusp showing exposure of dentine (table 3) reveals that most of the pigs at Prudhoe were slaughtered between the ages of one and three years. There does not appear to have been any shift in the age-slaughter strategy of pigs at Prudhoe between eleventh and eighteenth centuries.

ANIMAL SIZE

Cattle. Unlike the sheep and pig, cattle exhibit a size increase (figures 5 and 6). This probably occurred between the fourteenth and seventeenth centuries, and perhaps during the fifteenth and sixteenth centuries, but there are insufficient cattle remains from phases 6, 7 and 8 to pinpoint just when cattle might have become larger. Do these increases in mean astragalus size and third molar length reflect a real increase in cattle-size in post-Medieval Britain, or merely a change in the proportions of sexes (more cows in earlier phases, more bulls/oxen in later times)? The widths of individual cattle astragali (figure 5) show that the total spread of astragalus size has remained the same at Prudhoe, ie; both bulls and cows are represented throughout the Prudhoe sequence. However, the range of plots appears to shift to the right in the upper phases, which I interpret as representing a genuine increase of cattle body-size.

Armitage (1980 and 1982) documents size trends in English cattle since Roman times. Cattle of the eleventh to thirteenth centuries were small, but by the late fourteenth and early fifteenth century larger cattle began to appear in south-eastern England. He traces this improvement in English cattle back to the widespread conversion of arable land to pasture following the severe decrease of population resulting from the plague in the fourteenth century, and the replacement of the manorial system by tenant farming. These changes probably stimulated livestock husbandry. First, enclosed pasture provided the opportunity for controlled breeding. Second, large estates meant larger herds leading to greater overall variability and therefore more choice for selecting breeding stock. Third, the introduction of crop rotation which included fodder plants, as well as improved techniques for hay-making and storage, would have overcome the problem of long lean winters. This is the chain of events by which Armitage explains the origin of larger cattle in south-eastern England in the fourteenth and fifteenth centuries. Further increase of cattle size was probably stimulated by the growth of the cities - especially London - in the seventeenth and eighteenth centuries.

Sheep. There is no discernable change in the size of the sheep-bones at Prudhoe. A plot of astragalus widths (figure 7) reveals an interesting reduction in the overall variability of the sheep in the later periods (compare phases 3-8 with phases 9-11). One possible explanation for this is that by the sixteenth/seventeenth centuries sheep had become "streamlined" - perhaps due to breeding selection. An alternative explanation is that in the later periods mutton was procured from a single source (ie; derived from a single breed/flock rather than several different flocks/breeds). The three entire sheep metatarsals (table 16) from phases 9 and 11 are equivalent in size to Roman and medieval sheep shown in Armitage (1982, fig 44) being much smaller than early modern sheep from Aldgate in London.

Pig. Like the sheep, I could find no evidence for any change of size at Prudhoe: see figure 8. (Note that some of the larger suid teeth and bones may be wild boar.)

## SUMMARY AND CONCLUSIONS

Beef, mutton and pork were much in favour at Prudhoe, and supplemented by some venison. If we assume that most meat was imported "on the bone" then while beef was probably the most commonly consumed meat throughout the eight centuries of occupation, pork began to lose favour after the fifteenth century*, and mutton assumed greater importance during and after the sixteenth century. Both the increased numbers of sheep and their older age at slaughter in the later phases at Prudhoe may reflect the increasing importance of wool production in northern England. Much of the beef was probably derived from retired work/milk animals especially in the earlier periods, and all three species of deer (roe, fallow, and red) are represented throughout the Prudhoe sequence. I could find no evidence for any change in the mean size of pigs and sheep, but cattle increased in size between the fourteenth and seventeenth centuries (perhaps during the fifteenth-sixteenth centuries), which may have some bearing upon the beginnings of the agricultural revolution and the associated improvements in livestock.

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*An alternative explanation for the reduced numbers of pig bones, is that boned pork was increasingly favoured.

LEGENDS TO FIGURES

Fig 1 Measurements. A sketch to show how measurements of artiodactyl bones were taken.

a) Sheep/cattle/deer distal metapodial 1 = distal width, 2 = maximum diameter of the condyles, 3 = W. Cond., 4 = W. Troch.

b) Sheep/deer/cattle astragalus 1 = lateral length taken with both faces of the distal end resting on one arm of the calipers, 2 = lateral "height" taken across the external side when both edges of the upper part of the external side rest on one arm of the calipers, 3 = distal width.

c) Deer/bovid distal humerus 1 = width of distal trochlea, 2 = minimum diameter of trochlea.

d) Pig distal humerus 1 = width of distal trochlea, 2 = minimum diameter of trochlea.

Fig 2 The Prudhoe faunal succession. Percentages of the seven most abundant animal species at Prudhoe. Due to the small sample-sizes of phases 1-3 and phases 7-8, data are pooled.

Fig 3 Body-part frequencies. Percentages of different parts of the anatomy of cattle, sheep and pig. Due to the smallness of many of the samples, for cattle and sheep, phases 1-6, 7-9 and 10-11 are pooled, and for pig, phases 1-6 and 7-9 are pooled. The parts of the skeleton considered are as follows; posterior part of the mandible (head), scapula (shoulder blade), distal humerus, distal radius, distal metacarpal (forelimb), distal femur, distal tibia, calcaneum, astragalus and distal metatarsal (hind-limb). Due to the difficulty in distinguishing between pig metacarpals and metatarsals, I divided the "metapodial" counts into two halves. If all bones of an animal were to have been subject to an equal rate of selection/destruction, then each bar would be equal in height.

Fig 4 Cattle: age at slaughter. A plot of unerupted third molars "U" and third molar crown heights for phases 1-8 and 9-11. The crown height is measured up the buccal surface of the central pillar from the crown-root junction (neck) to the occlusal surface of the crown. Teeth from young individuals have high crowns, while those from older individuals have lower crowns. In order to take this measurement in young adults, the third molar had to be broken out of the mandible ramus. Each square represents a single specimen. Note the slightly greater proportion of younger cattle slaughtered in the later periods.

Fig 5 Cattle: size variation. A plot of the cattle astragalus distal widths in millemetres. Each square represents a single astragalus.

Fig 6 Cattle: size variation. A plot of the antero-posterior crown lengths in millemetres of cattle lower third molars in phases 5-9 and 10-11. Each square represents a single specimen.

Fig 7 Sheep: size variation. A plot of the length and distal width in millemetres of sheep astragali in phases 3-8 and 9-11. Each square represents a single specimen.

Fig 8 Pig: size variation. A plot of the antero-posterior lower third molar crown length, and bucco-lingual crown width of the first cusp of the lower third lower molar. Measurements are in millemetres and each square represents a single specimen.

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Prudhoe Castle. Tables 4 - 29.

Measurements of bones and teeth: individual specimens' measurements are given throughout, and the following format is adopted from left to right.

1. Phase
2. Context number
3. Side of body (where relevant) L = left, R = right
4. Measurements in millemetres to the nearest 0.1 mm. Approximate values are in parentheses. All epiphyses measured are fused to their diaphyses. Individual teeth are measured across their crowns at their widest point. Canid tooth-row measurements are alveolar.

| | Cattle | Sheep | Pig | Roe | Fal | Red | Horse | D | F | C | G | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| phase 12 | 50 | 27 | 4 | 4 | 0 | 0 | 0 | - | - | - | - | - |
| phase 11 | 56 | 61 | 5 | 3 | 6 | 0 | 1 | - | - | v | - | - |
| phase 10 | 86 | 59 | 7 | 4 | 0 | 1 | 2 | - | v | - | - | - |
| phase 9 | 209 | 232 | 33 | 7 | 14 | 5 | 2 | - | v | - | - | v |
| phase 8 | 73 | 32 | 5 | 0 | 2 | 2 | 0 | - | - | v | - | - |
| phase 7 | 19 | 14 | 2 | 0 | 2 | 1 | 0 | - | - | - | - | - |
| phase 6 | 85 | 39 | 27 | 4 | 2 | 3 | 1 | - | - | - | v | - |
| phase 5 | 129 | 62 | 49 | 12 | 1 | 4 | 3 | v | - | v | - | - |
| phase 4 | 120 | 67 | 92 | 5 | 2 | 7 | 3 | - | - | v | - | - |
| phase 3 | 20 | 13 | 17 | 2 | - | - | 1 | v | - | - | - | - |
| phase 2 | 7 | 4 | 3 | 2 | 0 | 0 | 0 | v | - | - | - | - |
| phase 1 | 26 | 1 | 7 | 0 | 0 | 0 | 0 | - | - | - | - | - |

Table 1 Prudhoe castle, numbers of bones in each phase according to animal as follows: Cattle, Sheep, Pig, Roe deer (Roe), Fallow deer (Fal), Red deer (Red), Horse, Dog (D), Fox (F), Chicken (C), Goose (G), and Fish (P). The last five animals were only present in small numbers and are not quantified, their presence being noted by a "v".

| | Mandible tooth wear stage | | | | | | | | | | | Ant.Mand. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | E/F | F | G | G/H | H | I | $m_3$ | $P_4$ |
| phase 12 | – | – | – | 3 | – | – | 1 | – | – | – | – | 0 | 2 |
| phase 11 | – | 1 | – | – | – | – | 1 | 2 | 2 | – | – | 2 | 3 |
| phase 10 | – | 2 | – | – | 5 | – | 1 | 1 | 3 | 1 | – | 5 | 6 |
| phase 9 | 1 | – | – | 6 | 10 | 1 | 7 | 14 | 7 | 1 | – | 7 | 30 |
| phase 8 | – | – | – | 1 | 3 | – | 3 | – | – | – | – | 1 | 3 |
| phase 7 | – | 1 | – | 1 | 1 | – | – | – | – | – | – | 1 | 1 |
| phase 6 | – | – | – | – | 1 | – | – | – | – | – | – | 0 | 1 |
| phase 5 | 2 | 2 | – | – | – | – | 1 | 1 | – | – | – | 5 | 1 |
| phase 4 | – | – | – | – | 1 | – | – | – | – | – | – | 0 | 1 |
| phase 3 | – | – | – | – | – | – | – | – | – | – | – | 0 | 0 |
| phase 2 | – | – | – | – | – | – | – | – | – | – | – | 0 | 0 |
| phase 1 | – | – | – | – | – | – | – | – | – | – | – | 1 | 0 |

Table 2. Sheep mandibles and anterior parts of mandibles: tooth eruption and wear stages. The left-hand set of columns provide counts of sheep mandibles aged according to the eruption and wear stage criteria of Payne (1973). On the right are two columns; $m_3$ are counts of anterior mandibles with deciduous third molar tooth, and $P_4$ are counts of anterior mandibles with the permanent fourth premolar tooth. Note: pooling data for phases 1-8 and phases 9-11 reveals an increase in the proportion of older sheep in later periods.

| | a) Anterior | | b) Posterior | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $m_4$ | $P_4$ | $m_4$ III | $M_1$ I | $M_1$ II | $M_2$ I | $M_2$ II | $M_3$ I | $M_3$ II | $M_3$ III |
| phase 12 | 0 | 2 | - | - | - | - | - | - | - | - |
| phase 11 | 1 | 0 | - | - | - | - | 1 | - | - | - |
| phase 10 | 1 | 2 | - | - | - | - | - | 1 | - | 2 |
| phase 9 | 0 | 12 | - | - | 1 | 1 | 8 | - | 3 | - |
| phase 8 | 2 | 0 | - | - | - | - | - | - | - | - |
| phase 7 | 1 | 0 | - | - | - | 1 | - | - | - | - |
| phase 6 | 2 | 9 | - | - | 1 | 2 | 3 | 2 | 4 | 0 |
| phase 5 | 4 | 22 | - | - | 1 | 2 | 6 | 1 | 2 | 2 |
| phase 4 | 9 | 27 | - | 1 | 6 | 3 | 14 | 9 | 3 | 4 |
| phase 3 | 0 | 3 | - | - | - | 2 | 2 | 1 | 1 | - |
| phase 2 | 1 | 2 | 1 | - | 1 | - | - | - | - | 1 |
| phase 1 | 0 | 4 | - | - | 1 | 1 | - | - | 1 | - |

Table XX. Pig mandible: tooth eruption and wear.

a) Anterior part of the mandible - numbers of mandibles with the last deciduous molar ($m_4$) or permanent pre-molar ($P_4$).

b) Posterior part of the mandible - numbers of mandibles whose most posterior cusp shows exposure of dentine (ie; "wear") - in progressively older wear stages. For example if the second of the two cusps on the second molar is the most posterior tooth in a particular mandible showing dentine it would be counted in column $M_2$ II. The seven cusps on the three permanent molar teeth in pigs come progressively into wear in the course of their first three or so years of life. Older individuals (those with all seven cusps "in wear" are counted in the $M_3$ III column).

| | | | | |
|---|---|---|---|---|
| Phase 12 | 184 | L | 45.6 | |
| 9 | 356 | R | 40.8 | |
| 5 | 1631 | L | 41.2 | |
| 5 | 1100 | R | 38.0 | |
| 4 | 1296 | R | 41.4 | |
| 4 | 1023 | L | 38.4 | |
| 4 | 1023 | R | 36.7 | |
| 4 | 1023 | R | 40.5 | |
| 4 | 411 | R | 37.5 | |
| 4 | 411 | R | 35.6 | |
| 3 | 1148 | L | 40.2 | |
| 3 | 1173 | R | 35.5 | |

4 Prudhoe Castle. Pig astragalus: length.

| | | | | |
|---|---|---|---|---|
| Phase 11 | 294 | L | 33.1 | 21.7 |
| 10 | 176 | L | 34.1 | 22.3 |
| 9 | 258 | R | 27.8 | 18.9 |
| 9 | 93 | R | - | 18.6 |
| 8 | 366 | L | 26.1 | 16.5 |
| 5 | 615 | R | 25.4 | 16.6 |
| 5 | 1100 | L | 26.5 | 18.6 |
| 5 | 1100 | R | 28.6 | 19.9 |
| 4 | 1023 | L | - | 17.9 |
| 4 | 792 | L | 26.6 | 18.3 |
| 4 | 411 | L | 25.6 | 18.4 |
| 3 | 1173 | R | 27.2 | 18.7 |

5 Prudhoe Castle. Pig humerus: width and minimum diameter of trochlea.

| | | | | | |
|---|---|---|---|---|---|
| Phase 11 | 160 | L | 40.1 | 26.5 | 22.9 |
| 9 | 96 | L | 38.3 | 25.7 | 21.0 |
| 9 | 12 | R | 38.2 | 26.1 | 21.3 |
| 9 | 93 | L | 36.2 | 24.4 | 20.4 |
| 7 | 705 | L | 37.7 | 25.3 | 20.8 |
| 7 | 106 | L | 38.8 | 26.7 | 22.1 |
| 6 | 728 | R | 36.0 | 23.9 | 19.6 |
| 4 | 1296 | R | 39.4 | 25.5 | 22.8 |

6 Prudhoe Castle. Fallow deer astragalus: lateral length, distal width and lateral "height".

| | | | | | |
|---|---|---|---|---|---|
| Phase 11 | 119 | - | | 32.0 | 20.4 |
| 11 | 8 | 199 | (28.4) | | 18.1 |
| 11 | 5 | 223 | | 31.9 | 19.7 |
| 9 | 96 | 220 | | 31.8 | 20.5 |

7 Prudhoe Castle. Fallow deer metatarsal: length, distal width, and maximum diameter of the distal condyles.

| | | | | | |
|---|---|---|---|---|---|
| Phase | 12 | 300 | L | 14.5 | - |
| | 11 | 5 | L | 15.4 | 36.9 |
| | 11 | 5 | R | 16.7 | 40.8 |
| | 10 | 176 | R | 15.3 | 38.2 |
| | 10 | 176 | L | 14.4 | 37.8 |
| | 9 | 283 | R | 15.2 | 39.9 |
| | 5 | 1612 | R | 15.9 | 38.8 |
| | 4 | 411 | L | 13.7 | 36.4 |
| | 3 | 1057 | L | 14.0 | 38.4 |
| | 3 | 1173 | R | 14.4 | 36.8 |

8 Prudhoe Castle. Roe deer mandible: third molar tooth crown length, and alveolar $M_1$ - $M_3$ length.

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| | | | | | |
|---|---|---|---|---|---|
| Phase | 12 | 184 | L | - | 14.7 |
| | 10 | 176 | R | 26.3 | 14.7 |
| | 9 | 12 | L | 26.8 | 16.6 |
| | 9 | 12 | L | 25.2 | 15.8 |
| | 5 | 1385 | L | 26.0 | 15.8 |
| | 5 | 464 | L | 25.1 | 15.0 |
| | 5 | 818 | L | 26.2 | 16.9 |
| | 4 | 1296 | R | 25.6 | 16.2 |
| | 4 | 1020 | R | 24.1 | 14.8 |
| | 4 | 1296 | R | 23.6 | 14.6 |

9 Prudhoe Castle. Roe deer humerus: distal trochlea width and minimum diameter.

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase | 12 | 184 | 162 | 22.0 | 14.2 | 10.0 | 10.4 | 9.8 | 10.3 |
| | 6 | 101 | 164 | 23.2 | 15.7 | 10.5 | 11.5 | 10.6 | 11.6 |

10 Prudhoe Castle. Roe deer metacarpal: length, distal width, maximum diameter of condyles, W. Cond, W. Troch, W. Cond, and W. Troch.

---

| | | | | | |
|---|---|---|---|---|---|
| Phase | 11 | 5 | 195 | 24.0 | 15.7 |
| | 10 | 15/16 | - | 23.2 | 15.9 |
| | 9 | 93 | - | 24.4 | 16.4 |
| | 4 | 1628 | 193 | (24.2) | 16.0 |
| | 2 | 955 | - | 25.7 | 16.3 |

11 Prudhoe Castle. Roe Deer metatarsal: length, distal width and maximum diameter of condyles.

---

| | | | | |
|---|---|---|---|---|
| Phase | 6 | 571 | 38.1 | 26.5 |
| | 6 | 101 | 40.1 | 28.4 |

12 Prudhoe Castle. Red deer metatarsal: distal width and maximum diameter of condyles.

---

| | | | | | |
|---|---|---|---|---|---|
| Phase | 9 | 104 | L | 47.0 | 25.8 |
| | 4 | 411 | L | 56.0 | 30.4 |

13 Prudhoe Castle. Red deer humerus: distal trochlea width and mimimum diameter.

---

| | L/R | l.M3 | w.M3 I | w.M3 II |
|---|---|---|---|---|
| Phase 12 | | | | |
| 184 | L | 32.8 | 15.1 | 15.1 |
| Phase 10 | | | | |
| 176 | L | 31.7 | 14.5 | 14.2 |
| 176 | R | 30.9 | 14.4 | 14.0 |
| 176 | R | 32.5 | 14.6 | 14.9 |
| Phase 9 | | | | |
| 93 | L | - | 15.2 | - |
| 7 | L | 30.0 | 13.7 | 14.6 |
| 93 | R | - | 15.7 | 14.6 |
| 14 | R | 32.4 | 15.4 | 15.1 |
| 12 | R | 38.1 | 16.0 | 15.6 |
| 12 | R | 32.6 | 14.7 | 14.9 |
| 295 | L | - | 15.3 | 14.0 |
| Phase 8 | | | | |
| 447 | L | 30.4 | 13.1 | 13.9 |
| Phase 6 | | | | |
| 373 | R | - | 13.3 | 13.7 |
| 978 | R | 31.9 | - | - |
| 20 | R | 33.3 | 15.8 | 15.5 |
| 1082 | L | 33.4 | 14.2 | 14.3 |
| 1078 | L | 30.7 | 14.9 | 14.8 |
| 101 | R | 29.4 | 14.3 | 13.8 |
| 1087 | L | 35.2 | 17.0 | 16.2 |
| 442 | R | 29.9 | 14.4 | 14.4 |
| Phase 5 | | | | |
| 517 | L | 38.3 | 18.8 | 18.0 |
| 1091 | R | 30.3 | 14.0 | 14.3 |
| 1273 | L | - | 16.4 | 15.4 |
| 1100 | R | 36.0 | 16.6 | 16.5 |
| 1100 | L | 29.6 | 14.8 | 14.6 |
| 1267 | R | 30.6 | (13.9) | 14.1 |
| 1100 | L | 37.4 | 17.4 | 17.8 |
| 378 | L | 27.9 | 14.8 | 14.6 |

| | L/R | l.M3 | wM3 I | w.M3 II |
|---|---|---|---|---|
| Phase 4 | | | | |
| 1296 | R | 39.8 | 16.3 | 16.1 |
| 793 | R | 35.1 | 15.6 | 16.4 |
| 411 | R | 29.6 | 14.4 | 13.5 |
| 1296 | R | 38.6 | 16.6 | 16.6 |
| 411 | L | 29.8 | 15.6 | 14.7 |
| 411 | L | 30.9 | 13.9 | 14.4 |
| 411 | R | 35.6 | 16.2 | 15.5 |
| 411 | L | 35.6 | 15.8 | 16.2 |
| 411 | L | 30.6 | 14.3 | 13.8 |
| 411 | L | 30.2 | 14.6 | 14.4 |
| 1023 | R | 33.1 | - | - |
| 1023 | L | 30.5 | 14.0 | 13.3 |
| 411 | R | 33.2 | 14.2 | 14.0 |
| 411 | L | (30.6) | 14.5 | 14.5 |
| 411 | R | (34) | 15.5 | 15.7 |
| 1274 | R | - | 13.3 | 13.4 |
| 793 | R | 33.0 | 14.9 | 14.7 |
| 793 | L | (42.3) | 18.3 | 18.4 |
| 1024 | R | 28.3 | 14.6 | 14.4 |
| 440 | L | 30.7 | 14.2 | 14.2 |
| 411 | L | 31.3 | 14.4 | 14.3 |
| 411 | L | 34.0 | 15.4 | 15.5 |
| 411 | R | 32.1 | 14.4 | 13.1 |
| 1296 | R | 35.3 | 16.0 | 15.9 |
| 1296 | L | 34.5 | 16.2 | 16.0 |
| 1296 | L | 31.7 | 15.7 | 15.3 |
| 1296 | R | 41.5 | 19.0 | 18.4 |
| 1120 | R | 26.6 | 15.0 | 15.0 |
| Phase 3 | | | | |
| 900 | L | 31.2 | 13.6 | 13.6 |
| 115 | R | 32.0 | 14.4 | - |
| 1173 | L | 29.6 | 14.7 | 14.2 |
| 1055 | L | 30.6 | 16.2 | 15.4 |
| Phase 2 | | | | |
| 955 | R | 31.0 | 13.5 | 13.6 |
| Phase 1 | | | | |
| 1240 | L | 27.2 | 13.4 | 13.2 |

Table 14 Prudhoe castle, pig third lower molar tooth, crown measurements: antero-posterior maximum length, width of first pillar, width of second pillar.

| | | | | |
|---|---|---|---|---|
| Phase 12 | | | | |
| 300 | R | - | 18.7 | - |
| 275 | L | 31.3 | 20.0 | 17.7 |
| 184 | L | 25.6 | (17.2) | 14.3 |
| Phase 11 | | | | |
| 5 | R | 28.5 | 18.9 | 16.1 |
| Phase 10 | | | | |
| 176 | R | 26.7 | 18.5 | 15.4 |
| 176 | L | 28.2 | 18.7 | 15.1 |
| 176 | R | 27.8 | 18.5 | 15.7 |
| 176 | L | 27.9 | 17.4 | 15.3 |
| 176 | L | 28.1 | 19.1 | 15.6 |
| 176 | L | 29.1 | 18.4 | 16.1 |
| Phase 9 | | | | |
| 93 | R | 28.2 | 19.0 | 15.4 |
| 96 | L | 27.4 | 17.7 | 15.0 |
| 283 | R | 26.9 | 19.4 | 15.1 |
| 283 | L | 27.8 | 17.7 | 15.4 |
| 297 | R | 27.4 | 17.6 | 15.5 |
| 96 | R | 28.5 | 18.4 | 16.0 |
| 96 | L | 29.9 | 18.5 | 16.6 |
| 96 | L | 27.9 | 18.6 | 15.4 |
| 12 | L | 26.7 | 18.2 | 14.6 |
| 295 | R | 26.4 | 17.2 | 14.2 |
| 356 | R | 27.6 | 18.5 | 15.3 |
| Phase 8 | | | | |
| 416 | L | 27.1 | 17.3 | 14.6 |
| 9 | L | 31.4 | (20.2) | 17.1 |
| 367 | L | 27.5 | - | - |
| Phase 7 | | | | |
| 243 | R | 25.8 | 15.8 | - |
| Phase 6 | | | | |
| 1074 | R | 29.1 | 18.6 | 16.0 |
| 1379 | R | 30.5 | 18.9 | 16.8 |
| Phase 5 | | | | |
| 615 | R | 27.9 | 18.5 | 15.4 |
| 1612 | L | 26.6 | 17.0 | 14.8 |
| 458 | L | 27.5 | 17.8 | 15.2 |
| 1394 | R | 27.6 | 17.0 | 15.5 |
| 1100 | R | 30.1 | 19.4 | 17.1 |
| Phase 4 | | | | |
| 411 | R | 27.5 | 17.5 | 15.5 |
| 411 | L | 27.6 | 17.7 | 15.5 |
| 1119 | R | 25.3 | 16.3 | 14.2 |
| 411 | R | 27.4 | 17.2 | 14.6 |
| 1296 | R | 25.0 | 17.1 | 14.5 |
| Phase 3 | | | | |
| 1130 | L | 26.6 | 17.1 | 14.1 |



Prudhoe Castle. Sheep astragalus: lateral length, distal width and lateral "height".

| | | | | |
|---|---|---|---|---|
| Phase 11 | 393 | 114 | (22.7) | (14.7) |
| Phase 10 | 176 | - | 22.2 | 15.1 |
| Phase 9 | 96 | 121 | 21.8 | 14.3 |
| Phase 9 | 14 | 124 | 24.3 | 16.1 |

16 Prudhoe Castle. Sheep metatarsal: length, distal width and maximum diameter of condyles.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase 11 | 5 | 122 | 12.6 | (23.9) | 16.1 | 11.6 | 11.3 | 11.0 | 10.6 |
| Phase 9 | 96 | 121 | 13.4 | 25.1 | 15.9 | 11.9 | 10.5 | 11.5 | 9.9 |
| Phase 9 | 12 | - | - | 24.0 | 15.7 | 11.4 | 10.7 | 11.0 | 10.2 |
| Phase 7 | 106 | 109 | - | 23.5 | 14.7 | 11.0 | 9.9 | 10.7 | 9.3 |

17 Prudhoe Castle. Sheep metacarpal: length, minimum shaft width, distal width, maximum diameter of condyles, W.Cond., W. Troch., W. Cond., W. Troch.

| | | | | |
|---|---|---|---|---|
| Phase 9 | 14 | R | length = | 143 |
| Phase 9 | 14 | L | length = | 148 |
| Phase 9 | 14 | L | length = | 150 |
| Phase 9 | 14 | L | length = | 153 |
| Phase 9 | 14 | L | length = | 152 |
| Phase 9 | 96 | L | length = | 139 |
| Phase 9 | 96 | R | length = | 144 |
| Phase 9 | 96 | L | length = | 148 |
| Phase 9 | 96 | L | length = | 157 |
| Phase 9 | 96 | L | length = | 145 |
| Phase 9 | 96 | R | length = | 147 |
| Phase 9 | 96 | R | length = | 160 |
| Phase 8 | 121 | L | length = | 162 |
| Phase 6 | 673 | L | length = | 183 |
| Phase 4 | 519 | R | length = | 150 |

18 Prudhoe Castle. Sheep Radius: length.

| | | | | |
|---|---|---|---|---|
| Phase 9 | 93 | L | length = | 203 |
| Phase 3 | 1117 | L | length = | 173 |

19 Prudhoe Castle. Sheep Tibia: length.

| | | | | | | |
|---|---|---|---|---|---|---|
| Phase 10 | 15/16 | 86.3 (56) | 38.5 | 34.2 | 44.6 | 24.8 |
| Phase 10 | 176 | 77.2 (52) | - | 30.8 | 41.0 | 23.1 |
| Phase 9 | 14 | 70.2 48.1 | 32.4 | 28.8 | 37.4 | 22.4 |
| Phase 5 | 517 | 83.6 54.4 | 35.8 | 34.6 | 44.9 | 26.1 |
| Phase 4 | 1296 | 79.1 52.1 | 37.8 | 31.1 | 40.5 | (24.1) |

Prudhoe Castle. Horse first phalanx: length, proximal width, proximal height, minimum shaft width, distal width of articulation, distal height of articulation.

---

| | | | | | |
|---|---|---|---|---|---|
| Phase 9 | 14 | 237 | 26.2 | 42.8 | 33.2 |
| Phase 4 | 411 | 273 | 29.2 | 48.9 | 39.4 |

Prudhoe Castle. Horse metatarsal: length, minimum shaft width, distal width, distal diameter of condyle.

---

| | | |
|---|---|---|
| Phase 11 | 5 | Horse radius (R) length = 284 |
| Phase 9 | 93 | Horse calcaneum (L) length = 108.7 |
| Phase 4 | 411 | Horse calcaneum (R) length = 110.7 |

Prudhoe Castle. Horse radius and calcaneum: length.

---

| | | | |
|---|---|---|---|
| Phase 10 | 176 | Fox mandible (L) l.$M_1$ = 16.6 w.$M_1$ = 6.0 | |
| Phase 9 | 14 | Fox mandible (R) l.$M_1$ = 17.7 w.$M_1$ = 6.7 l.$M_1$-$M_3$ = 28.6 | |
| Phase 9 | 131 | Fox single carnassial l.$M_1$ = 16.7 w.$M_1$ = 6.3 | |
| Phase 5 | 1275 | Dog mandible (R) l.$M_1$-$M_3$ = 35.5 l.$P_1$-$M_3$ = 73.2 | |
| Phase 3 | 426 | Dog mandible (R) l.$M_1$-$m_3$ = 36.7 l.$M_1$ = 23.9 w.$M_1$ = 9.2 | |
| Phase 2 | 117 | Dog mandible (L) l.$M_1$-$M_3$ = 38.3 l$P_1$-$M_3$ = 81.2 l.$M_1$ = 23.9 w.$M_1$ = 8.8 | |

23 Prudhoe Castle. Canid mandible and teeth.

---

| | | | |
|---|---|---|---|
| Phase 11 | 18 | Chicken humerus l = 71.6 | |
| Phase 8 | 9 | Cock tarso-metatarsal l = 78.8 basal measurements of spur = 8.2 X 6.7 | |
| Phase 5 | 1385 | ?Chicken femur l = 100.6 | |
| Phase 5 | 1612 | Chicken tarso-metarsal l = 65.3 | |
| Phase 4 | 29 | Chicken humerus l = 62.7 | |

24 Prudhoe Castle. Bird: lengths of limb bones.

---

| | |
|---|---|
| Phase 11: | 37.6, (34.4), 36.6, 35.6 |
| Phase 10: | 41.2, 35.3 |
| Phase 9: | 35.3, 34.4, 33.6, 33.0, 34.3, 37.9, 35.6, 37.6, 38.0, 34.8, 31.6 |
| Phase 8: | 39.9, 32.7, (32.6) |
| Phase 6: | 32.5, 35.7, 38.5, 36.5 |
| Phase 5: | 36.5, 34.4 |

25 Prudhoe Castle. Cattle lower third molar: antero-posterior crown length.

---

| | Anatomical Crown Height of $M_3$ | U | $m_3$ | $P_4$ |
|---|---|---|---|---|
| Phase 11: | 25.9, 22.5, 10.6 | 0 | 0 | 2 |
| Phase 10: | 7.1, 29.3 | 1 | 0 | 3 |
| Phase 9: | 42,7, 47.1, 23.5, 36, 17.4, 34.9, 37.1, 45.0, 38.3, 37.2, 17.2, 13.3, | 3 | 2 | 4 |
| Phase 8: | 35.2, 19.0, 7.0 | 0 | 0 | 0 |
| Phase 6: | 2.6, 13.9, 31.0, 39.7, 36.3 | 1 | 3 | 4 |
| Phase 5: | 17.1, 44.2 | 0 | 0 | 1 |
| Phase 4: | 33.0 | 0 | 0 | 0 |
| Phase 1: | - | 0 | 0 | 1 |

26 Prudhoe Castle. Cattle mandible. Lower third molar ($M_3$): anatomical crown height. On the right are three columns; "U" provides counts of posterior mandibles with unerupted third molars, "$m_3$" provides counts of anterior mandibles with deciduous third molar tooth, and "$P_4$" provides counts of anterior mandibles with permanent fourth pre-molar tooth.

---

| | L/R | l | w | ht |
|---|---|---|---|---|
| Phase 12 | | | | |
| 585 | R | 50.3 | 31.1 | 28.2 |
| 315 | R | 53.8 | (34.2) | 30.1 |
| 315 | L | 61.6 | 44.2 | 35.4 |
| 184 | L | 67.9 | 44.7 | 36.5 |
| 309 | R | 61.7 | 41.4 | 34.8 |
| 309 | L | 63.9 | 42.1 | 35.5 |
| 309 | L | 61.2 | - | - |
| 300 | R | 62.0 | - | 34.6 |
| 184 | R | (72) | - | 40.6 |
| Phase 11 | | | | |
| 393 | R | 58.7 | 35.9 | 33.0 |
| 393 | L | 68.4 | 41.5 | - |
| 119 | L | 67.8 | 44.5 | 37.8 |
| 5 | L | 58.9 | 38.3 | 31.7 |
| 5 | R | 57.6 | - | 31.4 |
| Phase 10 | | | | |
| 176 | L | 62.3 | 39.9 | 34.8 |
| 176 | L | - | 34.0 | - |
| 176 | R | 69.3 | - | 38.8 |
| 176 | R | 64.5 | 42.2 | - |
| 176 | R | - | 41.2 | - |
| 176 | L | 55.7 | (36.2) | - |
| 176 | R | 68.8 | 45.4 | 38.0 |
| 176 | L | 62.6 | 39.0 | 35.6 |
| 176 | R | - | 38.1 | 34.5 |
| 176 | R | - | 35.6 | - |
| 176 | R | 61.1 | 39.5 | - |
| 176 | R | - | 43.4 | - |
| 176 | R | 54.7 | 36.0 | 30.0 |
| 176 | R | - | 38.7 | - |
| 176 | R | 67.0 | 45.6 | - |
| 176 | L | 64.7 | 41.5 | 35.8 |
| 176 | L | 62.6 | 40.6 | 35.0 |
| Phase 9 | | | | |
| 93 | L | (57) | - | - |
| 93 | L | 50.7 | 30.6 | 27.0 |
| 7 | R | (57.4) | 36.0 | 32.4 |
| 93 | L | 66.6 | 44.6 | 37.3 |
| 93 | R | 56.7 | 37.5 | 33.1 |
| 93 | R | 65.4 | - | - |
| 288 | L | 61.9 | 37.9 | 33.8 |
| 96 | R | 64.6 | (43) | 36.2 |
| 96 | L | 58.0 | 38.3 | 31.9 |
| 96 | R | 66.0 | 43.4 | 36.9 |
| 96 | R | 60.3 | 37.0 | 33.4 |
| 96 | R | 62.7 | 38.2 | 34.0 |
| 96 | R | - | 38.5 | - |
| 14 | R | 54.4 | 36.0 | 29.1 |
| 293 | L | 63.7 | - | 34.4 |
| 104 | R | 63.1 | 39.5 | 33.5 |
| 317 | L | 58.3 | 37.4 | - |

| | L/R | l | w | ht |
|---|---|---|---|---|
| Phase 9 (cont) | | | | |
| 14 | L | 58.0 | 36.1 | - |
| 12 | L | - | 42.1 | - |
| 12 | L | 52.4 | 35.0 | 29.5 |
| 12 | L | 69.0 | - | 37.6 |
| 12 | R | 59.8 | 37.0 | (32.7) |
| 12 | R | 58.1 | 36.9 | 32.1 |
| 193 | R | 53.8 | 31.9 | 29.7 |
| 295 | L | 59.9 | 38.0 | 33.1 |
| 295 | R | 58.0 | 35.4 | 31.8 |
| 93 | L | 57.5 | 37.1 | 32.6 |
| 356 | R | 54.2 | 33.2 | 29.2 |
| Phase 8 | | | | |
| 19 | L | 61.2 | 39.2 | 33.4 |
| 19 | L | 65.8 | 43.1 | 36.0 |
| 19 | R | 61.6 | 40.2 | 33.1 |
| 19 | R | 67.5 | 44.5 | 37.4 |
| 19 | L | 60.8 | 36.8 | 34.4 |
| 165 | L | 53.4 | 33.5 | 29.6 |
| 447 | R | 53.7 | 33.3 | 31.6 |
| 19 | L | 62.4 | 40.8 | 33.7 |
| 550 | R | 58.2 | 37.4 | 32.3 |
| 9 | R | 56.4 | 35.8 | 31.2 |
| 367 | L | - | - | 29.7 |
| 121 | L | 57.9 | 37.0 | 32.0 |
| 121 | L | - | 43.2 | 35.2 |
| Phase 7 | | | | |
| 354 | L | 52.1 | 31.2 | 28.4 |
| 630 | R | 67.1 | 45.7 | 35.8 |
| 578 | L | 60.2 | 37.8 | 33.9 |
| 59 | L | 65.6 | 43.6 | 37.5 |
| Phase 6 | | | | |
| 1379 | L | 61.9 | 42.7 | 33.5 |
| 1379 | L | 50.1 | 30.5 | 27.5 |
| 858 | L | 58.8 | 36.2 | 33.1 |
| 1379 | L | - | 37.0 | - |
| 1379 | R | 52.9 | 34.5 | 29.4 |
| 673 | R | 57.7 | 35.5 | 31.0 |
| 1115 | L | 57.6 | 37.0 | 33.1 |
| 991 | L | 56.1 | 34.0 | 30.1 |
| 1078 | R | 55.9 | 33.8 | 30.6 |
| 101 | L | 63.6 | 42.0 | 33.8 |
| 911 | R | - | 37.8 | - |
| 978 | L | 56.9 | 41.0 | (32.4) |
| 409 | L | 54.7 | 33.4 | 30.8 |
| 409 | R | - | - | 36.6 |
| 409 | L | 60.1 | - | - |
| 20 | L | 57.5 | 34.7 | 30.5 |
| 418 | R | 58.9 | 34.6 | 32.1 |
| 442 | R | 55.8 | 35.5 | 30.5 |

27 Prudhoe castle. Cattle astragalus: length, width, "height".

| | L/R | l | w | ht |
|---|---|---|---|---|
| Phase 5 | | | | |
| 1385 | R | 53.9 | 33.4 | 30.2 |
| 1385 | L | 55.7 | 33.4 | 30.3 |
| 1385 | L | 60.5 | 37.7 | 33.6 |
| 180 | R | 57.1 | 34.7 | 31.5 |
| 687 | L | 57.4 | 34.7 | 30.4 |
| 1601 | R | 56.2 | 33.4 | 30.7 |
| 1259 | L | 52.1 | (32.1) | 29.1 |
| 609 | L | 66.5 | 41.4 | 35.7 |
| 1267 | R | 58.1 | 37.8 | 31.9 |
| 1267 | R | 54.2 | 33.3 | 30.0 |
| 1267 | R | 63.0 | 38.7 | 33.6 |
| 1267 | R | 60.2 | 36.3 | 32.6 |
| 1267 | L | 57.4 | 35.5 | 31.4 |
| 1267 | L | 55.6 | 34.4 | 31.6 |
| 623 | L | 53.2 | 34.5 | 29.6 |
| 378 | R | 57.6 | 35.0 | 32.9 |
| 1612 | L | 56.5 | 36.5 | 31.0 |
| 1273 | R | 57.4 | 35.5 | 31.3 |
| 1100 | R | 56.1 | 34.5 | 30.0 |
| 1100 | L | 53.4 | 31.7 | 29.5 |
| 1100 | L | 59.5 | 36.0 | 30.2 |
| 1100 | L | 53.6 | 33.1 | 29.5 |
| 464 | L | - | 32.9 | 29.5 |
| 1100 | L | 50.6 | 30.8 | 27.5 |
| 1100 | L | 58.5 | 36.4 | 32.6 |
| 1100 | R | 59.5 | 36.7 | 31.5 |
| 1100 | R | 56.9 | 36.0 | 32.3 |
| 1259 | R | 50.9 | 30.9 | 27.5 |
| 1259 | R | 52.2 | 32.5 | 28.8 |
| 607 | L | 54.5 | 33.9 | 29.9 |
| 1299 | L | 55.6 | 33.1 | 30.5 |
| 1395 | R | 51.7 | 31.9 | 28.4 |
| 1100 | R | 54.5 | 33.3 | 29.9 |
| 1100 | L | 54.5 | 33.5 | 30.1 |
| 378 | L | 54.1 | 36.5 | 30.2 |
| 1100 | R | 62.4 | 43.5 | 35.5 |
| Phase 4 | | | | |
| 1296 | R | 51.9 | 32.0 | 28.6 |
| 1296 | R | 60.9 | 37.4 | 32.8 |
| 411 | R | 60.8 | 35.7 | 31.5 |
| 411 | L | 53.7 | 33.9 | 29.0 |
| 411 | R | - | 33.5 | - |
| 411 | R | 56.6 | 34.0 | 30.6 |
| 1019 | L | 54.1 | 34.2 | 30.0 |
| 1709 | R | 64.7 | 38.1 | 34.1 |
| 1709 | R | 64.5 | 41.9 | 36.1 |
| 411 | R | 50.8 | 32.2 | 27.5 |
| 411 | R | 57.7 | 37.9 | 32.2 |
| 411 | L | 60.2 | 41.5 | 33.3 |
| 411 | R | 60.2 | 40.1 | 34.5 |

| | L/R | l | w | ht |
|---|---|---|---|---|
| Phase 4 (cont) | | | | |
| 793 | R | 57.8 | 36.2 | 32.6 |
| 793 | R | 55.9 | 35.1 | 30.8 |
| 1709 | R | 59.7 | 38.3 | 33.8 |
| 1024 | R | 59.6 | 35.3 | 32.3 |
| 791 | L | 52.1 | 32.5 | 28.6 |
| 440 | L | 54.3 | 32.6 | 29.7 |
| 440 | R | 53.4 | 30.2 | 29.6 |
| 411 | R | 53.2 | 34.4 | 29.6 |
| 411 | R | 50.7 | 31.1 | 27.4 |
| 411 | L | 54.2 | 34.0 | 29.8 |
| 411 | R | 60.9 | 35.0 | 32.3 |
| 411 | R | 55.8 | 35.3 | 29.4 |
| 411 | L | 54.1 | 33.2 | 30.8 |
| 1296 | L | 49.9 | 32.8 | 27.5 |
| Phase 3 | | | | |
| 900 | R | 58.0 | 36.6 | 31.6 |
| 1173 | L | 62.8 | 42.1 | 34.1 |
| 1173 | L | 63.0 | 40.2 | 35.3 |
| 1173 | R | 56.2 | 34.6 | 29.8 |
| Phase 1 | | | | |
| 1043 | R | 64.9 | - | 35.5 |
| 1045 | R | 60.7 | 36.9 | 32.4 |
| 861 | L | 58.5 | 35.7 | 32.1 |
| 1240 | L | 56.7 | 35.6 | 31.2 |
| 1045 | R | 54.0 | 32.5 | 28.4 |

27 Prudhoe castle. Cattle astragalus (cont): length, width, "height".

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Phase 12 | | | | | | | | | |
| 13 | 167 | 27.3 | 50.8 | 26.5 | 23.8 | 18.9 | 24.5 | 19.7 | |
| 175 | - | - | (60) | - | - | 24.7 | 28.4 | 22.6 | |
| 300 | - | - | 60.1 | (31.7) | 28.2 | 23.5 | 29.1 | 25.9 | |
| 184 | - | - | 50.1 | 28.9 | 23.1 | 20.7 | 23.7 | 22.0 | |
| Phase 11 | | | | | | | | | |
| 160 | - | - | 64.5 | 34.4 | 31.5 | 23.8 | 31.3 | 26.7 | |
| 441 | - | - | (63) | - | | | | | |
| 441 | - | - | 55.5 | 30.9 | | | | | |
| 18 | - | - | 62.0 | 32.0 | 29.1 | 25.4 | 31.2 | 23.8 | |
| 5 | 176 | 28.4 | 54.6 | - | 26.7 | 23.3 | 25.5 | 21.7 | |
| 5 | - | - | 60.3 | 31.1 | 28.2 | 22.2 | 28.5 | 23.8 | |
| 5 | - | - | 66.5 | 33.8 | 33.5 | 23.3 | 31.3 | 24.7 | |
| Phase 10 | | | | | | | | | |
| 176 | 176 | 26.3 | 50.1 | 27.2 | 22.8 | 20.0 | 23.3 | 21.2 | |
| 176 | - | - | 50.3 | 28.4 | 24.5 | 21.3 | 23.5 | 19.7 | |
| Phase 9 | | | | | | | | | |
| 93 | - | - | 50.4 | 27.6 | 24.7 | 20.5 | 23.8 | 19.1 | |
| 7 | - | - | 48.0 | 28.0 | 23.2 | 20.7 | 22.1 | 19.1 | |
| 320 | - | - | 60.2 | 33.2 | 27.1 | 23.3 | 28.5 | 25.2 | |
| 96 | - | - | 52.3 | 27.7 | 24.6 | 19.8 | 25.2 | 21.3 | |
| 96 | - | - | 53.5 | 30.3 | 24.7 | 20.7 | 26.2 | 22.6 | |
| 96 | - | - | 62.6 | 30.0 | 30.3 | 23.2 | 29.6 | 21.6 | |
| 96 | - | - | 52.8 | 27.8 | 25.2 | 20.9 | 24.7 | 19.7 | |
| 96 | - | - | 60.8 | 31.3 | 29.7 | 23.9 | 27.7 | 22.4 | |
| 133 | 176 | 33.5 | 63.1 | 30.8 | 32.4 | 24.6 | 28.2 | 22.4 | (asym) |
| 132 | - | - | 50.9 | 28.0 | 23.2 | 20.2 | 24.4 | 21.5 | |
| 14 | - | - | 62.2 | 31.4 | 29.0 | 22.6 | 30.3 | 24.2 | |
| 14 | - | - | 59.3 | 30.6 | 28.2 | 21.5 | 28.2 | 23.9 | |
| 14 | - | - | 59.0 | 30.7 | 28.2 | 23.7 | 28.3 | 21.8 | |
| 14 | - | - | 48.6 | 27.2 | 22.6 | 19.2 | 23.5 | 20.6 | |
| 14 | - | - | 54.4 | 29.1 | 25.5 | 20.2 | 26.1 | 21.2 | |
| 104 | - | - | 62.7 | - | 29.3 | 25.1 | 30.9 | 23.9 | |
| 313 | - | - | 61.8 | 32.0 | 28.1 | 21.7 | 30.8 | 24.5 | |
| 96 | - | - | 60.2 | - | - | - | 28.2 | 21.9 | |
| 96 | - | - | 51.6 | 29.7 | 24.2 | 21.2 | 25.2 | 21.9 | |
| 193 | - | - | 57.0 | 30.6 | 27.3 | 24.5 | 27.0 | (23.0) | |
| 295 | - | - | 65.2 | 32.9 | 30.3 | 23.0 | 32.0 | 24.3 | |
| 295 | - | - | 49.4 | 27.1 | 23.5 | 18.9 | 24.3 | 20.8 | |
| 93 | - | - | 52.1 | 28.9 | 24.8 | 21.4 | 24.7 | 19.9 | |

28 Prudhoe Castle. Cattle metacarpal: length, minimum shaft width, distal width, maximum diameter of condyles, W. Cond, W. Troch, W. Cond, and W. Troch. (The metacarpal marked "asym" shows lateral extension of one trochlea, possibly due to excessive stress during life.)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase 8 | | | | | | | | |
| 574 | - | - | 63.4 | (32.9) | | | | |
| 574 | - | - | 59.6 | (33.1) | | | | |
| 19 | - | - | 54.8 | - | 25.7 | 19.4 | 27.6 | (21.5) |
| 152 | - | - | 57.8 | 30.4 | 27.4 | 23.1 | 26.7 | 21.6 |
| 121 | - | - | 57.9 | 30.1 | 26.9 | 21.9 | 27.5 | 23.3 |
| 121 | - | - | 64.7 | 33.6 | 32.2 | 26.3 | 29.6 | 24.6 |
| Phase 7 | | | | | | | | |
| 702 | 193 | 28.1 | 52.4 | 29.0 | 24.1 | 20.8 | 25.1 | 22.3 |
| 579 | - | - | 47.4 | 27.7 | 22.0 | 19.3 | 23.0 | 20.4 |
| Phase 6 | | | | | | | | |
| 1115 | 177 | 30.1 | 57.8 | 31.4 | (28.3) | 24.6 | 27.2 | 23.0 |
| 409 | - | - | 50.5 | 27.0 | 24.1 | 20.2 | 23.7 | 19.3 |
| Phase 5 | | | | | | | | |
| 180 | - | - | 62.0 | 32.7 | 29.0 | 24.4 | 30.0 | 26.1 |
| 464 | 175 | 29.5 | 51.9 | (29.5) | 25.6 | 22.0 | 23.9 | 20.3 |
| 470 | 181 | 28.7 | 53.6 | 29.0 | 25.9 | 22.2 | 25.2 | 20.4 |
| 1394 | - | - | 49.0 | 26.9 | 23.6 | 19.9 | 23.5 | 21.2 |
| Phase 4 | | | | | | | | |
| 519 | 173 | 31.7 | 58.8 | 30.6 | 28.5 | 24.2 | 27.7 | 22.5 |
| 519 | 173 | 30.4 | 56.7 | 31.2 | 27.9 | 24.2 | 26.6 | 21.7 |
| 411 | 182 | 30.7 | 58.0 | 31.7 | 29.0 | 25.2 | 27.5 | 22.6 |
| 1296 | 181 | - | - | - | - | - | - | - |
| Phase 1 | | | | | | | | |
| 1240 | 180 | 27.2 | (51.7) | - | 24.4 | 21.4 | - | - |

28 Prudhoe Castle. Cattle metacarpal (cont.): length, minimum shaft width, distal width, maximum diameter of condyles, W.Cond, W.Troch, W.Cond and W.Troch.

| | | | | |
|---|---|---|---|---|
| Phase 12 | | | | |
| 309 | 209 | 51.6 | 29.3 | |
| 184 | - | 50.4 | 25.9 | |
| 184 | - | 50.6 | 29.2 | |
| 184 | - | 47.8 | 28.5 | |
| Phase 11 | | | | |
| 441 | - | 52.2 | 28.4 | |
| 441 | - | 48.2 | 29.4 | |
| 97 | - | 60.0 | - | |
| 393 | - | 54.1 | 31.8 | |
| 393 | (202) | (46.8) | (27.7) | |
| 18 | - | 49.8 | (26.9) | |
| 5 | - | 49.9 | 29.9 | |
| 5 | - | 50.2 | 29.1 | |
| Phase 10 | | | | |
| 176 | - | 55.7 | 31.8 | |
| 176 | - | 59.8 | 34.6 | |
| 176 | - | 57.0 | 32.0 | |
| 176 | - | 61.2 | 32.3 | (asym) |
| 176 | - | 56.7 | - | |
| 176 | - | 49.8 | - | |
| 176 | - | 56.7 | (30.7) | |
| Phase 9 | | | | |
| 90 | - | 57.6 | 31.6 | (asym) |
| 320 | - | 56.4 | - | |
| 96 | - | 50.3 | 30.2 | |
| 96 | - | 47.0 | 27.4 | |
| 96 | - | 48.3 | 27.3 | |
| 96 | - | 47.4 | 29.0 | |
| 181 | - | 53.9 | 29.0 | |
| 132 | 206 | (57.6) | 29.8 | (asym) |
| 293 | - | 58.1 | 33.2 | |
| 14 | - | 47.6 | 27.9 | |
| 14 | - | (65.4) | 33.7 | |
| 303 | - | 49.5 | - | |
| 158 | - | 56.9 | 32.3 | |
| 96 | - | 54.8 | - | |
| 96 | - | 48.4 | - | |
| 193 | 196 | - | - | |
| 295 | - | 56.7 | 30.6 | |
| 131 | 204 | 57.8 | 30.1 | |
| Phase 8 | | | | |
| 574 | - | 48.5 | 27.3 | |
| 19 | - | 51.2 | 28.5 | |
| 402 | - | 49.5 | (28.4) | |
| 200 | - | 55.8 | 29.2 | |
| 153 | 193 | (49.5) | 29.2 | |
| 153 | - | 60.6 | 33.2 | (asym) |
| 9 | 189 | - | - | |
| 367 | - | 46.3 | 27.7 | |
| 397 | - | 45.6 | 26.8 | |
| 121 | - | 55.7 | - | |
| 121 | - | 62.5 | 34.2 | |
| 121 | - | 49.5 | 29.1 | |
| 121 | - | 60.1 | 31.6 | |
| 121 | - | 50.1 | 29.1 | |
| 121 | - | 50.7 | 27.5 | |
| Phase 6 | | | | |
| 703 | - | 46.8 | 27.9 | |
| 101 | - | 47.2 | (26.9) | |
| 20 | - | 49.7 | - | |
| Phase 5 | | | | |
| 687 | - | 62.2 | 33.7 | (asym) |
| 818 | 212 | 54.6 | 31.0 | (asym) |
| 1393 | 198 | 44.9 | 26.0 | |
| 1394 | 209 | 52.0 | 29.7 | |
| 1394 | 196 | 50.5 | 27.4 | |
| Phase 4 | | | | |
| 411 | 190 | 57.3 | - | (asym) |
| 1296 | 209 | 54.2 | - | |
| 519 | 200 | 46.8 | 27.4 | |
| 519 | 199 | 46.9 | 26.8 | |
| 411 | 209 | (53.2) | - | |
| 411 | - | 53.5 | 28.7 | (asym) |
| 411 | 207 | 53.7 | 29.8 | |
| 411 | 207 | 53.9 | 29.6 | |
| 411 | 197 | - | (27.1) | |
| 519 | 200 | 55.6 | 29.6 | (asym) |
| 519 | 209 | 53.7 | 29.5 | |
| 1274 | 236 | 59.8 | 33.9 | (asym) |

29 Prudhoe Castle. Cattle metatarsal: length, distal width, maximum diameter of condyles. (Metatarsals marked "asym" show lateral extension of one trochlea, possibly due to excessive stress during life.)

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Tables 30-42

Bone counts at Prudhoe Castle, phases 1-12.

The articular ends only ("F" = fused, "U" = unfused epiphyses) are recorded.

Diaphyses are not included in order to avoid double counting.

Note:

"Scapula U" are scapulae to which the coracoid had not fused (ie; from very young individuals).

The "Scapula ?" category is for damaged scapulae in which the state of fusion of the coracoid cannot be determined.

"Calcaneum" only calcanea with part or all of the astragalus articular facets are counted.

The "Calcaneum ?" category is for calcanea without a shaft and tuber calcis (ie; the state of tuber calcis fusion cannot be determined).

"distal Metapodial" includes metapodials which could not be identified as metacarpals or metatarsals.

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | - | - | 12 | 2 | - | - | - |
| ant. Mandible | $m_3$ | - | 1 | 1 | - | - | - | - |
| " " | $P_4$ | 1 | - | 12 | 1 | - | - | - |
| Scapula (glenoid) | U | - | - | 1 | - | - | - | - |
| " | F | 3 | 1 | - | 1 | - | - | - |
| " | ? | 1 | 1 | - | - | - | - | - |
| dist. Humerus | | 2 | 3 | 2 | - | - | - | - |
| dist. Radius | U | 1 | - | - | - | - | - | - |
| " " | F | 4 | - | - | - | - | - | 1 |
| dist. Metacarpal | U | - | - | | - | - | - | - |
| " " | F | 1 | - | | - | - | - | - |
| dist. Femur | U | - | - | - | - | - | - | - |
| " " | F | 2 | 1 | - | - | - | - | - |
| dist. Tibia | U | - | 1 | - | - | - | - | - |
| " " | F | 9 | 3 | 1 | - | - | - | - |
| Calcaneum | U | - | - | 4 | - | - | - | - |
| " | F | 8 | 3 | 2 | - | - | - | - |
| " | ? | 3 | - | 1 | - | - | - | - |
| Astragalus | | 11 | 2 | 3 | - | - | - | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | - | - | | 1 | - | - | - |
| dist. Metapodial | U | - | - | 1 | - | - | - | - |
| " " | F | - | - | 2 | - | - | - | - |

Other species: Dog mandible 2

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/Ma | | 1 | 1 | 46 | 1 | 1 | - | - |
| ant. Mandible | Ma | - | - | 9 | - | - | - | - |
| " " | P4 | - | 1 | 29 | 1 | 1 | - | - |
| Scapula (glenoid) | U | - | 1 | 1 | - | - | - | - |
| " | F | 2 | 11 | 3 | - | - | - | - |
| " | ? | 2 | - | 3 | - | - | - | - |
| dist. Humerus | | 5 | 7 | 3 | 2 | - | 2 | - |
| dist. Radius | U | 1 | - | - | - | - | - | 1 |
| " " | F | 4 | 3 | 1 | - | - | - | - |
| dist. Metacarpal | U | - | - | | - | - | - | - |
| " " | F | 5 | - | | - | - | - | - |
| dist. Femur | U | 1 | 2 | - | - | - | - | - |
| " " | F | 3 | - | - | - | - | 1 | - |
| dist. Tibia | U | 3 | - | 2 | - | - | - | - |
| " " | F | 25 | 20 | 3 | - | - | 1 | - |
| Calcaneum | U | 3 | 3 | 16 | - | - | - | - |
| " | F | 12 | 10 | - | - | - | 1 | 1 |
| " | ? | 10 | 1 | 2 | - | - | - | - |
| Astragalus | | 30 | 8 | 6 | 1 | 1 | 2 | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | 13 | - | | 1 | - | - | 1 |
| dist. Metapodial | U | - | - | 2 | - | - | - | - |
| " " | F | - | - | 4 | - | - | - | - |

Other species: Chicken humerus 1

PHASE 4 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 2 | 6 | 18 | 2 | - | - | - |
| ant. Mandible | $M_3$ | - | 5 | 4 | 1 | - | - | - |
| " " | $P_4$ | 1 | 1 | 23 | 1 | - | - | - |
| Scapula (glenoid) | U | - | - | - | - | - | - | - |
| " | F | 5 | 3 | 5 | 2 | - | - | 1 |
| " | ? | - | 1 | 1 | 1 | - | - | - |
| dist. Humerus | | 3 | 8 | 4 | 3 | - | - | - |
| dist. Radius | U | 1 | - | - | - | - | - | - |
| " " | F | 2 | 1 | - | 1 | 1 | - | - |
| dist. Metacarpal | U | 2 | - | | - | - | - | - |
| " " | F | 5 | - | | 1 | - | - | - |
| dist. Femur | U | 1 | 2 | - | - | - | - | - |
| " " | F | 5 | 3 | - | - | - | - | - |
| dist. Tibia | U | 2 | 1 | 2 | - | - | - | - |
| " " | F | 24 | 14 | 3 | - | - | - | - |
| Calcaneum | U | 6 | 5 | 9 | - | - | - | - |
| " | F | 14 | 8 | 1 | 1 | - | - | 1 |
| " | ? | 8 | - | 1 | - | - | - | - |
| Astragalus | | 40 | 10 | 3 | 1 | - | 4 | 1 |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | 5 | - | | - | - | - | - |
| dist. Metapodial | U | 3 | - | 1 | - | - | - | - |
| " " | F | - | - | 1 | - | - | - | - |

Other species: Dog mandible 1
Chicken tarso-metatarsal 1
?chicken femur

PHASE 5 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 8 | 1 | 15 | - | - | - | - |
| ant. Mandible | $m_3$ | 3 | - | 2 | - | - | - | - |
| " " | $P_4$ | 1 | 1 | 9 | - | - | - | - |
| Scapula (glenoid) | U | - | 1 | 2 | - | - | - | - |
| " | F | 3 | 7 | 1 | 2 | - | - | - |
| " | ? | 1 | 1 | - | - | - | - | - |
| dist. Humerus | | 4 | 6 | 1 | 1 | - | - | 1 |
| dist. Radius | U | 1 | 1 | 1 | - | - | - | - |
| " " | F | 3 | 1 | - | - | - | - | - |
| dist. Metacarpal | U | - | - | | - | - | - | - |
| " " | F | 2 | - | | 1 | - | - | - |
| dist. Femur | U | - | 1 | - | - | - | - | - |
| " " | F | 3 | 1 | - | - | - | - | - |
| dist. Tibia | U | 2 | - | - | - | - | - | - |
| " " | F | 17 | 9 | 1 | - | 1 | 1 | - |
| Calcaneum | U | 4 | 1 | 4 | - | - | - | - |
| " | F | 6 | 5 | - | - | 1 | 1 | - |
| " | ? | 7 | - | 1 | - | - | - | - |
| Astragalus | | 20 | 3 | - | - | - | - | - |
| dist. Metatarsal | U | - | - | | - | - | 1 | - |
| " " | F | 3 | 1 | | 1 | - | 2 | - |
| dist. Metapodial | U | 1 | - | 1 | - | - | - | - |
| " " | F | - | - | 1 | - | - | - | - |

Other species: Goose humerus
?Goose femur

PHASE 6 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | - | 3 | 1 | - | - | - | - |
| ant. Mandible | $m_3$ | - | 1 | 1 | 1 | - | - | - |
| " " | $P_4$ | - | 1 | - | - | - | - | - |
| Scapula (glenoid) | U | - | - | - | - | - | - | - |
| " | F | 4 | - | - | - | - | - | - |
| " | ? | - | 1 | - | - | - | - | - |
| dist. Humerus | | 1 | 1 | - | - | - | - | - |
| dist. Radius | U | - | - | - | - | - | - | - |
| " " | F | 2 | 1 | - | - | - | - | - |
| dist. Metacarpal | U | - | 1 | | - | - | - | - |
| " " | F | 2 | 1 | | - | - | - | - |
| dist. Femur | U | - | - | - | - | - | - | - |
| " " | F | - | - | - | - | - | - | - |
| dist. Tibia | U | - | 1 | - | - | - | - | - |
| " " | F | 1 | 3 | - | - | - | 1 | - |
| Calcaneum | U | - | - | 1 | - | - | - | - |
| " | F | 2 | 1 | - | - | - | - | - |
| " | ? | 1 | - | - | - | - | - | - |
| Astragalus | | 6 | 1 | - | - | 2 | - | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | - | - | | - | - | - | - |
| dist. Metapodial | U | - | - | 1 | - | - | - | - |
| " " | F | - | - | - | - | - | - | - |

Other species: -

PHASE 7 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 3 | 7 | 2 | - | - | - | - |
| ant. Mandible | $m_3$ | - | 1 | 2 | - | - | - | - |
| " " | $P_4$ | - | 3 | - | - | - | - | - |
| Scapula (glenoid) | U | 1 | - | - | - | - | - | - |
| " | F | 2 | - | - | - | - | - | - |
| " | ? | 2 | - | 1 | - | - | - | - |
| dist. Humerus | | 5 | 4 | 1 | - | - | - | - |
| dist. Radius | U | - | - | - | - | - | - | - |
| " " | F | 4 | 3 | - | - | - | - | - |
| dist. Metacarpal | U | 1 | - | | - | - | - | - |
| " " | F | 6 | - | | - | - | - | - |
| dist. Femur | U | - | - | - | - | - | - | - |
| " " | F | - | - | - | - | - | - | - |
| dist. Tibia | U | 1 | - | - | - | - | - | - |
| " " | F | 7 | 14 | - | - | 1 | 1 | - |
| Calcaneum | U | 2 | - | 1 | - | - | - | - |
| " | F | 2 | - | - | - | 1 | - | - |
| " | ? | 5 | - | - | - | - | - | - |
| Astragalus | | 14 | 4 | - | - | - | 1 | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | 16 | - | | - | - | - | - |
| dist. Metapodial | U | 1 | - | - | - | - | - | - |
| " " | F | 1 | - | - | - | - | - | - |

Other species: cock tarso-metatarsal 1
hen tarso-metatarsal 1

PHASE 8 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 17 | 48 | 15 | 1 | - | - | - |
| ant. Mandible | $m_3$ | 2 | 7 | - | 1 | - | - | - |
| " " | $P_4$ | 4 | 30 | 12 | - | - | - | - |
| Scapula (glenoid) | U | - | 3 | - | - | - | - | - |
| " | F | 17 | 24 | - | - | - | 1 | - |
| " | ? | 6 | 13 | 1 | 1 | - | - | - |
| dist. Humerus | | 17 | 40 | 6 | 2 | 1 | 1 | - |
| dist. Radius | U | 5 | 1 | 1 | - | - | - | - |
| " " | F | 10 | 20 | - | 1 | - | - | - |
| dist. Metacarpal | U | - | - | | 1 | - | - | - |
| " " | F | 24 | 2 | | - | - | - | - |
| dist. Femur | U | 3 | - | - | - | - | - | - |
| " " | F | 4 | 2 | - | - | 1 | - | - |
| dist. Tibia | U | 1 | 1 | - | - | - | - | - |
| " " | F | 20 | 50 | 2 | - | 5 | 1 | - |
| Calcaneum | U | 9 | 3 | 1 | - | 1 | - | - |
| " | F | 8 | 6 | 1 | - | 2 | - | 1 |
| " | ? | 12 | 1 | 2 | - | - | - | - |
| Astragalus | | 30 | 14 | 2 | 1 | 3 | 2 | - |
| dist. Metatarsal | U | - | 1 | | - | - | - | - |
| " " | F | 24 | 3 | | 1 | 1 | - | 1 |
| dist. Metapodial | U | 1 | - | 1 | - | - | - | - |
| " " | F | 1 | - | 2 | - | - | - | - |

Other species: Fox mandible 1,
" carnassial 1,
fish bone frag.

PHASE 9 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 3 | 14 | 4 | 2 | - | - | 1 |
| ant. Mandible | $m_3$ | - | 5 | 1 | - | - | - | - |
| " " | $P_4$ | 3 | 6 | 3 | 2 | - | - | - |
| Scapula (glenoid) | U | - | - | - | - | - | - | - |
| " | F | 11 | 7 | - | - | - | - | - |
| " | ? | 1 | 3 | - | - | - | - | - |
| dist. Humerus | | 2 | 7 | 1 | 1 | - | - | - |
| dist. Radius | U | 2 | - | - | - | - | - | - |
| " " | F | 4 | 4 | - | - | - | - | - |
| dist. Metacarpal | U | - | - | | - | - | - | - |
| " " | F | 3 | 1 | | - | - | - | - |
| dist. Femur | U | 2 | 1 | - | - | - | - | - |
| " " | F | - | 1 | - | - | - | - | 1 |
| dist. Tibia | U | 1 | - | - | - | - | - | - |
| " " | F | 8 | 9 | - | - | - | - | - |
| Calcaneum | U | 4 | - | 2 | - | - | - | - |
| " | F | 6 | 4 | - | - | - | - | - |
| " | ? | 10 | - | - | - | - | - | - |
| Astragalus | | 20 | 7 | - | - | - | 1 | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | 7 | 1 | | 1 | - | - | - |
| dist. Metapodial | U | 2 | - | - | - | - | - | - |
| " " | F | - | - | - | - | - | - | - |

Other species: Fox mandible (L)

PHASE 10 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 7 | 6 | 1 | 2 | - | - | - |
| ant. Mandible | $m_3$ | - | 2 | 1 | - | - | - | - |
| " " | $P_4$ | 2 | 3 | - | 1 | - | - | - |
| Scapula (glenoid) | U | - | - | - | - | - | - | - |
| " | F | 7 | 2 | - | - | 1 | - | - |
| " | ? | 1 | 2 | - | - | - | - | - |
| dist. Humerus | | 5 | 16 | 1 | - | - | - | - |
| dist. Radius | U | - | - | 1 | - | - | - | - |
| " " | F | 4 | 3 | - | - | - | - | 1 |
| dist. Metacarpal | U | - | - | | - | - | - | - |
| " " | F | 7 | 1 | | - | 1 | - | - |
| dist. Femur | U | - | - | - | - | - | - | - |
| " " | F | - | 1 | - | - | - | - | - |
| dist. Tibia | U | - | - | - | - | - | - | - |
| " " | F | 5 | 18 | 1 | - | - | - | - |
| Calcaneum | U | 1 | 2 | - | - | - | - | - |
| " | F | 1 | 8 | - | - | - | - | - |
| " | ? | 2 | - | - | - | - | - | - |
| Astragalus | | 7 | 1 | - | - | 1 | - | - |
| dist. Metatarsal | U | - | - | | - | - | - | - |
| " " | F | 8 | 1 | | 1 | 3 | - | - |
| dist. Metapodial | U | 1 | - | 1 | - | - | - | - |
| " " | F | - | - | - | - | - | - | - |

Other species: Chicken humerus

PHASE 11 Bone counts

| | | CATTLE | SHEEP | PIG | ROE | FAL | RED | HORSE |
|---|---|---|---|---|---|---|---|---|
| post. Mandible/$M_3$ | | 3 | 5 | 1 | 1 | – | – | – |
| ant. Mandible | $m_3$ | – | – | – | – | – | – | – |
| " " | $P_4$ | 2 | 2 | 2 | – | – | – | – |
| Scapula (glenoid) | U | – | – | – | – | – | – | – |
| " | F | 4 | 1 | – | 1 | – | – | – |
| " | ? | 1 | 1 | – | – | – | – | – |
| dist. Humerus | | 4 | 6 | – | 1 | – | – | – |
| dist. Radius | U | – | – | – | – | – | – | – |
| " " | F | 1 | 2 | – | – | – | – | – |
| dist. Metacarpal | U | 1 | – | – | – | – | – | – |
| " " | F | 4 | – | | 1 | – | – | – |
| dist. Femur | U | – | – | – | – | – | – | – |
| " " | F | 2 | 1 | – | – | – | – | – |
| dist. Tibia | U | – | – | – | – | – | – | – |
| " " | F | 9 | 6 | 1 | – | – | – | – |
| Calcaneum | U | 1 | – | 1 | – | – | – | – |
| " | F | 3 | 1 | – | – | – | – | – |
| " | ? | 2 | – | – | – | – | – | – |
| Astragalus | | 11 | 4 | 1 | – | – | – | – |
| dist. Metatarsal | U | – | – | | – | – | – | – |
| " " | F | 4 | – | | 1 | – | – | – |
| dist. Metapodial | U | – | – | – | – | – | – | – |
| " " | F | – | – | – | – | – | – | – |

Other species: –

PHASE 12 Bone counts

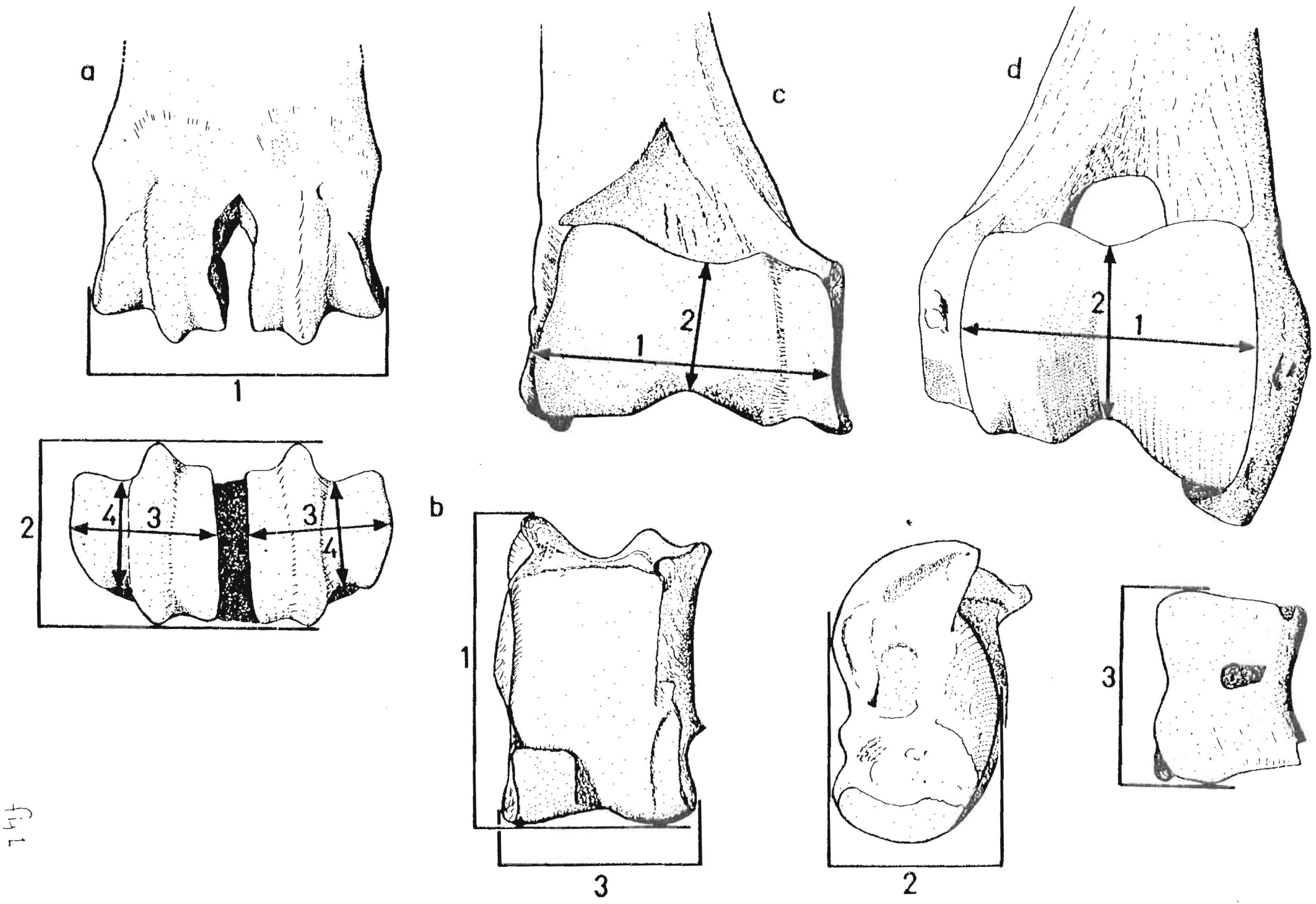



fig 1

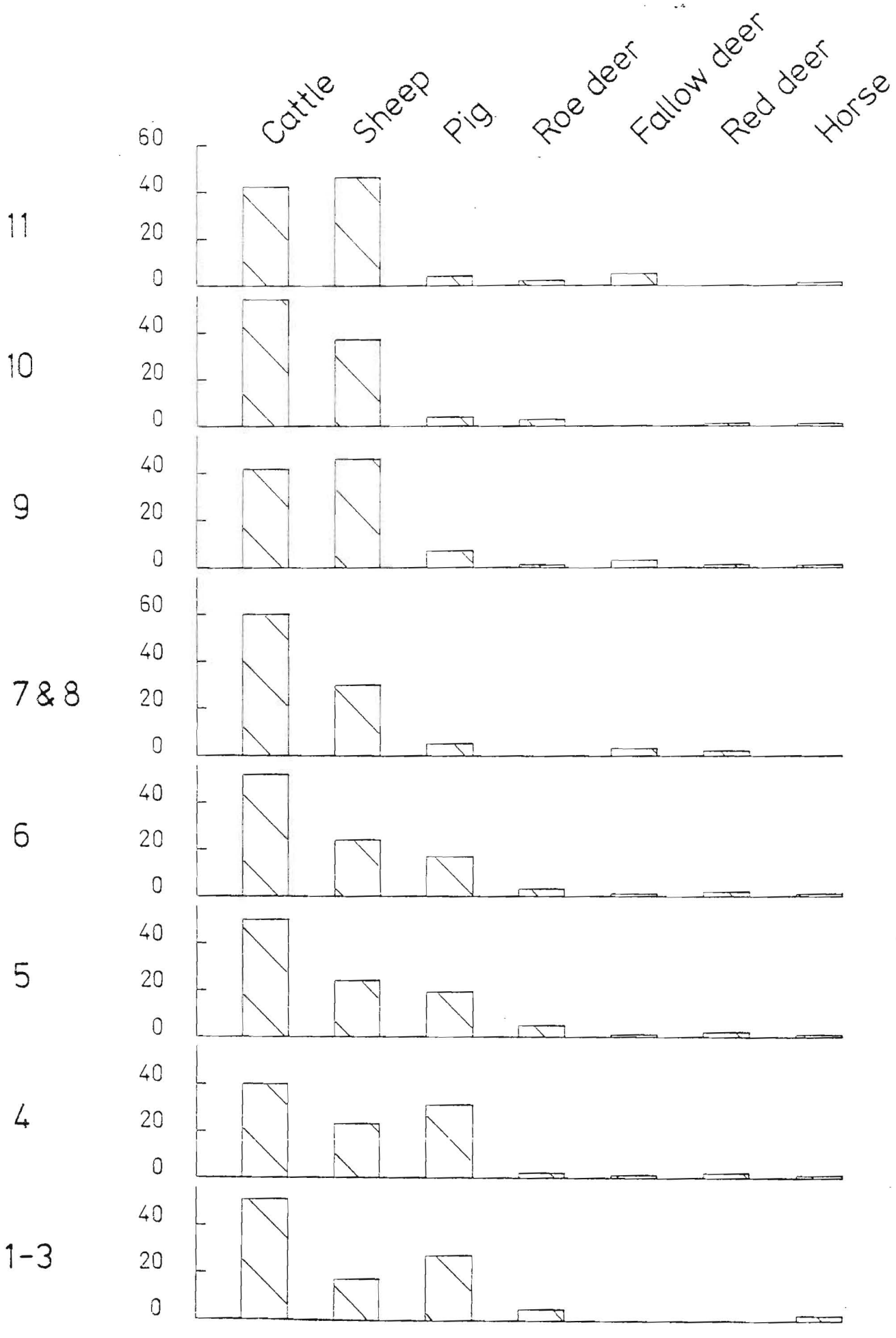
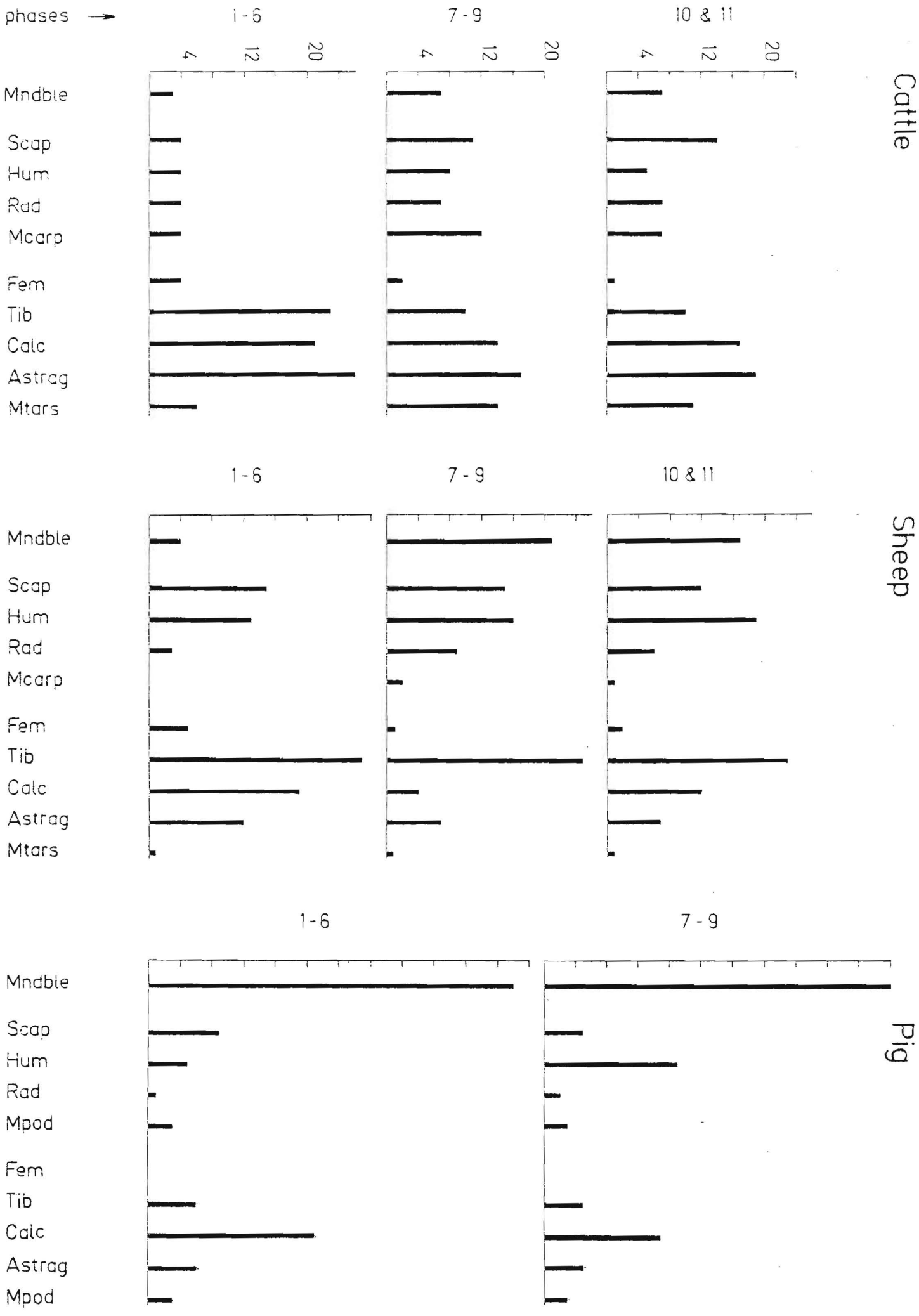

Cattle
Sheep
Pig
Roe deer
Fallow deer
Red deer
Horse
11
10
9
7&8
6
5
4
1-3
60
40
20
0

Fig 2


phases →
1 - 6
7 - 9
10 & 11
4
12
20
Mndble
Scap
Hum
Rad
Mcarp
Fem
Tib
Calc
Astrag
Mtars
Cattle
Sheep
Mpod
Pig

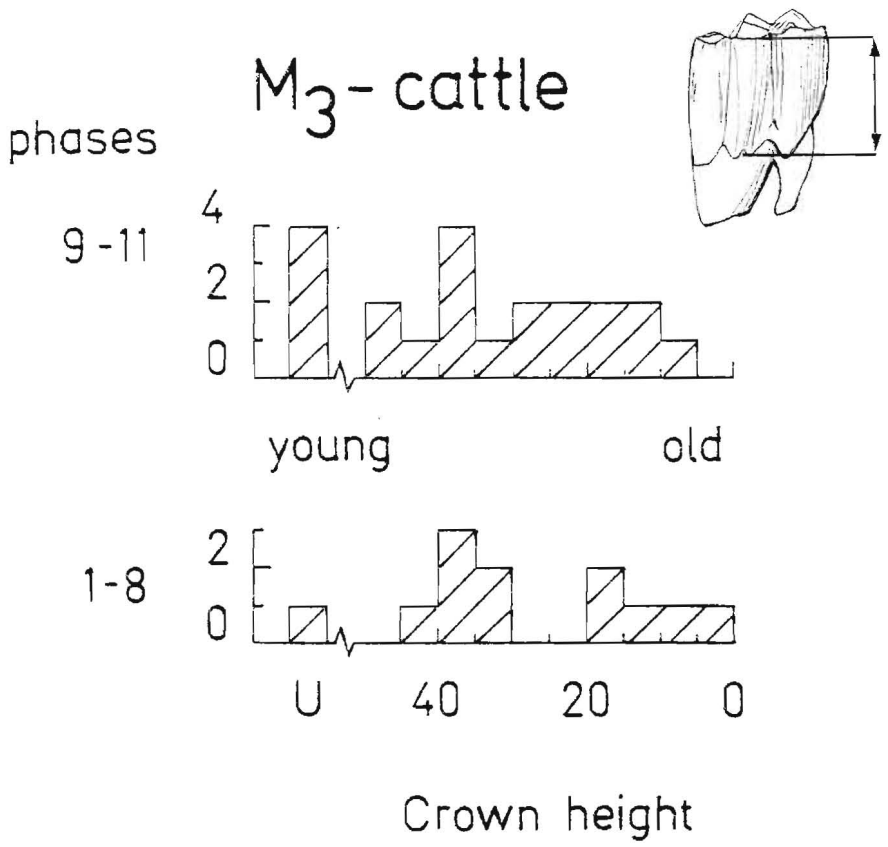



fig 4

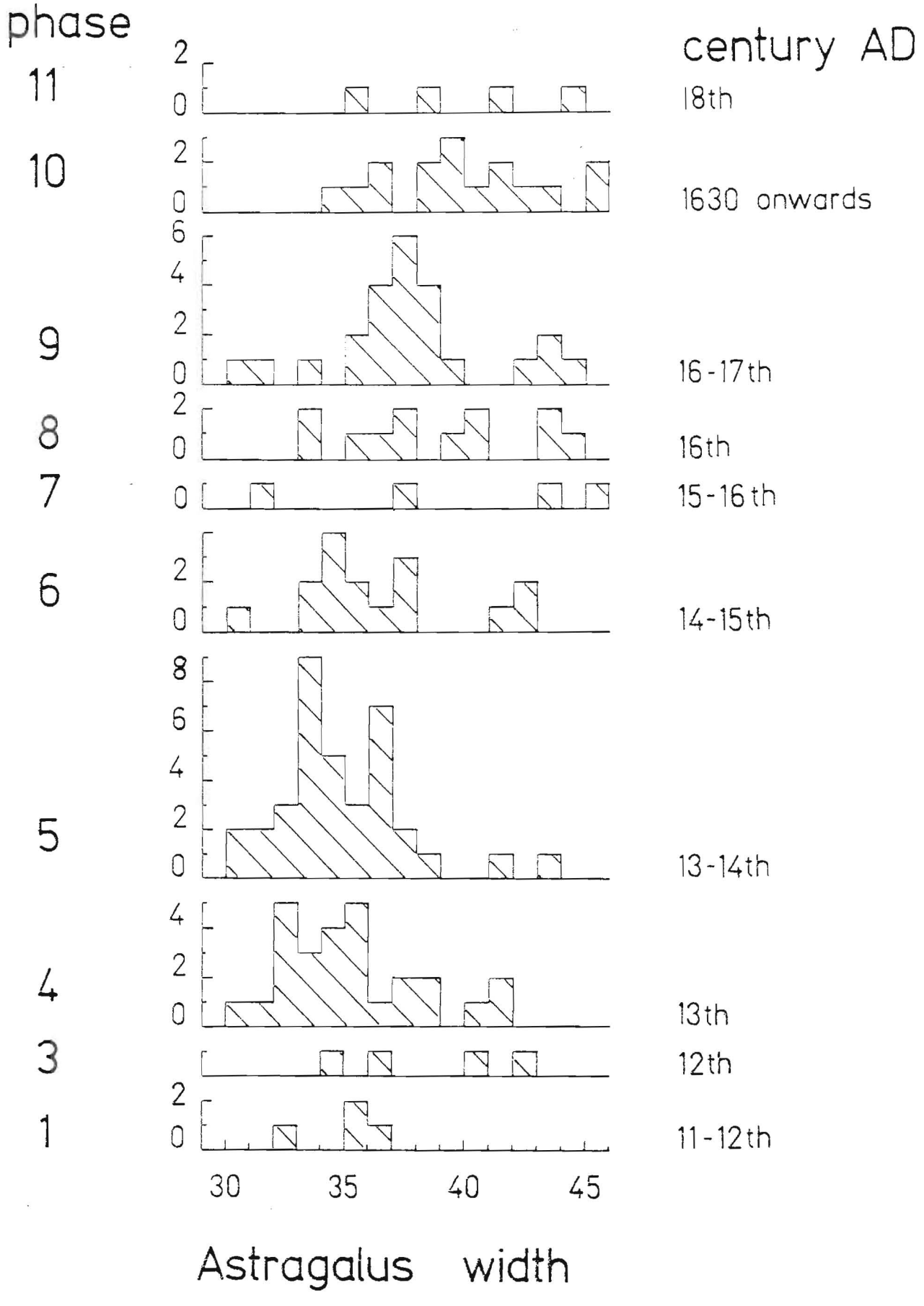
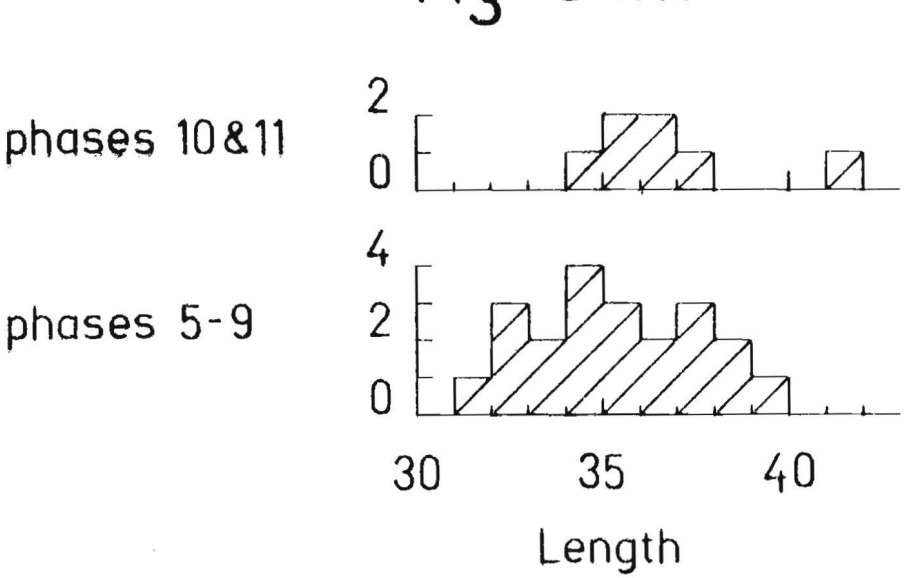

phase
century AD
11
18th
10
1630 onwards
9
16-17th
8
16th
7
15-16th
6
14-15th
5
13-14th
4
13th
3
12th
1
11-12th
2
0
6
4
8
30
35
40
45
Astragalus width

fig 5


M3-cattle
phases 10&11
phases 5-9
2
0
4
2
0
30
35
40
Length

# Astragalus - sheep

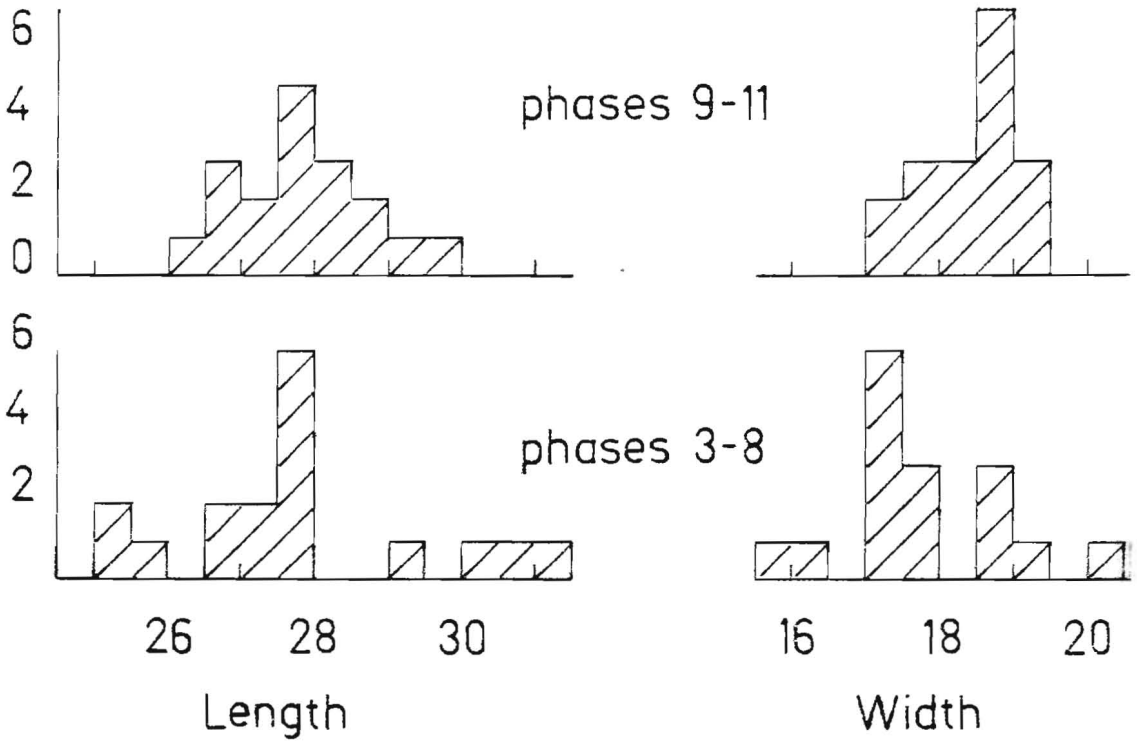



Fig 7

# $M_3$-pig

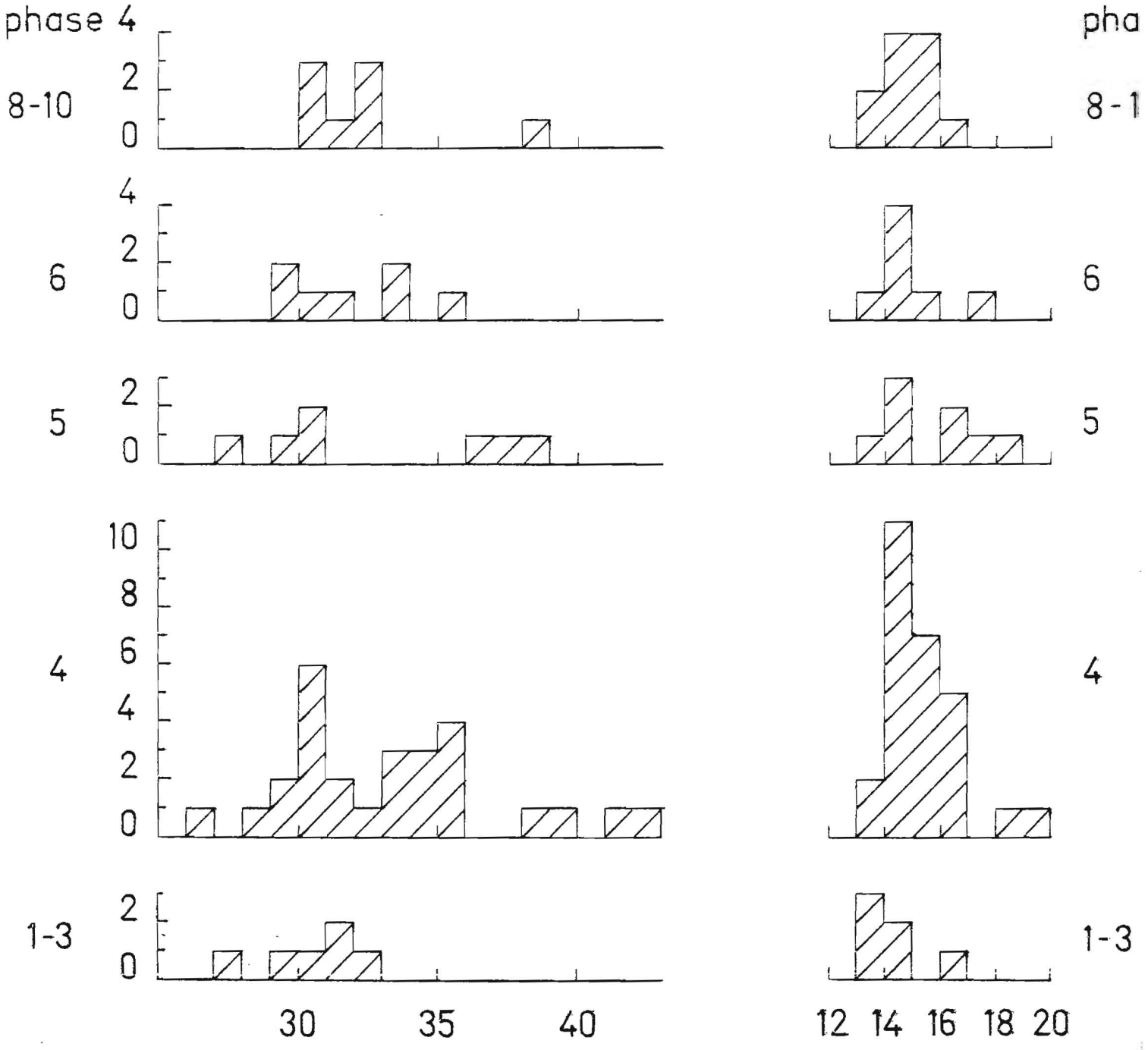



fig 8

fig 8

PRUDHOE CASTLE - PLATES

Cattle metapodials and phalanx with abnormalities, possibly caused by excessive stress during life.

They may have belonged to draught cattle.

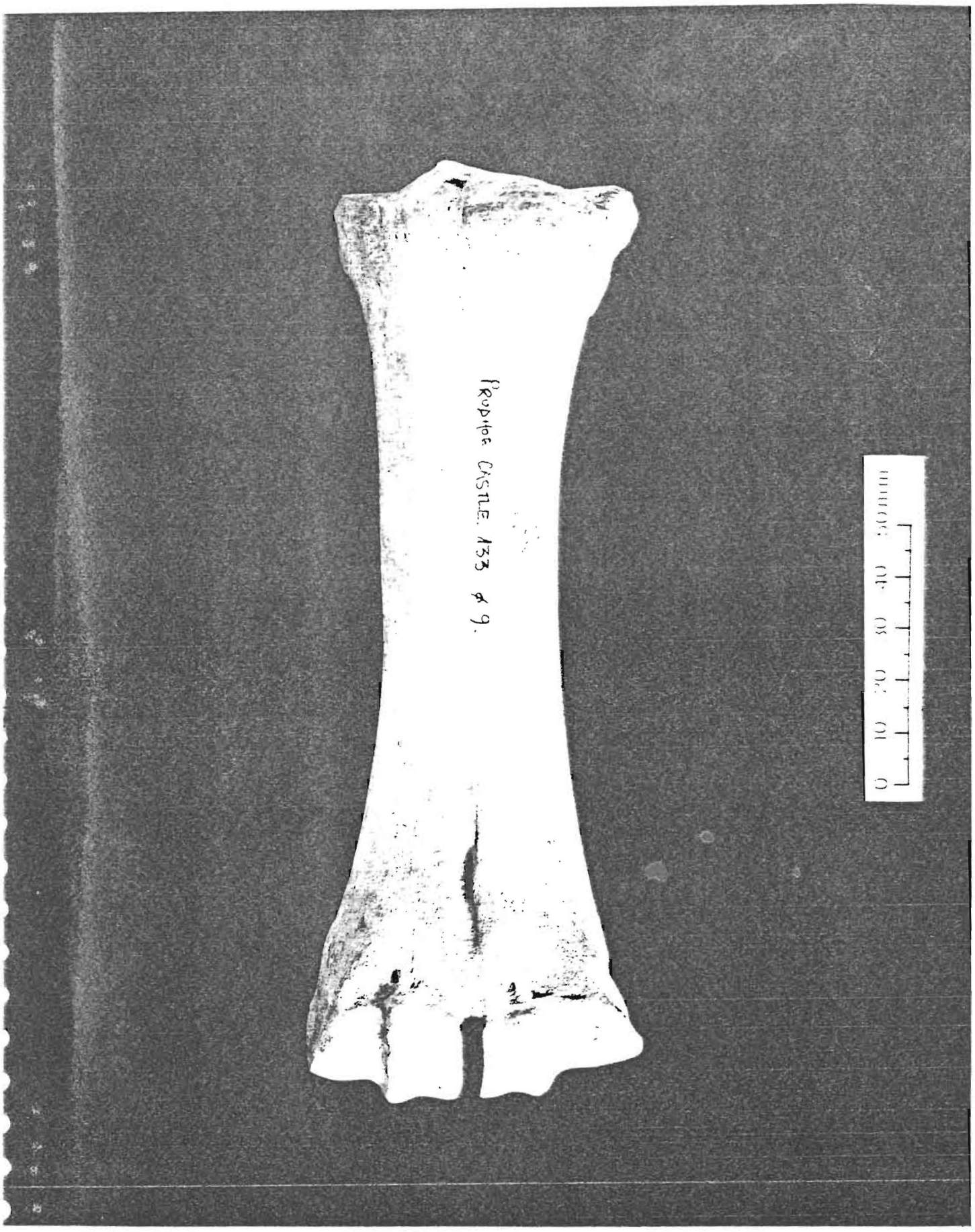



PLATE 1.
Cattle metacarpal in anterior view; context 133 phase 9. Note the asymmetrical distal end - with one trochlea wider than the other.

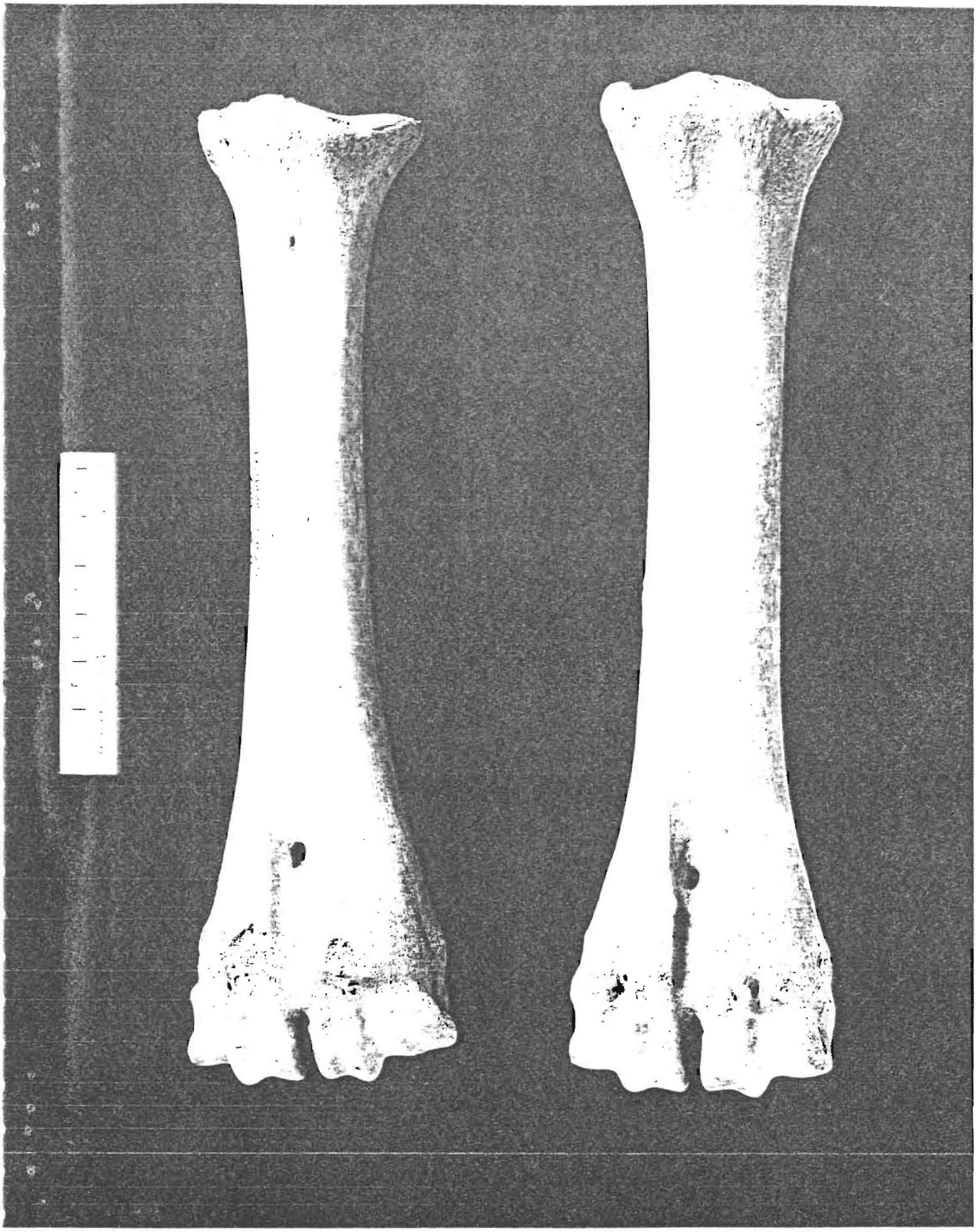


Plate 2

Plate 2.

Two cattle metatarsals in anterior view, one normal (on the right ) and one showing an asymmetrical distal end (on the left). Both are from context 519, phase 4.

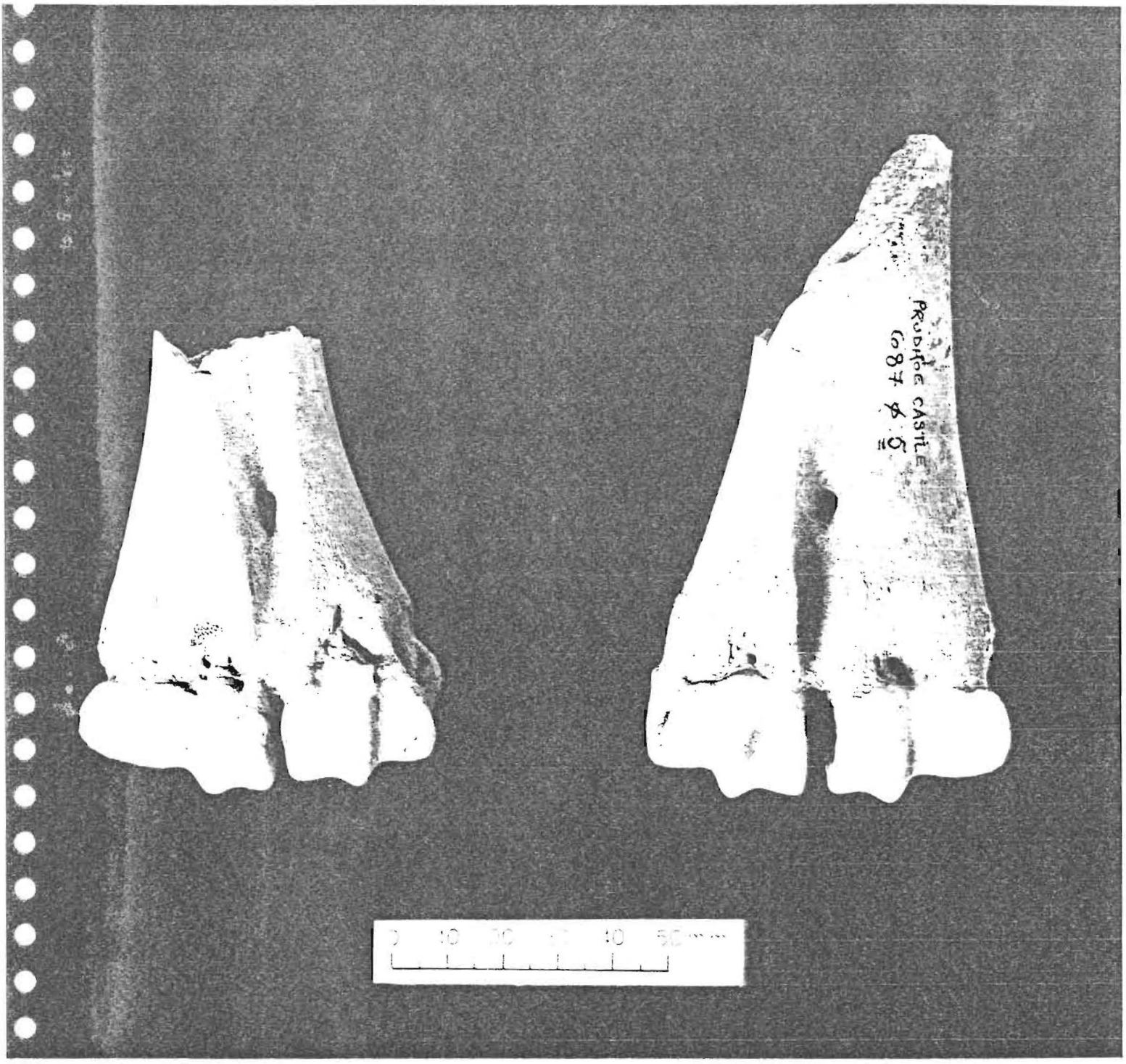



Plate 3.

Two cattle metatarsals in anterior view (distal ends) with asymmetrical distal ends. The one on the left is from context 93, phase 9; and on the right from context 687, phase 5.

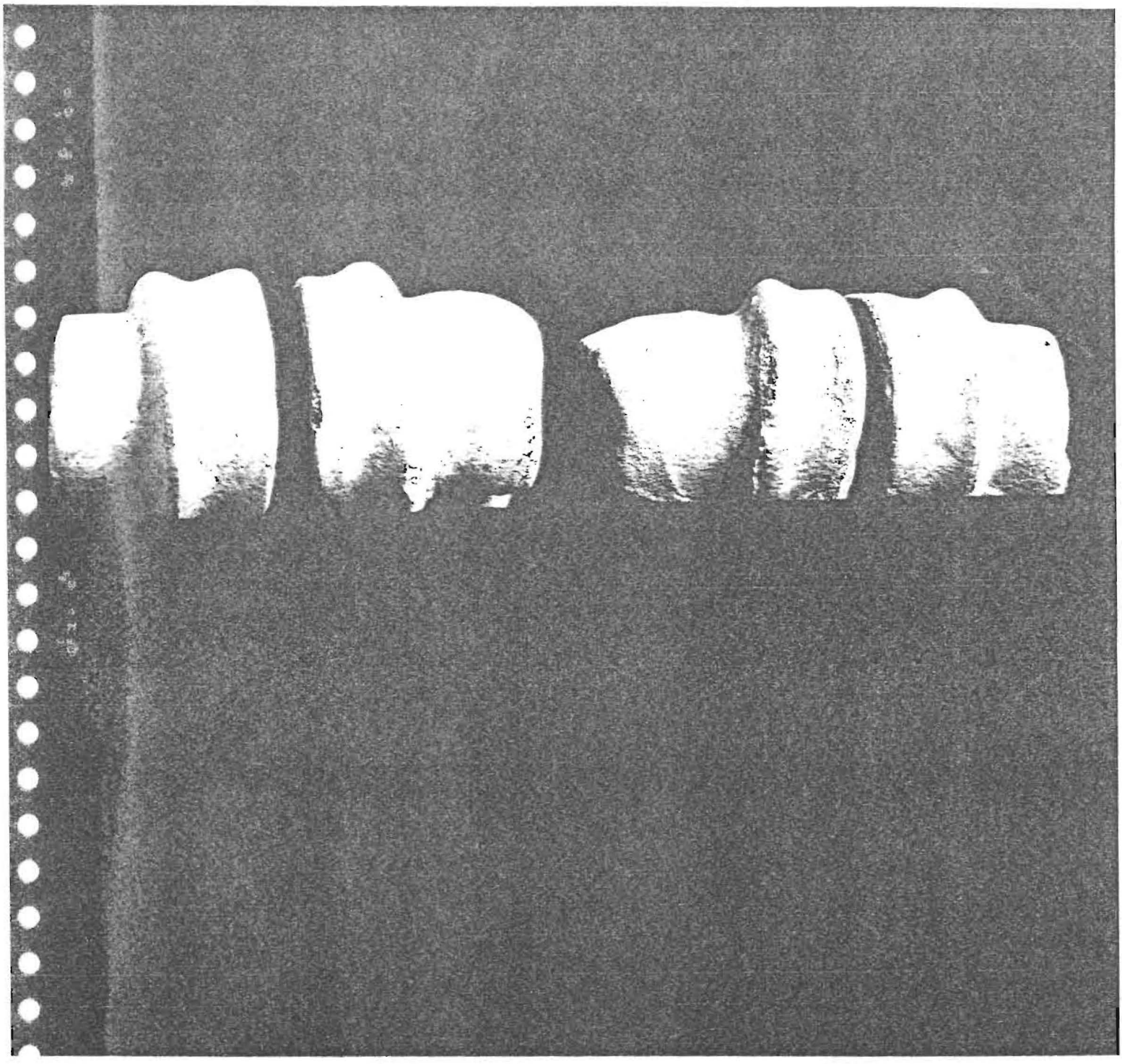


Plate 4.

The same two cattle metatarsals as in plate 3 - plantar view.

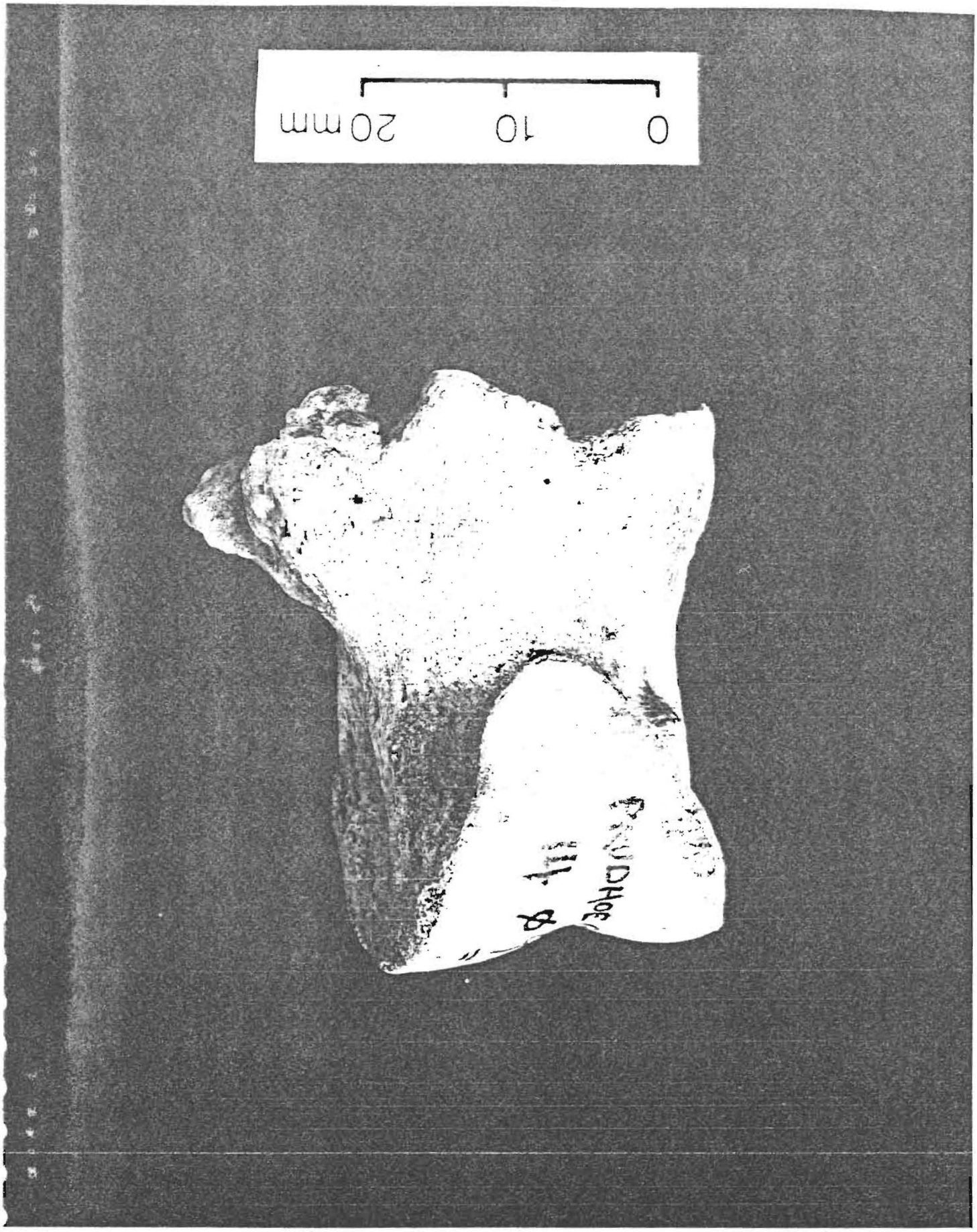



plate 5

Plate 5.

Cattle second phalanx in anterior view, from context 14, phase 9. There are exostoses (?stress induced) around the proximal articular surface.

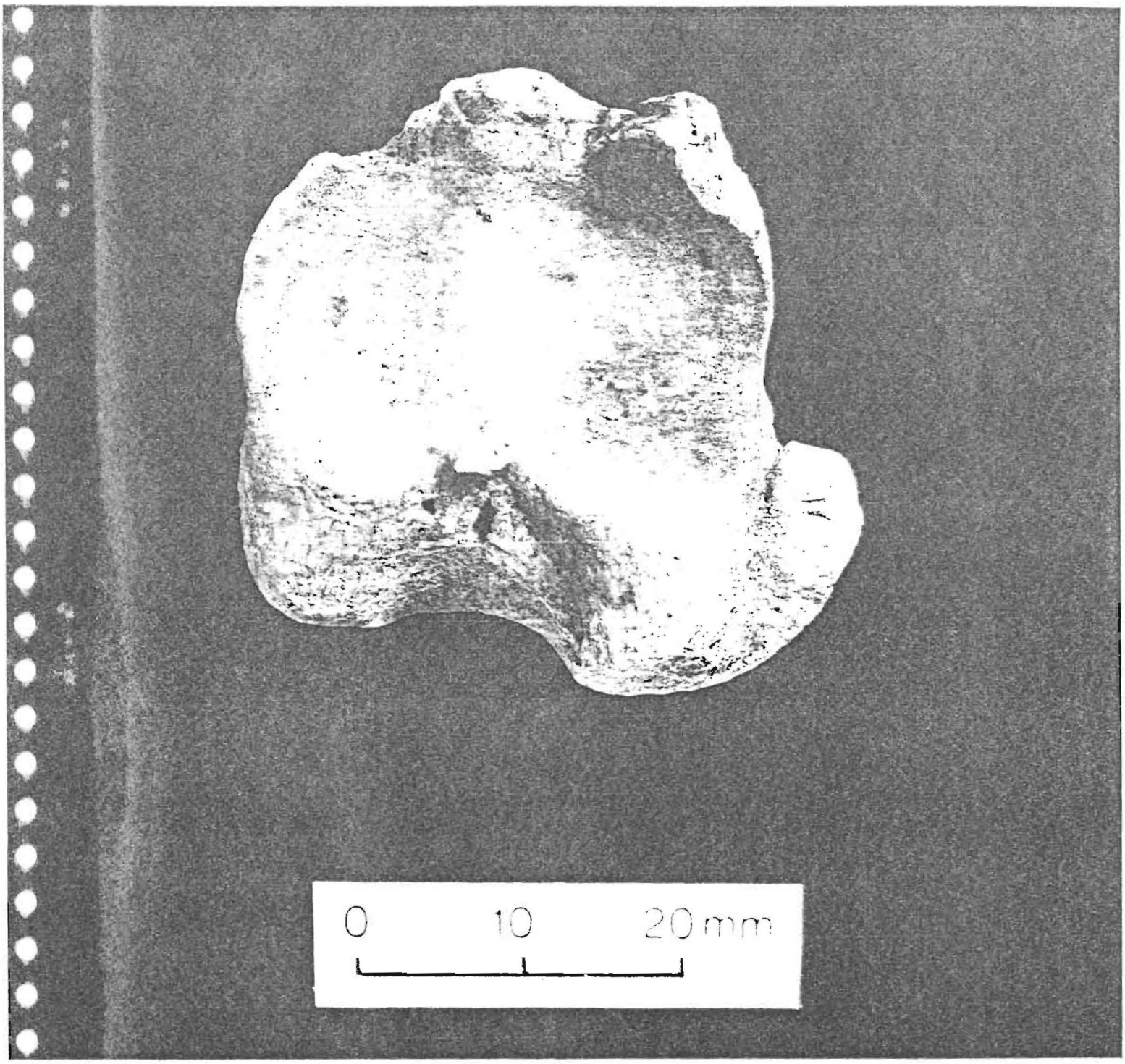



Plate 6.

The same cattle second phalanx as plate 5. View of the proximal articular surface.