HHL Report 4067

Site 1046

FAUNAL REMAINS PROJECT
DEPARTMENT OF ARCHAEOLOGY
UNIVERSITY OF SOUTHAMPTON

17.8.83

A PRELIMINARY STUDY OF THE ANIMAL BONES FROM SITES A,B, AND C, READING ABBEY (WAC SITE 12, 1981) WITH RECOMMENDATIONS FOR FUTURE STUDY, ESPECIALLY OF THE CATTLE HORN CORES

Jennie Coy

This report is the result of a preliminary study made in order to assess the potential of this material, especially the cattle horn cores, before the new excavations take place in Autumn 1983 . There were 56 boxes of assorted size containing bone & shellwhich roughly divide between the different sites and Phases as below:

SITE	PHASE	DATE	BOXES	HORN CORES
A		deposits of little interest or	2	not assessed
B		not securely dated	4	
C	I	mid 12C -mid 13thC AD	16	338 (of which 328 computer coded)
	II	late13th - early 16thC	17	227
	III	mid 16th - end 17th C	2	4
	IV	early 18th-mid 19thC	10	50
	unphased		2	
various		shell	3	
			56	619

Deposits were mostly in riverine silts and peats and phasing was derived from pottery typology. One aim of the study was to assess the likelihood of contamination of the horn core deposits and whether they were worth saving in future.

This study necessitated the spreading and detailed examination of all 619 cattle horn cores and reincorporating them into the correct bags and boxes after study. The cores were sorted into age groups and types (short, medium and long-horned) and possible sex groupings. Those from Phases I, III, and IV were computer coded using the Ancient Monuments Laboratory's methodology. Those of mixed date from Phase II and the rest of the bones in all collections were examined but not individually recorded.

Dr Philip Armitage (Museum of London) examined the horn cores and advised on the groupings and possible date ranges but should not be held responsible for the comments below which are those of the writer. Miss Marion Butler assisted in the analysis and Mr O'Prey of the Department of Biology kindly allowed us to take over a large laboratory.

A sample of horn cores has been retained at the Faunal Remains Project to assist in typing any further material. A short paper is being prepared for publication in view of the interest of the Phase I group.

The Cattle Horn Cores

Size and Age The Phase I horn cores were classified by size using the method described by Armitage and Clutton-Brock (1976) and age class according to a more recent analysis (Armitage 1982). As the latter really deals with post-medieval material no estimates of absolute age have been given. These results are shown in Table 1 and demonstrate that most cores are from short or medium-horned cattle in the sub-adult and young adult ranges. Appendix Table 1 gives a detailed listing of the layers and horn cores found in Phase I.

Obviously the porous horn cores in age classes 1 and 2 had not yet reached their adult size and may have ended up in a higher size category. For this reason only the more compact horn cores (age classes 3-5 inclusive) are included in Table 2 which compares the size categories for Phases I and II.

In Phase II there are no 'small' cores and there is clearly a bias towards the longer ones, something that is confirmed

TABLE 1

Phase I All cores: Matrix of Size and Age Assessments

	Age Class					
	1*	2*	3	4	5	total
size						
small	8	14	4	5	1	32
short	20	48	65	31	8	172
medium	2	18	44	31	7	102
long	-	3	3	-	2	8
TOTAL	30	83	116	67	18	314

* Figures in these columns are unlikely to be final sizes.

KEY size

'small' - length of outer curvature < 96mm
'short' 96-150mm
'medium' 150-200
'long' > 200mm

(Armitage & Clutton Brock 1976 - apply only to medieval cores)

Age Class
1 - juvenile
2 - sub-adult
} referred to as 'porous' in this paper & in archive

3 - young adult
4 - adult
5 - old adult
} referred to as 'compact' in this paper and in archive

(Armitage 1982 - originally applied to post-medieval cores)

TABLE 2

Phases I and II: Percentage of Compact Cores in Different Size Categories.

	Size Groups				
Phase I	small	short	medium	long	total
no. of horn cores	10	104	82	5	201
% of total	5%	52%	41%	2%	
Phase II					
no. of horn cores	-	21	28	16	65
% of total	0%	32%	43%	25%	

by the large number of porous cores which had already reached the medium size range. The fact that the sample in Phase II is very mixed and contains pottery of 13th to 16th Century date may mean that the cores are similarly mixed. Certainly cores from some Phase II contexts do look very like Phase I cores but other contexts contain core types not found in Phase I and there are even three contexts with fragments from cores which probably exceeded 220 mm in length and look typical of post-medieval deposits. (Armitage uses a slightly different classification for post-medieval cores. In order to classify as 'long' a post-medieval horn core has to exceed 360mm in length so that such cores would come into only the medium category if they were in a post-medieval context.)

Appendix Table 2 gives a comment on each Phase II context in the hope that these may aid archaeological interpretation. Because of their mixed origin the Phase II cores were not studied in detail but it was noted that there were many cores of age categories 1 and 2 , i.e., which were porous and had not yet reached their adult size.These are included in Table 3 which compares the numbers for the porous/compact division in the two phases. It is clear that Phase II is associated with a significantly higher proportion of immatures (χ^2 is highly significant even at $p \simeq 0.001$, 1 d.f. using Yates correction).

The simplest explanation is probably a depositional one (P.J.Fasham, personal communication) as the Phase II contexts are mainly from water channels whereas those from Phase I are mainly from reclamation layers. Preservation in the former may have been more uniform with all ages of horn cores, even the porous ones, surviving.

Measurements

Only about 40% of the Phase I cores gave complete lengths either because of immaturity or fragmentation. The measured cores, however, showed roughly the same breakdown into the different size categories as the estimates in Table 2. Any preservational bias concerned with size did not appear to exist, at least

TABLE 3

Phases I and II: Percentage of Porous/Compact Cores

	porous (Age Classes 1 & 2)	compact (Age Classes 3-5 inc)	total
Phase I			
no. of horn cores	113	201	314
% of total	36%	64%	
Phase II			
no. of horn cores	134	65	199
% of total	67%	33%	

between the small, short, and medium size categories. Phase I measurements are summarised in Appendix Table 3. This shows that even fragmentary horn cores often produced measurements at the base of the core. These are broadly positively correlated with the total length but basal circumference is not a good predictor of core length as can be seen in Appendix Figure 1 which shows each core size group has a wide range of basal sizes. This is partly due to sex differences discussed in the next section.

This wide range of shapes and sizes (a selection is shown in the Plates) is also the reason for the very high coefficients of variation shown in Appendix Table 3. These figures do, however, correspond well overall with figures given by Armitage for City of London material of the Late 12th and early 13th Century (Armitage 1980). The Reading material has a wider range.

When the horn core lengths were measured it was very difficult to assess which size category the cores should be in. This was because a large number of cores were just at the interface between the Armitage and Clutton-Brock size categories. The distribution of core lengths actually followed a bimodal normal distribution with modes at c.120mm and 130mm. These are both within the medium size range.

There was a very small amount of horn core material from Phase III. These were larger than the Phase I examples. One, not that with the largest basal circumference, had a length of 250mm putting it in the medium category for post-medieval horn cores (as shown below) and the large category for medieval cores (Table 1).

Post-medieval Core Size Categories (Armitage 1982)

	outer curvature
shorthorn	< 220
medium horn	220 - 360
longhorn	> 360

It was difficult to apply these categories to the highly fragmentary but often large Phase IV horn cores which were measurable to some degree and gave a basal circumference range of 124 to 234 mm with a mean value of 179mm. This mean is about at the maximum for Phase I and these cores are quite visibly different (see Plate). Only three produced outer curvature lengths, one coming out in the above classification as short and the others as medium. These three were not by any means the heaviest cores in Phase IV and some of the fragmentary ones might have been at least good sized medium horns. Details of the Phase III and IV contexts are given in Appendix Table 4.

Horn Core Shape and Type

It is impossible to deduce with any degree of certainty the sex of the individuals that provided these cores or to know whether the different types were regarded as breeds or what was their coat colour(something often used as a major breed characteristic). Armitage and Clutton-Brock (1976,332) have suggested horn core shape differences which might be linked with sex or castration and an attempt was made with the Reading cores from Phase I to sort into these categories. The plates illustrate some typical cores in each category from the different size groups. Examples of these types have been saved at the Faunal Remains Project to allow for quick assessment of any future material from the same source.

The fact that Phase II contains some Phase I types does not necessarily mean that they are dated to the 12 or 13th century. Some forms might have persisted in local populations over a long period. Some of the very small cores and crania present in Phase I are even reminiscent of Iron Age types, although they are also present in other early medieval collections.

The Phase IV types that turn up in some layers with Phase II pottery do however look somewhat different from the normal range of Phase I material and are probably later in date (these are in Contexts 732, 931, and 942). None of these were recognized in Phase I.

Some attempt was made to record in archive for Phase I at least the angle at which the cores projected from the skull; whether they were straight, curved or twisted (Armitage and Clutton-Brock 1976, 332); and the incidence of especially high frontal eminences, or thin frontal bones or cores. In any future study with a larger sample it would be useful to analyse horn core shape and direction, frontal profile, suture changes with age and some other non-metrical characters in greater depth, perhaps using the terms defined by Grigson (1976).

The Other Bones

This analysis was very superficial in that each bag was checked quickly and horn cores removed if phaseable. Contexts 909 and 1350 although only provisionally assigned to Phase I were included to augment the sample. Horn cores were sometimes noted in unphased layers, especially a good collection in 778. There were many other bones in some bags and some idea of what was present is given for Phase I in Appendix Table 1.

The other species represented were domestic horse, sheep, goat, pig, dog and fowl; fallow deer, Dama dama; and red deer, Cervus elaphus. The majority of fragments, however, were of cattle skull and metapodials. Many contexts seem to have consisted of almost pure deposits of cattle horn cores and they formed at least half the total collection by volume.

Only a full analysis of these associated bones, especially the cattle skulls and metapodials for butchery evidence, will clarify the processes that went into the formation of these deposits and this swift appraisal also suggests that measurement of the cattle bones would provide confirmation of the size increase with time which is suggested by the examination of the horn cores.

The Shells

These have not been studied although a swift appraisal showed that they are at least in part marine molluscan remains which must have come there as a result of human activities. There was oyster, Ostrea edulis, in all phases,

and species of marine whelk and mussel in some. Freshwater mussels, which may have a more natural explanation, were also common.

Interpretation of the Horn Core Deposits

A large number of cattle are represented by this collection. Apart from two small partial crania (which presumably would not have yielded enough horn to make them of much interest) there were only 3 possible cases where the left and right cores could have been from the same individual. This suggests that cores had become separated before deposition, the most likely explanation being the necessity for both cores to point downwards into a container in order for the tissue holding the horn itself to the core to be rotted away. The associated finds of leather from this site suggest that the cores may initially have been brought to the site with skins but whether on the live animal or just as convenient handles for the tanning process is something that is difficult to deduce without further evidence.

Certainly each core is attached to a block of skull which has been in most cases subjected to three chopping blows. Using the terminology of Grigson (1976,116) these are in three planes at right angles to one another - the midline cut (that separates the horn cores from one another) is in a vertical plane with dorso-ventral and anterio-posterior axes, the second in a horizontal plane with anterio-posterior and medio-lateral axes (and cutting the skull behind the horn cores), and the third a vertical plane with dorso-ventral and medio-lateral axes. Further study might reveal the direction and order of these cuts.

In addition, at the point where the second cut goes through the top of the temporal groove there is often a worn area (Plate). It is suggested that this is more likely to have been caused at some point during the tanning process than in horn core removal and might suggest that the partial cranium was at that point in the skin.

There are also more superficial cuts on the dorsal surface of the frontal bone probably made when the skin was

removed. The butchery of the frontal bones would also repay further study as it may provide evidence for method of slaughter.

Conclusions and Recommendations

Despite initial doubts about whether the cores would be dateable these are important finds. The collection provides a unique opportunity to sort out an expected range of variability for cattle horn cores in at least the 12th and 13th centuries A.D. If more such material should be saved, along with associated bones, it would be easier to assess the total collection in terms of horn length, age and type. It would obviously be very important if actual water channel material associated with early pottery could be collected as this might be better preserved and provide a better breakdown into age classes.

Well-dated collections of later material from any medieval or post-medieval period should also be treated with high priority.

If new material does come to light in future excavations in this area, the material described here should be included in any full study of the bones. The cores can not only shed light on the types of cattle present in different periods and the industrial activities of the site but they can increasingly be used as a rough dating tool as we learn more about their changes through time. As explained in an earlier section it is vital that the associated bones, if phaseable, should be studied in detail too so that retrieval should be by normal careful methods and not selection, and bulk samples taken from each context, if possible, in order to be certain that the absence of certain bones (e.g. the toe bones) is real, not a result of differential retrieval.

References

Armitage P.L. 1980 A preliminary description of British cattle from the late 12th to the early 16th century Ark (Journal of the Rare Breeds Survival Trust) VII (No. 12), 405-412

Armitage P.L. 1982 A system for ageing and sexing the horn cores of cattle from British post-medieval sites (17th to early 18th century) with special reference to unimproved British longhorn cattle. In (R.Wilson, C. Grigson & S.Payne eds) Ageing and sexing animal bones from archaeological sites. British Archaeological Reports (British Series) 109, pp 37-54

Armitage P.L. & Clutton-Brock J. 1976 A system for classification and description of the horn cores of cattle from archaeological sites. Journal of Archaeological Science 3, 329-348

Grigson C 1976 The craniology and relationships of 4 species of Bos, 3. Basic craniology: Bos taurus L. Sagittal profiles and other non-measurable characters. Journal of Archaeological Science 3, 115-136

APPENDIX TABLE 1

Horn Cores in Phase I

(The sizes referred to here are the medieval size categories as in Armitage and Clutton-Brock 1976)

Context 786 — 17 cores were recorded of which 9 were porous (age class 2). Of the compact ones (age classes 3-5) one was small and the rest short or medium-horned. One broken one could have been long.

864 — 19 cores recorded, of which 9 were porous. Of the compact ones two were small and the rest short or medium. Associated finds were several dozen cattle metapodial fragments and some bones of other species, including goat horn cores and pig jaws.

886 — 10 cores recorded of which 3 were porous. Two compact cores were small, two medium, and the rest short. Very variable. There were associated cattle cranial fragments.

889 — A single porous short horn core was recorded. cattle metapodial and sheep fragments were associated.

906 — 64 cores recorded of which 5 were very porous (age class 1), 28 porous (age class 2) and both porous and compact were overwhelmingly of short-horn size with only a handful of medium and small cores. One fragmentary core might have been long-horn size. A few cattle metapodials were associated.

909 (Phase I ?) — 14 cores recorded of which 2 very porous and 7 porous. The remainder where assessable were more medium than short. One medium-horn was 193mm and a fragment could have come from a longhorn. There were associated cattle cranial fragments and metapodial fragments and some other bones, including goat horn core and pig bones.

911 15 cores were recorded, 6 porous. Assessable compact cores were mostly medium. One broken base could have been long.

912 60 cores were recorded of which 5 were very porous and 7 porous. Apart from 3 medium (and 1 possible fragment of long) all the cores, porous and compact alike, were within the short-horn category although they spread throughout it from 97 to 150mm. This was a particularly useful collection for typing the short-horns for shape and type. Two cattle metapodials were associated.

919 A single compact core recorded.

936 6 cores recorded of which 2 porous. They were medium or short. A few cattle metapodials and bones of pig, sheep, dog and domestic fowl were associated. One core was deformed and was similar to a deformed core in context 1076.

945 Two fragmentary cores, one porous, were recorded. Associated with them were distal metacarpus of cattle and some other fragments, including sheep bones.

952 Two fragmentary cores were recorded. Sheep bone was associated.

978 9 cores were recorded, 3 porous. One was a longhorn, with a total length of 210. Other cattle and pig bones were associated.

980 16 cores were recorded, 2 porous. Very much a mixture of small, short and medium (one with a total length of 194mm). Variability comparable to 886. An assortment of other cattle fragments associated.

985 25 cores recorded, one very porous, 6 porous. Three were small, 4 medium, and 8 short and there was a good deal of variability. Two fragmentary cores

could have been long. Cattle metapodials and jaws were associated.

1054 13 cores recorded, 2 porous. The compact cores were a mixture of short and medium. There was a quantity of associated cattle bones, including jaws and metapodials and some sheep bones.

1076 23 cores were recorded, 6 (including a long-horn) were porous. Apart from a medium-horn of 190mm length and three small horns the measurable compact cores were all short. Cattle tail and ribs and goat horncore were associated. Second deformed core in here.

1304 contained cattle metatarsus but no horn cores.

1350 (Phase 1?) 27 cores were recorded of which 4 were porous. Short, medium and a long-horn were noted (the latter 225mm long). Associated was a fragment of fallow deer antler. Cores in this context were very variable.

APPENDIX TABLE 2

Horn Cores in Phase II

(Although this mixed collection may contain post-medieval material, cores are so similar to those in Phase I that the sizes referred to here are the medieval ones as for Appendix Table 1)

Context	
284	Four porous cores and two compact (one long)
285	One porous core
381	10 porous cores and 6 compact (1 short, 4 medium & 1 long). Three have similar shapes to examples in Phase I
389	4 porous cores and three compact long cores.
582	1 short core comparable to a Phase I form.
732	6 porous cores and 3 compact (one medium-horn like a Phase I example and another comparable with a Period IV medium -- i.e. long by these standards).
757	3 porous cores and three compact which are all medium and compare with Phase I forms.
758	10 porous and 9 compact cores (two short, 4 medium, and 3 long - some comparable with Phase I material).
773	1 porous core.
777	1 compact medium core that does not fit Phase I types.
793	1 short-horn that is similar but bigger than a Phase I type.

807 1 medium-horn. Variant of a Phase I type.

808 2 compact (one short, the other a variant of a PhI type).

811 3 porous and a short-horn Phase I type.

825 1 core

836 1 short-horn of a Phase I type.

856 1 short and 1 medium matches of Phase I types.

859 1 medium-horn match of a Phase I type.

860 7 porous cores and 8 compact (2 short, 3 medium, 3 long and mostly matching Phase I types). The above fits the Phase I material well.

895 8 porous cores and 3 compact (one short, 1 medium, and one long). The porous cores are at least medium.

896 1 porous core

930 2 compact cores (one short and the other a good size medium).

931 26 porous, 7 compact (3 short,3 medium, and two long, of which one compares to the Period IV longer types).A few of the porous cores may also be quite large.

934 19, all porous, some small. Calves are probably represented here.

938 1 porous core

942 1 compact core of a Period IV type.

943 1 porous core.

944 2 porous cores and 1 short-horn compact. This contains types seen in Phase I.

946 1 porous

982 3 porous cores

1048 22 porous and 3 compact (2 short of types seen in Phase I and 1 medium).

Measurement Summary for Phase I Horn Cores

	N	range	$\bar{X}$	S	CV
1. Maximum proximal width	218	26.1 - 67.4	46.5	7.9	17.0
2. Minimum proximal width	219	21.0 - 61.0	36.9	6.8	18.3
3. Length Outer Curvature	122	65.0 -225.0	129.8	29.7	22.9
4. Basal Circumference	217	82.0 -189.0	134.6	22.3	16.6

Key

N number in sample

$\bar{X}$ mean (mm)

S standard deviation (mm)

CV coefficient of variation = $\frac{S}{\bar{X}} \times 100$ (%)

Horn Cores in Phases III and IV

(The sizes represented here are the post-medieval size ranges given by Armitage 1982)

Phase III

Context 387 — Three cores were recorded, one had an estimated length of 230, another an actual length of 250mm- both medium-horns by post-medieval standards.

Phase IV

Context 356 — Three compact cores were recorded, one estimated as just a medium-horn by post-medieval standards.

Context 359 — Six compact cores were recorded, 3 with length estimates of 200, 300 and 360 respectively, making the last just a long-horn-even by post-medieval standards.

Context 391 — Two compact cores were recorded one with an estimated length of 195mm

Context 924 — A single compact core of 267 mm length (medium-horn) was recorded.

APPENDIX FIGURE ~~TABLE~~ 1

Basal circumferences of the different core sizes (PHASE I)