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Faunal Remains Project
Department of Archaeology
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The Animal Bones from Bantham Ham, Devon

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Just over 4,000 bone fragments were examined, most of them (about equally) from Areas A and B with small numbers also from Areas C and D. The number of fragments seen from the various layers of these four areas are shown in Table 1 which also gives the Table references for the detailed results.

Methods Used

All fragments were identified to species or as nearly as possible using the modern comparative collections of mammals, birds, and fish at the Faunal Remains Project, University of Southampton. Details, including part of the bone present, butchery, state of preservation, and age of the animal, were recorded using the Ancient Monuments Laboratory's computer coding scheme (Jones n.d.).

The initial work was carried out under supervision by two undergraduate students in the Department of Archaeology, Nicki Cleminson and Rose Seagrief.

Various 'unidentifiable' categories are used in the Tables, as follows:

s/g - sheep or goat
sfg -from a mammal the size of sheep (on this site mostly sheep)
cfg -from a mammal the size of cattle (on this site probably cattle)
UNM - unidentifiable species but mammalian
UNB - unidentifiable species but bird bone
UNF - unidentifiable species but fish bone

In addition to an assessment of the range of mammal, bird, and fish species exploited an attempt was made to deduce what type of deposits these were - for example whether material had been initially deposited here or redeposited, whether bones were from food remains, and what stage of discard they represented if so.

TABLE 1 Numbers of bone fragments examined for each layer

Publication Number	Number of Fragments	Further Details
AREA A		
2	19	
4	13	
10	5	
11	683	* * * * * * * * Table 2
12	786	* * * * * * * * Table 3
13	1	
14	4	
15	2	
16	342	* * * * * * * * Table 4
Total from A	1,855	
AREA B		
19	47	
20	15	
21	1	
22	24	
25	6	
28	53	
30	14	
31	26	
32	817	* * * * * * * * Table 5
33	3	
35	2	
36	209	
39	604	* * * * * * * * Table 6
40	103	
Total from B	1,924	
AREA C		
42	12	
44	7	
45	22	
Total from C	41	
AREA D		
sand to E of D (old 12)	9	
46	64	
50	62	
52	174	
53	7	
Total from D	316	
GRAND TOTAL	4,136	

If deposits were suitable for the purpose it was hoped to use this material to comment on the husbandry of this period and region.

Layer Analysis of Area A - using Publication Numbers

Early Hearth 2 produced 19 fragments, most of them unidentiable fragments of fish bone but also cattle and sheep femur (the latter showing an eroded surface), an antler fragment of red deer, Cervus elaphus, and 7 small unidentifiable fragments of mammalian bone.

Slot 4 contained 13 fragments again, where identifiable, of meat-bearing bones - humerus, rib, and vertebra of cattle; another 6 fragments of large ungulate including scapula and sternal fragments; a dog radius; and 8 unidentifiable fragments of fish bone. Two of the cattle bones showed knife cuts or chopping marks and 5 fragments were badly preserved.

Note In this account a very rough division of the skeleton into 'meat-bearing' parts (trunk and upper limbs) and 'non meat-bearing' parts (cranial fragments, jaws, distal limbs) is used although this is somewhat crude as brains and trotters are sometimes delicacies.

Base Layer of Hollow, 10 contained a distal tibia of cattle and mid-shaft tibia fragment of sheep or goat - not necessarily meat-bearing bones. These were accompanied by large and small ungulate rib fragments. Three of the five fragments were eroded.

Layer 11 results are given in Table 2. About 74% of the cattle and cattle-sized fragments and 86% of the sheep-sized fragments came from meat-bearing bones of the body, notably vertebrae and ribs. These figures exclude loose teeth and small unidentifiable fragments although the latter (labelled 'other' in Table 2) may

TABLE 2 Fragment Distribution in Layer 11 - Species & Anatomies

	cow	she	s/g	cfg	sfg	pig	cer	dog	unm	fow	unb	fsh	unf	total
cranial	6	1		1	3	1	4*		21			10		47
mandible	5		2		2	1								10
sternum				1										1
vertebra	3			8	6				1			14	5	37
ribs	7		3	20	14				2				8	54
scapula	2		1	1										4
humerus	1													1
radius			4					1	1					6
ulna					1				1	1				3
pelvis	2													2
femur	1	1								1				3
tibia	2		3											5
car/tar	1													1
metapodial	4		1					5						10
phalanx	3		1			1		2						7
teeth	6		3		1	2			2					14
LBF				6	15				3					24
other				43	5			1	156		2		247	454
fish scales												✓	✓	
TOTALS	43	2	18	30	47	5	4	9	187	2	2	24	260	683

* three fragments were antler

key to species:

cow	cattle
she	sheep
s/g	sheep or goat (ovicaprid)
cfg	from cattle-sized mammal
sfg	from sheep-sized mammal
cer	Cervus elaphus, red deer
unm	unidentifiable mammal
fow	domestic fowl
unb	unidentifiable bird
fsh	fish identified to species
unf	unidentifiable fish

In addition to the bones above there was 1 tooth of horse

be mostly from processed food remains. This meat/non-meat division is detailed for this and some other deposits in Table 7. The high proportion of 'other' fragments especially those unidentifiable to species and under the heading 'unknown mammal' is a result of the sieving of some bulk samples in some of the more productive layers. This sieving produced most of the fish evidence.

About 10% of the bones in this layer were eroded, some badly. Very little butchery was noted in this layer - only cuts on deer antler, and cattle metapodials and vertebrae. The paucity of butchery may be linked with poor preservation of the bone (fine knife cuts on the smaller species may just not be visible) and the fact that a great deal of it was very finely fragmented.

The identifiable fish represented were pollack, Pollachius pollachius; a sea bream, Sparidae; horse mackerel, Trachurus trachurus; Ballan wrasse, Labrus bergylta; bass, Dicentrarchus labrax; and cod, Gadus morhua (see Table 8).

Layer 12 results are shown in Table 3 and provided a similar number of fragments to Layer 11, most of them unidentifiable mammal or fish fragments and only a very small proportion recognizable cattle, sheep, and pig bones. But again meat-bearing bones of cattle and sheep were more important than head and foot bones (Table 7). Only 9 of the 786 bones were eroded and butchery was recorded for a few bones again showing that these were food remains.

The identifiable fish bones were again all from marine species - pollack, bass, and horse mackerel - and represented fish from about 0.2 to 1.6kg in weight.

Sand above Hollow and Slots, 13, 14, and 15 . These layers contained together only 7 fragments of meat-bearing bone of cattle and pig.

TABLE 3 Fragment Distribution in Layer 12 - Species & Anatomies

	cow	she	s/g	cfg	sfg	pig	cer	unm	fow	dck	unb	fsh	unf	total
cranial				1		2	3*	67				13		86
mandible					2									2
coracoid									1					1
sternum										1				1
vertebra	1			2	2			4				9	11	29
ribs	3		1	3	3			18						28
scapula	1													1
radius									1					1
ulna	1					1								2
tibia						1								1
car/tar						1								1
metapodial	1	1				1								4
phalanx						2					3			5
teeth	5		6			7								18
LBF				2	27			19			1			49
other	2			17	1			232			4		302	558
fish scales												✓	✓	.
TOTALS	14	1	7	25	35	15	3	340	2	1	8	22	313	786

* antler car/tar = carpals and tarsals LBF= long bone fragment

key to species :
- cow cattle
- she sheep
- s/g sheep or goat (ovicaprid)
- cfg from cattle-sized mammal
- sfg from sheep-sized mammal
- cer Cervus elaphus, red deer
- unm unidentifiable mammal
- fow domestic fowl
- dck domestic duck or mallard, Anas platyrhynchos
- unb unidentifiable bird
- fsh fish identified to species
- unf unidentifiable fish

Blown Sand and Shell Layer, 16, produced a small collection detailed in Table 4 which showed a high proportion of unidentifiable mammal and fish fragments and a preponderance in the identifiable bones of cattle- and sheep-sized meat-bearing fragments. Sample size was however small but in this small collection several bones were charred and 47 showed some erosion, a higher proportion than in any layer since some of the early layers of A.

Fish represented were salmon, Salmo salar; horse mackerel; bass; and a species of sea bream.

Layer Analysis of Area B

Bone material from Area B was notably less disturbed than that in Area A as associated bones such as contiguous toes and long bones and their epiphyses were still associated so that they must have been deposited there while there was still some soft tissue holding them together.

Gully 36 showed 3 instances of associated bones in a collection of 209 fragments. There were also some burnt and some gnawed bones. Cattle and cattle-sized mammal fragments totalled 33; 107 fragments were sheep or sheep-sized; and 17 came from pig. There were also 10 fragments of domestic fowl and bones of starling, Sturnus vulgaris, a sea bream species, and pollack.

Again the majority of the fragments were from meat-bearing bones (Table 7). Fifteen bones showed signs of erosion.

Gully 33 produced a domestic fowl sternum, a fragment from cattle-sized mammal, and an ovicaprid long bone fragment.

Hollow, Layers 19, 20 . This contained a collection of 47 bones from the bottom of the hollow. They were a mixture of meat and non-

TABLE 4 Fragment Distribution in Layer 16 - Species & Anatomies

	cow	she	s/g	cfg	sfg	pig	roe	unm	unb	fsh	unf	total
cranial	1		1		3	1		6		1		13
mandible	3		2		1			1				7
vertebra	1			3					1	8	2	15
ribs	7			13	4							24
humerus	3	3	1									7
radius	1											1
ulna	2					1						3
pelvis			1									1
patella	1											1
tibia	1		2		4							7
car/tar	1											1
metapodial		1	2				1					4
phalanx	2											2
teeth	9		5			4		1				19
LBF				26	14			9				49
other				48	4			57			79	188
fish scale										✓		
TOTALS	32	4	14	90	30	6	1	74	1	9	81	342

key to species:

cow	cattle
she	sheep
s/g	sheep or goat (ovicaprid)
cfg	from cattle-sized mammal
sfg	from sheep-sized mammal
roe	Capreolus capreolus , roe deer
unm	unidentifiable mammal
unb	unidentifiable bird
fsh	fish identified to species
unf	unidentifiable fish

meat bones of cattle, sheep and pig with evidence also of salmon.

This collection was presumably undisturbed since its initial deposition as it contained bones from the same pig's trotter and pig and cattle vertebrae associated with their unfused epiphyses. Two fragments were burnt, four eroded and one chewed by a carnivore.

The sand above contained 15 fragments, virtually all from meat-bearing bones of cattle and sheep.

Pits - 21,22,35 contained very few fragments - one domestic fowl radius in 21, 3 ovicaprid fragments and a frog skeleton in 22, and a cattle ulna and a small ungulate fragment in 35.

Pit 25 contained one cattle-sized, two sheep-sized and three unidentifiable fish fragments.

Charcoal from Fire, 28. This produced 53 bones, including 11 meat, 4 non-meat bones, and 3 loose teeth of sheep and sheep-sized mammal; two meat bone fragments of cattle; and 3 fowl long bones.

Two Associated Hearths 30 and 31. The first of these contained 14 fragments, six of which were meat-bearing fragments of sheep. Unidentifiable bird and fish bones were also present. The second contained 26 fragments, mostly meat-bearing bones of cattle and sheep with 3 fish fragments.

Layer 32 results are given in Table 5. Again the majority of these were meat-bearing bones of cattle and sheep. The largest sample yet of pig bones comes from this deposit and there was one definite identification of goat. Domestic fowl, bass, pollack, and horse mackerel (represented by scales) were also present. A few small mammal fragments were identified to the vole sub-family, Microtinae, but not to species.

TABLE 5 Fragment Distribution in Layer 32 - Species & Anatomies

	cow	she	s/g	cfg	sfg	pig	unm	fow	unb	fsh	unf	total
cranial	5		15	10	15	12	40			4		101
mandible	4		20		1	3	2					30
coracoid								1				1
vertebra	13		9	10	12	5	3	1			2	55
ribs	3		1	36	80	4	7		4			135
sternum								1				1
scapula	1	1	2	2	1	4	1					12
humerus	4	1	3			1						9
radius	6	3	2	1					1			13
ulna	3		2			2		2				9
pelvis	5		7	1		2		1				16
femur			2	1		2		1				6
patella			1			1						2
tibia	1		6		2	2						11
fibula						2						2
car/tar	5		5		1	2	1					14
metapodial	4	1	12			4						21
phalanx	8		1			3			1			13
teeth	8		27			7	1					43
LBF			1	20	77		28		2			128
other				9	19		133		2		32	195
TOTALS	70	6	116	90	208	56	216	7	10	4	34	817

In addition to these there was 1 goat bone and 4 small mammal bones

key to species:
- cow cattle
- she sheep
- s/g sheep or goat (ovicaprid)
- cfg from cattle-sized mammal
- sfg from sheep-sized mammal
- unm unidentifiable mammal
- unb unidentifiable bird
- fsh fish identifiable to species
- unf unidentifiable fish

There were 36 instances of eroded bone, seventeen instances of knife and chopping marks (apart from one noted on a sheep bone, all these were on cattle), three charred or calcined bones, and three instances of bone gnawing, one probably human gnawing. In four cases bone shafts were associated with their unfused epiphyses suggesting that they had remained undisturbed since deposition.

Composite Layer 39. Results for this substantial collection are in Table 6. These show the lowest results so far for the proportion of meat-bearing bones of the body. Like the previous layer there is a higher proportion of head and foot fragments than in most Area A deposits, in this case for cattle, sheep, and pig. There were also two horse and three goat fragments in these deposits. Erosion was recorded on 45 fragments, knife cuts and chopping marks on 22 cattle bones and on red deer antler, and canid gnawing on 8 bones of various species. There was one case of associated bones belonging to a cattle ankle.

Final Limpet Deposit, 40, contained 103 bones which were mainly unidentifiable mammalian (42) and fish (34) bone fragments from sieved samples but some identifiable fragments of cattle, ovi-caprid, pig, dog, fowl, and house sparrow, Passer domesticus, were present. Two bones were recorded as eroded.

Layer Analysis of Area C

This area contained only 41 bones in total so that detailed analysis is pointless. Horse, cattle, sheep, pig, and hare (one rib of Lepus sp.) were represented. Three fragments showed an eroded surface.

TABLE 6 Fragment Distribution in Layer 39 - Species and Anatomies

	cow	goa	she	s/g	cfg	sfg	pig	dog	cer	unm	fow	dck	unb	fsh	unf	to
cranial	18	2	2	6	3	9	5		1	7				1	1	55
mandible	12			12			6									30
coracoid											2					2
vertebra	15			4	15	8	1									43
ribs	22				44	54	3			3			1			127
scapula	6	1	1	4		1	10				1					24
humerus				2			3				1	1	1			8
radius	2		1	2									1			6
ulna	8		1	2		2	2									15
pelvis	2			1			2	1								6
femur	4			2	1	1	1				1					10
patella				1												1
tibia	6			5		1	2									14
fibula							1									1
car/tar	4			3												7
metapodial	8			10			3									21
phalanx	9						3									12
teeth	13		1	15			6			1						36
LBF					26	37				2						65
other					18	18				64					21	121
TOTALS	129	3	6	69	107	131	48	1	1	77	5	1	3	1	22	609

In addition to above there are 2 horse teeth

key to species:

cow	cattle
goa	goat
she	sheep
s/g	sheep or goat (ovicaprid)
cfg	from cattle-sized mammal
sfg	from sheep-sized mammal
cer	Cervus elaphus, red deer
unm	unidentifiable mammal
unb	unidentifiable bird
fsh	fish identifiable to species
unf	unidentifiable fish

Layer Analysis of Area D

Of the 316 bones from Area D most (174) came from layer 52. Of the total D collection over one third of the bones (108) were eroded, some badly, which is a much higher proportion than for the other areas. There was also no evidence for associated bones remaining buried together. Layer 52 contained over 90% meat-bearing bones in the cattle and sheep categories, there were 31 eroded and three charred bones. Horse and dog and domestic fowl were found in Area D and some fish bone although no individual fish species could be identified.

Species and Anatomies Present

As Tables 2 to 6 inclusive show most of the identifiable bone fragments are the remains of domestic cattle and ovicaprid (sheep or goat). There are many positive identifications of sheep but very few of goat so that it can be presumed that most ovicaprid remains (and those called 'sheep-sized') are from sheep. There are very few bones of pig.

Table 7 demonstrates for the three major species the percentage of bone fragments from meat-bearing and non meat-bearing parts in the major deposits. As would be expected in deposits consisting primarily of food remains the former is high throughout, suggesting that some of the primary butchery took place elsewhere. There is, however, some variation from deposit to deposit.

Layers 12 and 52 are especially high in meat-bearing bones. These tables use figures which include the 'sheep-sized' and 'cattle-sized' categories.

The second fact demonstrated by Table 7 is the enormous variation that these fragments suggest for the specific ratios in these layers. Somewhat different ratios are given later in Table 10 where all the loose teeth and fragments assigned to size category but not to anatomical group are included. These results will be more fully

TABLE 7 Numbers of meat, non-meat bones (omitting loose teeth) in major layers for the three main domestic species. This table also gives specific percentages for these.

Pub. No.	species	no. meat bones	no. non-meat bones	total no. bones		% meat bones	specific %	
11	cattle	54	19	73		74 %	55 %	
	ovicaprid	48	8	56	132	86	43	100 %
	pig	-	3	3		-	2	
12	cattle	13	2	15		87	26	
	ovicaprid	33	2	35	58	94	60	100%
	pig	2	6	8		-	14	
16	cattle	58	7	65		89	61	
	ovicaprid	29	10	39	106	74	37	100 %
	pig	1	1	2		-	2	
36	cattle	23	7	30		77	21	
	ovicaprid	78	16	94	139	83	68	100
	pig	11	4	15		-	11	
32	cattle	107	27	134		80	29	
	ovicaprid	214	71	285	468	75	61	100
	pig	25	24	49		51	10	
39	cattle	151	54	205		74	49	
	ovicaprid	131	42	173	420	76	41	100
	pig	25	17	42		59	10	
52	cattle	28	3	31		90	55	
	ovicaprid	22	1	23	56	96	41	100
	pig	2	-	2		-	4	
TOTALS	cattle	434	119	553		78	40	
	ovicaprid	555	150	705	1,379	79	51	100
	pig	66	55	121		54	9	

discussed in the section on site economy.

The Size of the Animals

Measurements are few as much of the bone was highly fragmented, those available are given in Table 8A-D as it was felt that these details were important for this unique collection. All the measurements taken are described in Von den Driesch (1976) and the abbreviations used are hers.

The cattle sizes compare with the means and ranges for Hamwic (Saxon Southampton). They were larger than Iron Age animals, but within Romano-British and Saxon ranges, and also compare well with the Early Saxon material from West Stow (Crabtree n.d.). Comparison with material from Exeter (Maltby 1979) is interesting as bones in some cases are bigger at Bantham Ham. This is a small sample of cattle bones and measurements, however, and they may give a false idea of the range of variation which occurred in this area which could have been much wider.

Sheep measurements show a different picture. Bantham bones appear to be at the very bottom of (sometimes even below) the ranges for Saxon sheep such as those for Hamwic (Bourdillon & Coy 1980) and West Stow (Crabtree n.d.)whereas they fit well within Iron Age size ranges - such as those for Winnall Down, Hampshire (Maltby forthcoming).

This association of cattle well-built for the period with a sheep more reminiscent of Iron Age stock is interesting, especially in an area where one would expect the effects of any Roman stock improvements to have been negligible. It may however, merely be a direct reflection of the type of land used to graze the two species.

Pig measurements are few but fit the quite narrow range of size observed for both Iron Age and Saxon domestic pigs from other sites in Southern Britain. Confirmation that this is indeed a domestic

TABLE 8 Measurements of the main domestic species

A. CATTLE

		GL	Bp	SD	Bd	BT	SLC	GLP	LG	BG
B39	scapula						43.0	58.2	50.2	38.8
A4	humerus					60.2				
A12	humerus			37.2	80.2	64.4				
B32	humerus				69.0	62.4		BFp		
B32	radius		73.6					66.2		
B32	tibia			22.3		GL1	GLm	Dl		
B32	talus		41.6		39.3	59.7	53.7	32.8		
B39	talus				36.5	57.4	51.9			
D(sand)	talus					69.4		40.1		
A12	metatarsus		40.3	36.6						
B32	metatarsus				53.3					
B39	metatarsus				52.2					

B. SHEEP AND GOAT

							41 max diam	42 min diam		
B39	horn core	s					28.5	17.8		
B39	horn core	g					28.6	20.7		
			SLC	GLP	LG	BG				
B39	scapula	s			23.9					
B36	scapula	s	13.8	24.6	19.9	16.4				
			GL	Bp	SD	Bd	BT			
A16	humerus	s				24.1	23.9			
B32	humerus	s				26.5	25.3			
B36	humerus	g				29.4	28.9	BFp	BFd	
B32	radius	s		26.0						
B39	radius	s		28.0	13.6	25.2		25.8	20.8	
A11	radius	s		28.0				25.5	LO	BPC
B39	ulna	s					DD		35.8	16.3
A2	femur	s					41.6	GL1	GLm	Dl
B39	talus	s/g		17.3		16.9		25.5	24.5	14.3
B39	talus	s/g				16.0		25.2	23.4	13.6
B36	talus	s/g		18.8		17.4		25.8	24.1	14.5

NOTE : All measurements are to the nearest tenth of a millimetre and are taken according to the methods of Von den Driesch (1976).

TABLE 8 continued

C. PIG

		28 molar row	30 length M^3			
B39	maxilla	61.1	29.8			
				SLC	GLP	BG
B39	scapula			20.2	31.4	23.0
B39	scapula					23.3
B39	scapula			22.9		
B39	scapula			22.6	32.8	

D.	FOWL	GL	Lm	Bb	BF			
B39	coracoid	43.8	42.7	13.4	10.5			
B39	coracoid	54.9	52.1		12.1			
B36	coracoid			9.5				
D52	coracoid	46.5	44.4	12.0	9.6			
B28	coracoid	53.4	50.9	13.1	10.2	DiC		
B39	scapula					11.0		
		GL	Bp	SC	Bd			
B39	humerus				15.6			
B40	humerus			7.2				
B36	ulna		7.8					
						Dp	Dd	Lm
B32	femur	67.1	13.8	5.8	12.4	9.2	10.2	62.6
B39	femur	66.3	12.3			9.3		61.5
B28	tarso-metatarsus	57.4	11.0	5.1	11.0	(female)		
B28	tarso-metatarsus	56.2	11.3	5.0	10.5	(female)		

Note: All measurements are to the nearest tenth of a millimetre and are taken according to the methods of Von den Driesch (1976).

pig comes from the single third molar measurement, well within the range for domestic pigs.

Measurements for domestic fowl are included. Some of the coracoid and femur measurements are rather small and below the Hamwic and West Stow ranges. Some of these birds were just what could be termed Bantams although there were some smaller birds at Hamwic that were not represented by these particular bones. Female tarso-metatarsals, for example, at Hamwic showed a minimum Greatest Length of 49.1mm.

The Exploitation of Fish

The Tables have shown that sometimes almost half the bone fragments were from fish. These figures are not comparable from layer to layer though, as in some layers more sieved samples were analysed and these tended to produce large quantities of unidentified fish fragments. What is clear however is that fish played an important dietary rôle as did shellfish.

The species present and the approximate sizes of the individuals identified are given in Table 9. Apart from salmon which may have been caught in salt, fresh, or brackish water, all the fish here are marine and are still caught in the area today.

It is difficult to deduce what techniques of fishing were used as it would depend upon the time of the year whether it would be possible to catch these species from the shore. In the case of the horse mackerel or scad and the pollack, larger specimens do move in closer to the shore in the summer months.

The sizes given in Table 9 must be regarded as a rough guide only and are based on a few diagnostic bones such as jaws and a comparison of their size with that of specimens in the modern fish skeleton collection at the Faunal Remains Project. In many cases there are gaps in the size runs of the species concerned so that it is only possible to say that a specimen is greater than or

TABLE 9 Fish Sizes by Comparison with Modern Specimens

AREA	LAYER	NO.	SPECIES	APPROX. WT (Kg)	& LENGTH (M)
A	12	1	salmon, Salmo salar	2	0.7
A	11	5	pollack, Pollachius pollachius	> 2.7	> 0.7
A	12	1	" " "	<< 1.6	<< 0.5
A	sample area	1	" " "	<< 1.6	<< 0.5
A	12	3	" " "	< 1.6	< 0.5
A	12	1	" " "	1.6	0.5
B	32	1	" " "	1.6	0.5
B	36	1	" " "	< 1.6	< 0.5
A	11	1	cod, Gadus morhua	gutted 3	0.7
A	11	1	bass, Dicentrarchus labrax	> 0.7	> 0.4
A	12	3	" " "	0.7	0.4
B	sample area	1	" " "	0.7	0.4
B	" "	3	" " "	1.2	0.5
A	11	1	scad, Trachurus trachurus	0.3	0.3
A	11	1	" " "	>> 0.3	>> 0.3
A	12	1	" " "	0.3	0.3
A	11	1	sea bream, Sparidae	1	0.4
A	11	1	" " "	>> 1	>> 0.4
B	53	1	" " "	>> 1	>> 0.4
A	12	1	ballan wrasse, Labrus bergylta	0.6	0.3

smaller than the specimen available. The cod size estimate was taken from a dentary measurement according to the method of Wheeler and Jones (1976).

Site Economy

Table 10 gives the specific percentages for the three major domestic mammals using all the fragments, including loose teeth and sheep- and cattle-sized fragments not identifiable to anatomical element. Results for layers 11, 12, and 16 are somewhat different from those in Table 7 - this reflects the addition of material from sieving.

The order from left to right in Table 10 is in increasing order of level of eroded bones. This information and the sample size might be relevant to the specific percentages as the level of eroded bones may be an indicator of the type of deposit and the factors which may have acted since deposition and there might be a sample size below which results could be considered unreliable.

Layer 12 is obviously different from the others partly at least because of its very high proportion (43% and 40% of total fragments respectively) of unidentifiable mammal and fish fragments derived from sieving (Table 3). The extent to which the sieving has made its specific percentages a more reliable reflection of the economy of the period at that site is arguable. The volume of soil sieved compared with the whole layer is not known, neither can we know at this stage whether there was a tendency for the different species to become fragmented to the same extent.

The amount of erosion recorded is, compared with some sites, low but it may be significant that the two deposits with the most eroded bone produce higher figures for cattle at the expense of the smaller species. Similar effects have been noted at Winnall Down where in some cases erosion seems to have had a greater effect on ovicaprid remains (Maltby forthcoming).

TABLE 10 Specific Ratios for Layers in Order of Increasing Percentage of Eroded Bone

% Eroded Bone	1%	4%	7%	10%	14%	
Area	A	B	B	A	A	
Layer	12	32	39	11	16	
CATTLE %	40	29	48	63	69	
SHEEP/GOAT %	45	61	42	34	27	100%
PIG %	15	10	10	3	4	
Total no. frags.	786	817	604	683	342	

Layers 32 and 39, however, both of which from the excavation account are deemed to have been laid down quickly, show quite different results from one another. One could deduce a change between the time of deposition of 32 and that of the later layer 39 but this would be unwise without a more rigorous appraisal of the exact part played by sieving in the two layers and perhaps a more careful future study of the exact fragment and erosion qualities of all the bones.

One possible explanation for the greater representation of ovicaprid in Layer 32 is swifter deposition than in other layers where cattle dominates, as this favours better preservation and poor preservation tends, under some situations, to favour the larger bones. Another explanation for the difference between results for Layers 32 and 39 could be a seasonal one with one species being exploited more at one time of the year.

No consistent pattern therefore seems forthcoming but these results are detailed here in order to stress the importance of knowing many of the qualities of an excavated sample before any comparison of the economy represented by different deposits.

In addition to the specific percentages the age of the stock at death must be considered.

Cattle jaw remains for all sites were highly fragmented but it appeared that various age groups were represented. About half of the total ageable jaws had a Grant numerical value(n.v.) of more than 30 (Grant 1975). This means that they had the third molar in wear. Eight of these represented animals with a numerical value of 38 or more - that is cattle with the third molar in full wear and probably aged 4 years or more.

The sheep jaws were again highly fragmentary but the majority (28) had an n.v. of 30 or more - only 6 jaws definitely had an n.v. of less than 30. This could partly have a preservational explanation assuming

that the more mature mandibles are more likely to survive (Maltby n.d.). But as most of these mandibular remains come from B, which contains numerous porous and immature bones, this is unlikely to be the only explanation. Additionally, some B layers are probably primary deposits and this makes the disappearance of young bones less likely than in deposits accumulated in other ways. There is therefore probably evidence here of a bias towards older sheep suggesting that after immature deaths animals were retained for wool where possible. This compares better with the Saxon picture than that for the pre-Roman Iron Age or Romano-British deposits (Maltby 1981,175).

Nine of the 12 available pig jaws gave an n.v. of less than 20 (third molar unerupted). This is a common pattern in pig husbandry in all periods.

Conclusions

Apart from one or two bones of hare and deer, these were remains of domestic mammals and birds and they were the remains of meals, with very little evidence of primary butchery on these areas at all.

Especially where sieving was carried out there were numerous small fragments of fish bone : fish (apart from Salmon, all marine species) and shellfish obviously formed important elements in the diet. Some of the fish caught were medium sized specimens for their species and would have weighed several kilogrammes.

Both cattle and ovicaprids (mostly sheep) dominate in some deposits and it is difficult to decide to what extent one or the other formed the major food source. Cattle, being larger, must at all times have produced the most meat. Pig remains were relatively few.

Many of the cattle and sheep represented were mature with all permanent molars in wear and yet there is evidence of some very

young individuals.

Many other factors have played a rôle in the production of what is left to interpret and some attempt has been made to stress the importance to archaeological interpretation of the careful recording of, for example, bone fragmentation and condition. On some sites the incidence of gnawing on bones can have significance if it occurs as a major factor aiding the disappearance of bone. On this site, although there were a few cases of dog gnawing and evidence that dogs were kept, this does not seem to be the case.

References

Bourdillon J. & Coy J.P, (1980) 'The Animal Bones'in P. Holdsworth, 'Excavations at Melbourne Street, Southampton, 1971 - 76'. Council for British Archaeology Research Report 33. p. 79-121.

Crabtree P.J. (n.d.)'The Fauna'in S.E. West,'West Stow, Suffolk, the Anglo Saxon Village'. East Anglian Archaeology.

Grant A. (1975) Appendix B.'The Use of Tooth Wear as a Guide to the Age of Domestic Animals - a Brief Explanation ' in B. Cunliffe, 'Excavations at Portchester Castle, Volume I Roman', Society of Antiquaries. p.437-450

Jones R.T. (n.d.)'Computer Based Osteometry. Data Capture User Manual (1)'. Report to the Ancient Monuments Laboratory No. 3342.

Maltby J.M. (1979) 'The Animal Bones from Exeter 1971-1975' Exeter Archaeological Reports, Volume 2.

Maltby J.M. (1981) 'Iron Age, Romano-British and Anglo Saxon Animal Husbandry - A Review of the Faunal Evidence' in M. Jones & G. Dimbleby (eds) 'The Environment of Man: the Iron Age to the Anglo Saxon Period. BAR British Series 87. p.155-203.

Maltby J.M. (n.d.) 'The Variability of Faunal Samples and their Effects upon Ageing Data.' Sexing and Ageing Studies for Animal Bones in Archaeology ' BAR forthcoming.

Von den Driesch A. (1976) 'A Guide to the Measurement of Animal Bones from Archaeological Sites.' Peabody Museum Bulletin No. 1.

Wheeler A. and Jones A. (1976)'Report on the Fish Bones' in A. Rogerson, Excavations on Fuller's Hill, Great Yarmouth, 1974. East Anglian Archaeology Report Number 2, 208-226.