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THE ANIMAL BONES

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INTRODUCTION

Altogether 10,058 animal bone fragments from Iron Age and Romano-British features are described. Most came from the four wall-trenched roundhouses, especially from house 1 (IA2) and house 4 (IA5), and from general Iron Age features over the whole settlement area which cannot be more closely dated.

Data were recorded using the Ancient Monuments Laboratory's computerised recording scheme. This includes categories for recording erosion, fragmentation, butchery, gnawing, and other attributes relating to human activity and subsequent deterioration (Coy 1981, 101). Data are stored at the Faunal Remains Project. A more detailed account is also available for consultation giving all the synthesised information on which this account is based.

Sieved material was available from some features but mostly consisted of small crumbs of unidentifiable bone, probably from the major domesticates, which were not counted in totals as this would make impossible comparison with other collections which were not sieved.

The bones showed extremely fine ancient fragmentation making it worthwhile to spend more time than usual on identification to species and anatomical element. This high degree of ancient fragmentation may itself indicate extensive utilization of carcases and bones but, linked with the large amount of surface erosion on the bones, could mean that some were crushed while lying around the settlement, on or near the surface.

Table _ shows the species represented in the different phases of Iron Age deposits, the general Iron Age, and the Romano-British features. The first two lines represent undiagnostic splinters from 'cattle-sized' and 'sheep-sized' animals. The former are probably from cattle (with a possibility of horse), the latter mostly from sheep and pig. There seems little likelihood of deer bones playing any part in the formation of these splinters. In view of the rarity of goat in this collection sheep counts include all fragments of ovicaprid.

TABLE 1 Fragment Counts for Phases and Species

	Phases								
	IA1	IA2	IA3	IA4	IA5	IA6	GIA	RB	TOTAL
Species									
C-fragments	7	265	70	100	554	50	320	16	1,382
S-fragments	34	1098	216	452	1337	242	1311	49	4,739
horse	–	20	2	4	49	5	8	1	89
cattle	1	110	29	44	233	38	101	13	569
sheep	16	461	58	167	560	124	496	22	1,904
goat	–	1	–	1	–	1	1	–	4
pig	5	263	41	79	570	62	268	8	1,296
dog	–	3	–	1	–	1	13**	–	18
red deer	–	1*	–	–	–	–	–	–	1
roe deer	–	–	1	–	–	–	–	–	1
fox	–	1	–	–	–	–	–	–	1
hare	–	–	–	2	–	–	3	–	5
rodent	–	–	6	3	6	–	–	–	15
goose	–	–	–	–	–	–	1	–	1
crane	–	–	–	–	1	–	–	–	1
raven	–	–	–	1	1	–	–	–	2
buzzard	–	–	–	–	4	–	–	–	4
unidentified bird	–	–	2	–	3	1	1	–	7
common frog	–	–	–	–	–	–	1	–	1
OTHER	1	10	–	–	4	–	3	–	18
TOTAL	64	2233	425	854	3322	524	2527	109	10,058

* antler

** nine were from one articulated foot

SPECIFIC PERCENTAGES OF CATTLE, SHEEP, AND PIG

Because of the difficulty of assigning 'S-fragments' to sheep or pig categories the specific percentages are given only for fragments identified to species or to ovicaprid. Table - gives these for the three major collections compared with those worked out by Griffith for the banjo settlement at Micheldever, Hampshire, where Phase 1 corresponds to Middle Iron Age to Pre-Gallo-Belgic Late Iron Age and Phase 2 to Late Iron Age/Early Roman. The bone analysis for both sites was carried out using as far as possible the same methods.

A chi-squared test was run on the original frequencies for Groundwell. Observed frequencies show a highly significant difference over expected frequencies even at the 0.001 level of probability ($p < 0.001$, chi-squared = 87 on 10 d.f.). The major differences are the low value for sheep and high value for pig in Phase 5 and the low value for cattle and high value for sheep in the general Iron Age results. The null hypothesis that these phases show similar specific proportions does not therefore hold. Phase 5 is obviously aberrant, and the general Iron Age deposits also significantly different. Results for the 'C-fragments' and 'S-fragments' were also tested and supported these general conclusions. The nature of bone deposits must now be examined more closely in order to deduce whether they are comparable and reflect the relevant impotance of the different species.

TAPHONOMIC ASPECTS OF THE MATERIAL

Parts of the Carcase Represented

A division into meat-bearing and non-meat-bearing bones was used to show up any specialization in deposition by acting as a comparative index for the different collections. This was taken in conjunction with the residuality evidence discussed below.

Samples from Phases 1,3,4,6 and RB were too small to be viable. Differences between the others were not very great and did not suggest great dissimilarity in the three deposits except that there was for all species a slight gradation across the three groups with non-meat bones greatest in proportion in IA2 and least in the General deposits (cattle non-meat percentages ranged from 66 to 70% of cattle bones, sheep from 53 to 67% of sheep bones). Pig did not show such a high proportion of non-meat bones as it did in recent excavations at Ower, Dorset, where pig non-meat levels ranged from 66 to 84% of pig bones compared with 62 to 68% here. Fragment numbers may not therefore be such an underestimate of pig importance at Groundwell as they are at Ower and numerous other Wessex sites.

TABLE Comparison of Specific Percentages from Fragments for Groundwell Farm and Micheldever, Hampshire

	GROUNDWELL			MICHELDEVER PH 1		MICHELDEVER PH 2	
	IA2	IA5	GIA	pits	ditch	pits	ditch
no. fragments	(834)	(1363)	(865)	(1605)	(239)	(277)	(430)
% cattle	13	17	12	33	41.5	25	46
% sheep	55	41	57	53	41.5	57	31
% pig	32	42	31	14	17	18	23

Fragmentation

Differential fragmentation between species and between deposits would, like any specialized carcase disposal practices, give a misleading picture for specific ratios. One index of fragmentation which can be used is that used for Micheldever by Niall Griffith. Bone fragments are coded as 'whole', 'roughly three-quarters', 'half', or 'less than half'. Exclusion of some fragments, like cranial and toe bones, to some extent eliminates the effect of specialised disposal practices, and bones that fragment highly or infrequently.

Specific differences in fragmentation proved to be very much in line with specific percentages for the different deposits apart from a relatively high value for sheep larger fragments in the General deposits and relatively high values for sheep smallest fragments in IA5. There is a slight suggestion also that General deposits contain fewer whole and three-quarter bones.

The relative percentage of fragments coded as 'unidentifiable' or 'long-bone fragment' within the large and small ungulate categories were compared for the different phases. The percentage these counts formed of the total large ungulate counts were 38, 38, and 50% respectively for IA2, IA5, and General deposits. The same percentages for the small ungulate counts were 40, 38, and 49%. This is further slight evidence that the bone from the general deposits was less identifiable. These generally high levels for unidentifiable bone could be the result of a number of factors such as high efficiency in retrieval on excavation and good survival in the soil. Fragmentation of the material before it becomes buried must also be of great significance.

A third indicator of fragmentation used was the percentage of the fragment total for each species in the various deposits which consisted of loose teeth. This is (unlike the previous value) a species-based index as teeth, even when highly fragmented, are usually specifically identifiable. Again there were high values (ranging from 24-39% for cattle, 19-30% for sheep, and 14-21% for pig) which could be due to a combination of factors: retrieval, survival (poor survival of bone selectively favours teeth), and fragmentation (with high fragmentation breaking down mandibles and the more vulnerable maxillae and releasing teeth). There is slight evidence for the importance of the latter in the relatively low values for pig. Pig jaws are more solid and would be more difficult to fragment.

These results were remarkably consistent from deposit to deposit which contrasts with the high degree of variability found on sites with different types of context in different periods. It points to similarities in the derivation of this material from phase to phase. More complex analysis could be undertaken using this material. An attempt to split results from wall-trenches from those from other types of deposit would not be worthwhile at this stage as work of this type is at the moment best attempted on site material with larger samples excavated with this in view.

Erosion

Most of the bone fragments showed root marks; this was not included in the erosion figures. The actual erosion was quite severe and was recorded at three levels: R1 - slight erosion where there is some degree of attack over most of the bone surface but the surface preserved its general level nature despite this (rarely the erosion only attacked part of the bone); R2 - moderate erosion where the bone surface was uneven; R 3 - severe erosion where the bone shape is altered in a major way. The material shows a very high percentage of surface erosion, especially severe erosion, compared with other Wessex Iron Age sites but it is difficult to compare erosion quantitatively between sites and more difficult when different workers have recorded the erosion, even using the same scheme.

Once eroded, bones do not yield much information on gnawing or butchery, although a combination of gnawing and surface erosion probably produced the R2 and R3 condition on some bones.

That from the General deposits was the most eroded with levels ranging from 28 to 40% in the various species categories and an overall average across the whole deposit of 35% for the incidence of erosion compared with 8% and 9%, respectively, for IA2 and IA5. Features included under the general Iron Age category are mostly shallow ones but, more importantly, they are not wall-trench deposits whereas most of the bone from the phased groups is from wall-trenches.

Over the site as a whole S-fragments show the highest incidence of erosion but the level of erosion within each species category is remarkably consistent.

The high percentage incidence of erosion for the General Iron Age deposits is interesting as none of the other indicators discussed above show up much difference between deposit types. It is likely that the higher level of erosion from some deposits is an indication that much more bone has disappeared in these

~~deposits~~ and this could in itself have biassed the specific percentages and anatomical distribution that we now see. Erosion figures for other Wessex Iron Age sites such as those studied by Maltby are usually high for deposits from hut gullies, scoops, and postholes, and relatively low in some pits.

Settlement Indicators

Butchery is difficult to see as a result of erosion and was probably underestimated. Bones of cattle, sheep, and pig often show knife cuts or chopping marks. There are several knife cuts on horse bones in IA2 and IA5 resulting from butchery not skinning.

There is a very small amount of ovicaprid long-bone in various phases closely gnawed with cracking of the bone walls, possibly from human gnawing and sucking of the bone for marrow. Canid gnawing, with scratches at the ends of the bones where they were held in the paws, is visible on 2 - 4 % of fragments in the major deposits. This suggests that, despite the few canid bones on this site, dogs played a role in the degeneration and degradation of bone fragments. The combined effect of erosion and gnawing has already been mentioned and there is no doubt that gnawing would have predisposed any surviving bone to subsequent erosion by soil solutions by removing its articular ends, if they had not already disappeared, and by damaging the bone cortex.

Gnawed bone does not seem to be distributed in any particular pattern on this settlement as far as the deposits examined indicate.

The incidence of charred and ivoried bone, often used as settlement indicators, is very low. Again there is a general distribution over all parts of the excavation with no major concentrations suggesting particular activities. More detailed feature by feature analysis might show up minor concentrations but was not considered worthwhile at this stage.

EVIDENCE OF THE ECONOMY

Examination of the above properties of this bone collection and discussion of a few of the factors at work can only lead to the conclusion that the specific percentages shown in Table 2 must be treated with caution. It is drawn from a sample of highly eroded bone from the roundhouse trenches and shallow features. Pit and ditch contents might have given a different picture of the economy. These arguments of intra-site variability have been made for larger and more varied samples (Maltby 1981a, 166). Within these constraints it is possible to suggest that comparisons between IA2 and IA5 are, from the evidence of the bones, more valid than comparisons between those and any of the General Iron Age material. Bone samples from the other Iron Age phases and the Romano-British features are too small to provide sensible comparisons.

Compared with results for other Iron Age settlements within Wessex, Groundwell has however produced a very high value for pig bones throughout and noticeably low figures for cattle. Although it is conceivable that there may be large numbers of cattle bones discarded elsewhere on the settlement as at, for example, Winnall Down, Hampshire (Maltby 1981a,165) it is less likely, from what we already understand of Iron Age deposition, that the treatment of pig and sheep bones would be so different that these deposits are giving us a completely biassed picture. Pig bones might, however, tend to be moved peripherally but it would be difficult to demonstrate this on this site.

Pig and sheep, not cattle, would have been the major suppliers of meat if these figures are a true reflection of the economy, despite the greater size of cattle individuals. On the other hand pigs were not likely to have been underestimated in their importance on this settlement by a lack of postcranial bones.

AGE AND SEX OF THE DOMESTIC MAMMALS

Cattle ageing evidence is insignificant. Of 30 ageable sheep jaws, 13 are at Grant stage 30 or above (Grant 1975). If ageable loose teeth are included there is a bias towards the oldest part of the range corresponding to the older peak seen for most Iron Age material (Maltby 1981a,175) but there is no peak of young jaws as seen by Maltby at Balksbury, Winnall, and Old Down Farm, Andover (Maltby 1981b,148). The reasons could be a mixture of preservation and disposal. At Winnall, for example, there were very high values for young jaws in pit deposits.

Of 49 ageable jaws of pig the bulk are Grant stage 19 (equivalent to an age in wild boar of 1 to 1½ years) or more but only four are older than stage 30 (wild boar equivalent 2 years). This is quite different from the picture at Ower where 71% of pigs represented by jaws were at stage 30 or later. Gussage All Saints had 33-47% of jaws at a similar stage (Harcourt 1979, 153). There are a few much younger individuals and no apparent differences between the different deposits.

BONE PATHOLOGY

There are a few instances of pathology but most bones are too broken to show up small pathological changes. Mandibles of sheep in IA5 (2) and General deposits (1) show an advanced stage of periodontal disease with loosened or lost teeth.

A cattle metatarsus showed joint damage distally and a forelimb phalanx considerable exostoses. These could be evidence for draught use of cattle but there is no confirmation of this from the few measurements available.

There are four cases of small lumps or exostoses on the distal limb bones of pig and a horse pelvis with slightly abnormal wear at the hip joint.

SIZE OF THE DOMESTIC MAMMALS

Only 4% of the bones are measurable but these give some idea of the size of the domestic animals kept. Cattle were small in stature but quite stocky in some measurements. Withers heights of 106 (2), 109, and 100 cm were calculated from four whole bones. A number of width measurements exceed those noted for cattle at Gussage All Saints (Harcourt 1979) but fit within the wider range produced by a number of Hampshire sites studied recently by Maltby.

The highest measurements obtained for sheep exceeded the Gussage range but can be matched by material of a similar size at Iron Age sites in Hampshire. Four whole metacarpals gave withers height estimations of 53-62.5cm. The highest exceeds withers height estimates from Micheldever and Gussage metacarpals but is itself exceeded by an estimate from Winnall.

There are more measurable bones of pig available for this site than from many of a similar size elsewhere in Wessex. Groundwell pig measurements are by no means small compared with the few available from other Iron Age sites. Tooth measurements, however, confirm the domestic nature of these pigs, the lower third molar range of 29.3 - 34.2mm is comparable with other supposed domestic populations and smaller than comparable measurements for wild boar.

The very few measurements available for horse are close to those for a New Forest Pony skeleton in the Faunal Remains Project which was 13 hands in life, but there are some bones slightly smaller than this. The dog bones are of a similar size to a modern dog skeleton with a shoulder height in life of 46cm. This fits within Harcourt's suggested ranges for Iron Age dogs of shoulder heights of 32 - 58cm (Harcourt 1974).

There is no evidence of any size differences between the different phases.

OTHER SPECIES

Altogether five bones believed to belong to domestic goat were found - immature metapodials from IA2, IA6, and General layers; and horn cores from IA2 and IA4. Other species are detailed in Table 1. Hare bones are most like the brown hare, Lepus capensis. The voles present were the water vole, Arvicola terrestris, and the bank vole, Clethrionomys glareolus, the latter from sieving.

Bird bones are few. The goose fragment is too poorly preserved for further identification. Raven, Corvus corax, and buzzard, Buteo buteo, are common finds for Wessex Iron Age settlements and could have been killed as predators of domestic stock, or as scavengers.

The crane, Grus sp, is more likely to have been eaten and is represented by a single radius in IA5. This species has not bred in Britain since medieval times but its bones have now been found on a number of Wessex archaeological sites, including Gussage All Saints.

CONCLUSIONS

A picture emerges of a highly fragmented collection of bones becoming spread in a relatively unspecialised manner throughout the wall-trenches, postholes, and other features. Subsequent erosion by soil solutions has affected much of the bone, sometimes triggered by dog gnawing.

These fragments, if representative of the economy of the settlement, suggest a relative dearth of cattle compared with other Iron Age sites in Wessex, and a high proportion of pig bones. Comparisons between fill of the different features is dangerous, except perhaps in the case of Houses 1 and 4 where samples are quite large and many of the taphonomic factors are comparable. The other large sample of general Iron Age date is probably not comparable, showing a very high degree of erosion.

Detailed comparisons with faunal remains from other Iron Age sites in Wessex are unwise as much of their material is derived from pits and ditches.

The Groundwell collection fills two important gaps in the data bank being built up for Wessex: it provides a collection of bones from wall-trenches and for successive phases of these which could be subjected to further study where necessary (the location of all the fragments is recorded according to sectors and layers of the individual wall-trenches); and it provides an example from an area of Wessex quite different from the areas of Hampshire where much faunal work for the Iron Age has been concentrated over the past few years.

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