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18

FAUNAL REMAINS

Umberto Albarella, Simon J M Davis and Pippa Smith

18.1 THE MAMMAL AND BIRD BONES: A BRIEF REVISIT

by Umberto Albarella and Simon J M Davis

Large multi-period faunal assemblages from English archaeological sites dating to the last few centuries are not common. There are all sorts of reasons why this is the case. Early modern people probably used the whole animal more efficiently, and disposed of their garbage in a more effective way than their predecessors, while the vast range of buildings erected in England since the 19th century may have destroyed many such deposits. In addition, archaeologists have shown rather less interest in biological remains from 'late' levels than from earlier ones. The site of Launceston Castle, with its large assemblages of remains both medieval and post-medieval, is a notable exception. Like most sites, the majority of the animal bones, many still bearing traces of the butcher's knife, are the leftovers of meals eaten in antiquity.

The excavations uncovered a substantial collection of animal bones. Perhaps their main importance lies in the fact that they derive from both medieval and post-medieval periods. We identified and recorded over 9000 hand-recovered bones and teeth. The larger and more significant assemblages derive from Periods 6 and 8 (medieval) and Periods 9 and 10–11 (post-medieval). Not only do they help us understand something about the people who inhabited the castle through the ages, but they have provided a wealth of data which contribute towards our understanding of the development of animal husbandry in medieval and post-medieval England, a time of great economic and social change. The collection has allowed us to compare what the bones indicate with what more traditional historical sources tell us about English agriculture at this time.

The bones were studied by us in the early 1990s and are reported in detail in Albarella and Davis (1996). For more general considerations of zoo-archaeology within the context of medieval and post-medieval developments in England and how this relatively new science contributes to our understanding of economic change, the reader is referred to Grant (1988), Albarella (1997a; 2005), Davis (1997), Bond and O'Connor (1999), and Davis and Beckett (1999), for example. The following few paragraphs briefly outline some of the main observations we made at Launceston.

There is much information that can be inferred from faunal remains. Apart from identifying which species are represented, the zoo-archaeologist considers the frequencies of the species represented, their age-at-slaughter, the parts of the carcass represented, and the size and shape of the bones and teeth. In addition observations like cut marks, pathological deformations and evidence for craft are recorded. Perhaps the most interesting changes we found at Launceston include a substantial change in the frequencies of the different species in the course of time, a shift in the age-at-slaughter of the largest species, an unusually high representation of hind limbs of one of the presumably hunted animals, and a substantial increase in size of the three most common species. Most of these changes appear to be part of a pattern commonly reported on other contemporary sites in various parts of the country like Barnard Castle in county Durham (Jones *et al* 1985), Exeter in Devon (Maltby 1979), Okehampton Castle in Devon (Maltby 1982), Lincoln (O'Connor 1982; Dobney *et al* nd), London (Armitage 1984) and Prudhoe Castle in Northumberland (Davis 1987), to name just a few of the larger ones.

Like most contemporary archaeological sites, the majority of the remains belonged to sheep, cattle and

PERIOD	1	2	3	4	5	6	6	7	8	8	9	9	10+11	10+11
	n	n	n	n	n	n	%	n	n	%	n	%	n	%
Cattle	12	–	42	33	72.5	397.5	19	23	1185	30	577.5	40	690.5	43
Sheep/goat	1	–	52	23	24	427	–	4	854.5	–	409.5	28	569	36
sheep	–	–	5	1	3	61	–	–	83	–	47	–	98	–
goat	–	–	1	–	2	12	–	–	8	–	1	–	1	–
Pig	5.5	2	55.5	41.5	25.5	463.5	22	2	764.5	19	156.5	11	138	9
Fallow deer	–	–	1	–	2	64.5	3	–	324	8	45	3	33.5	2
Red deer	3	–	2	4	4.5	16	1	–	15	–	3	–	2	–
Roe deer	–	1	1	2	3	13	1	1	24.5	1	7	–	1	–
Horse	1	1	5	8	2	7	–	4	42	1	102	7	54	3
Hare	1	–	1	1	1.5	24	1	1	49.5	1	3	–	4.5	–
Rabbit	–	–	–	–	–	19	1	–	19.5	–	13	1	3	–
Dog	–	2	1	14	6	17	1	–	23	1	60	4	55	3
Fox	–	–	3	–	–	3	–	–	22	1	1	–	–	–
Cat	–	–	–	1	–	7	–	–	8	–	2	–	5.5	–
Badger	–	–	–	–	–	–	–	–	1	–	–	–	1	–
Hedgehog	–	–	–	–	–	1	–	–	1	–	–	–	–	–
Rat	–	–	–	–	–	4	–	–	1	–	2	–	1	–
Common dolphin	–	–	–	–	–	+	–	–	1	–	–	–	–	–
Whale	–	–	+	–	+	+	–	–	+	–	+	–	+	–
Chicken	–	1	4	11	21	472	23	1	497	13	40	3	39	2
Grey partridge	–	–	–	–	–	16	1	–	13	–	–	–	–	–
Quail	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Goose	–	–	1	3	2	52	3	–	77	2	12	1	2	–
Duck	–	–	–	–	–	4	–	–	5	–	1	–	–	–
Swan ?mute	–	–	–	1	–	–	–	–	–	–	–	–	–	–
Woodcock	–	–	3	2	5	19	1	–	8	–	7	–	1	–
Snipe	–	–	–	–	–	1	–	–	–	–	–	–	–	–
Curlew	–	–	–	–	–	–	–	–	–	–	1	–	–	–
?Redshank	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Lapwing	–	–	–	–	–	1	–	–	1	–	–	–	–	–
Golden/grey plover	–	–	1	2	1	8	–	–	3	–	1	–	–	–
golden plover	–	–	–	1	–	5	–	–	–	–	1	–	–	–
grey plover	–	–	–	–	–	1	–	–	–	–	–	–	–	–
Red kite	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Kestrel	–	–	–	1	–	–	–	–	–	–	–	–	–	–
Pigeon	–	–	–	–	–	4	–	–	1	–	–	–	–	–
Gannet	–	–	–	–	–	–	–	–	2	–	–	–	–	–
Grey heron	–	–	–	–	–	–	–	–	6	–	–	–	–	–
Crane	–	–	–	–	–	1	–	–	+	–	–	–	–	–
Manx shearwater	–	–	–	–	–	11	1	–	1	–	–	–	–	–
Raven	–	–	–	–	–	1	–	–	2	–	–	–	1	–
Crow/rook	–	–	–	1	–	3	–	–	5	–	–	–	–	–
Small corvid	–	–	–	–	–	4	–	–	1	–	5	–	–	–
?Shrike	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Turdid	–	–	–	–	–	2	–	–	3	–	1	–	–	–
Total	23.5	9	172.5	148.5	174.5	2060.5		36	3956.5		1448.5		1602	

FIGURE 18.1

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

pig (Figures 18.1 and 18.2). Birds, fish and deer were also common, but they declined in relative importance during Launceston's occupation from the 12th to the 19th centuries (Figure 18.3). This decline probably reflects the gradual demise of the aristocratic use of the castle and its increasing tendency (especially in Periods 10 and 11) to become merely part of the urban area and to be used as a town rubbish tip. Of the more common large mammals, cattle increased and pig declined in numbers (Figure 18.4).

The age-at-death data of the cattle remains reveal a most interesting change between Periods 8 and 9 which almost certainly reflects a shift in the way this animal was exploited (see Figure 18.5 for the dental ageing data). In medieval times over 80% of the cattle slaughtered at Launceston were adults. Presumably most

PERIOD	6	8	9	10+11
Cattle	22	55	42	52
Sheep/goat	40	104	50	57
Pig	32	62	15	11

FIGURE 18.2

Minimum Numbers of Individuals of the three main species (unsieved collection) at Launceston Castle

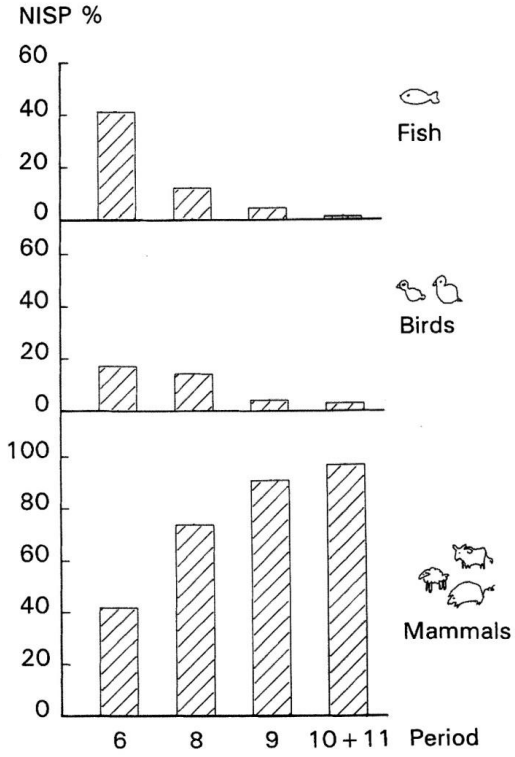

FIGURE 18.3

Percentages of the mammals, birds and fish at Launceston Castle

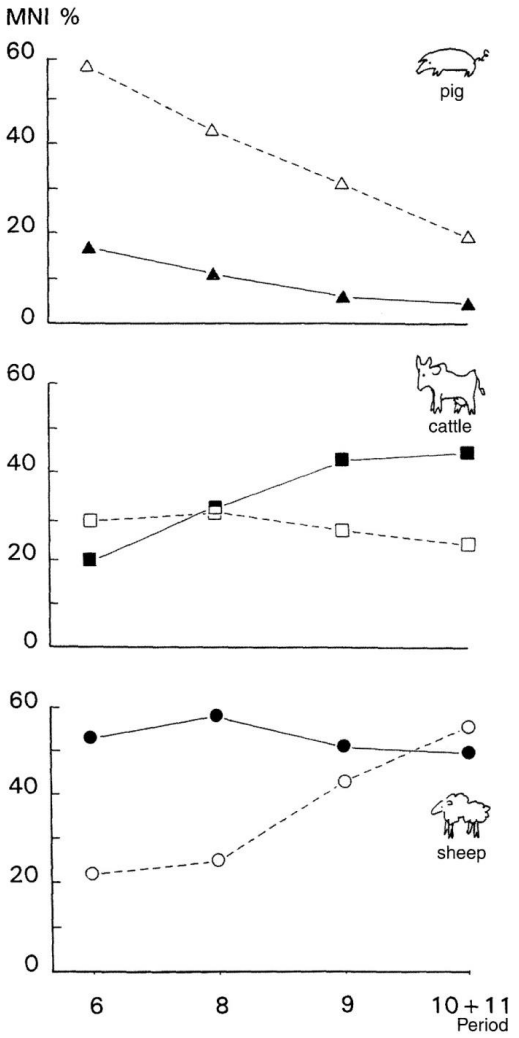

FIGURE 18.4

Percentages of the three most common animals represented at Launceston calculated from the MNI (Minimum Number of Individuals) separately for teeth (open symbols) and bones (closed symbols). Note the decrease of pig and increase of cattle in the course of time

of the beef derived from retired dairy/breeding and work animals. The situation in subsequent periods at Launceston was quite different, with many of the cattle slaughtered young, before the end of their third year of life. It seems that a shift occurred towards a more specialised kind of beef farming, most probably geared more to veal and dairy production. This seems to be part of a countrywide trend. Historians have suggested that during the 16th and 17th centuries the cow shifted from being a beast of traction to become a breeder of meat and source of milk (Trow-Smith 1957; Campbell and Overton 1992; 1993). As a consequence veal became more easily available particularly for the more affluent people. We observed no change in the ages at which sheep were culled, most were slaughtered between 2 and 6 years. On this basis we suggest the chief interest was on wool production (see also Albarella and Davis 1996), though of course mutton and perhaps milk too were considered to be important. Some goat bones and teeth were found. Most of these belonged to young kid, once a great delicacy at the high table. This animal declined in importance after

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

FIGURE 18.5

Launceston Castle. Cattle wear stages of individual teeth (following Grant 1982). Both teeth in mandibles and isolated teeth are included. Grant's stage 'U' is considered equivalent to stage 'a'. Isolated teeth which could have been in one of the eruption stages (C,V,E,H) are coded as 'a'. Note the large increase of milk teeth in the post-medieval period. Thus the ratio dP_4:P_4 in periods 6 and 8 is 12:61 while in periods 9 and 10+11 is 28:19. This suggests a very significant change in the pattern of exploitation of cattle

the 16th–17th centuries which seems to agree with contemporary writers on the subject (Muffett 1655, 64).

The diners at Launceston castle, especially during its early periods of occupation, were without doubt from the privileged classes as is indicated not only by the consumption of highly esteemed birds such as crane, swan, partridge, woodcock, plovers, etc (more common in the earlier periods) but the abundant cervid bones, especially fallow deer. The majority of the remains of this animal, as seems to be characteristic of other high-status sites, derive from hind limbs (Figure 18.6) (Jones *et al* 1985; Griffith *et al* 1983; Maltby 1982). It was apparently customary to offer the haunches of game animals to the lord of the manor.

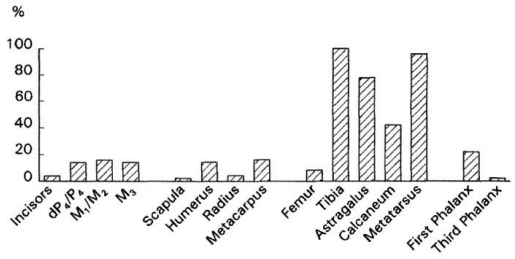

FIGURE 18.6

Fallow deer: body parts represented. The bars show the percentages of different teeth and bones of the fallow deer calculated from the MNI (Minimum Number of Individuals) for each bone for all periods. Note the preponderance of bones that derive from the hind limb

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

The osteometry of the animal bones proved to be extremely interesting. Both sheep and cattle increased markedly in size during the period Launceston was occupied: cattle appear to have done so quite rapidly between the 15th and 16th/17th centuries, sheep rather more gradually between the 15th and the 18th/19th centuries (Figure 18.7 and 18.8). These size increases have been reported from other contemporary sites in different parts of England. These include, for example, Closegate, Newcastle (Davis 1995), Prudhoe Castle (Davis 1987); Lincoln (Dobney *et al* nd); Castle

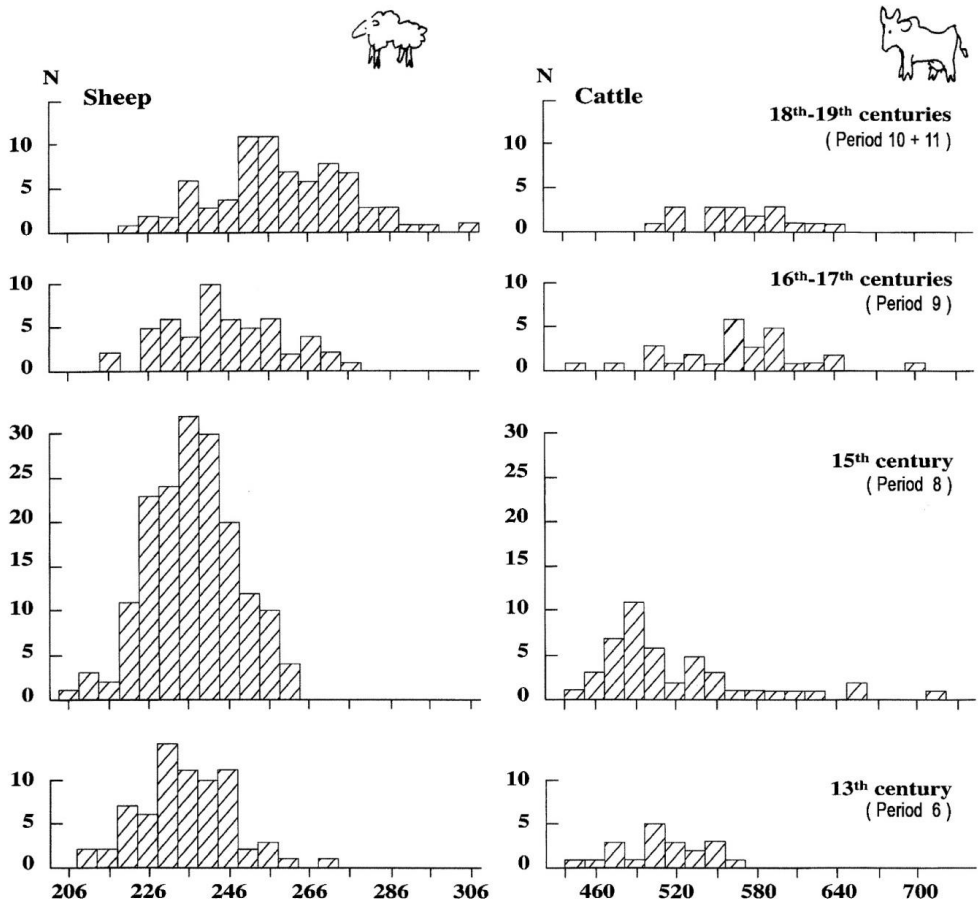

FIGURE 18.7

Sheep and cattle size increase: histograms of measurements in tenths of a millimetre of the width of the distal tibiae. Adults only (with fused epiphyses) are included. Note the size increases after Period 8

Mall, Norwich (Albarella *et al* 1997); St Frideswides, Oxford (Stallibrass 1988); Exeter (Maltby 1982), and Whitefriars, Coventry (Holmes 1981), though none can match the strength of the evidence we have obtained from Launceston. We believe these size increases signify a countrywide improvement of the nation's livestock. The pigs appear to have changed size in a somewhat complicated way, which may reflect two different factors at play. The teeth show a *decrease* in size between Periods 8 and 9 followed by an increase between Periods 9 and 10–11, while the post-cranial bones show a continuous trend towards increased size. This seems to reflect a general change in shape, possibly due to the supposed import of Chinese stock in the 18th century.

As well as increasing in size between Periods 8 and 9 (15th to 16th/17th centuries), cattle metapodials became relatively more slender at their distal ends (Figure 18.9) (see Albarella 1997b for a more detailed analysis of cattle metapodials from medieval and post-medieval England). The kind of shape difference we detected is more consistent with breed than sex variation (cf Fock 1966). Besides shape and size change, we also noted that for the cattle there occurred a decrease in the frequency of lower third molars with missing hypoconulids (the posterior pillar of this three-pillared tooth). This anomaly could be an inherited one signifying a degree of inbreeding. Its demise may therefore support the notion of a change of breeding stock at Launceston between medieval and post-medieval times. Hence, for the cattle, their altered shape, increase in size, and reduced frequency of aberrant M_3s, all reflect genetic change, most probably an improvement. Perhaps too new breeding animals were imported — a suggestion that would coincide with historical records (Trow-Smith 1957) indicating that Dutch cattle (pied milkers) were coming into the country at that time, as well as a supposed increase in the movement of breeding stock around the country.

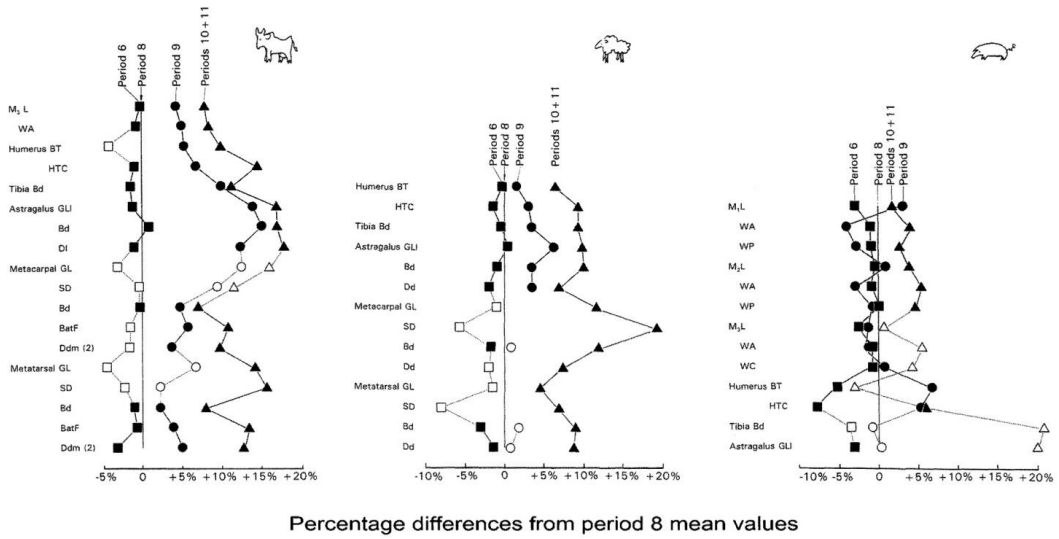

FIGURE 18.8

Size change of the three principal mammals at Launceston: cattle, sheep and pigs. Percentage differences from Period 8 mean values (the '0' vertical line) for selected tooth and bone measurements. Samples where n <10 are shown as open symbols, the abbreviations used to label measurements are as in Driesch (1976)

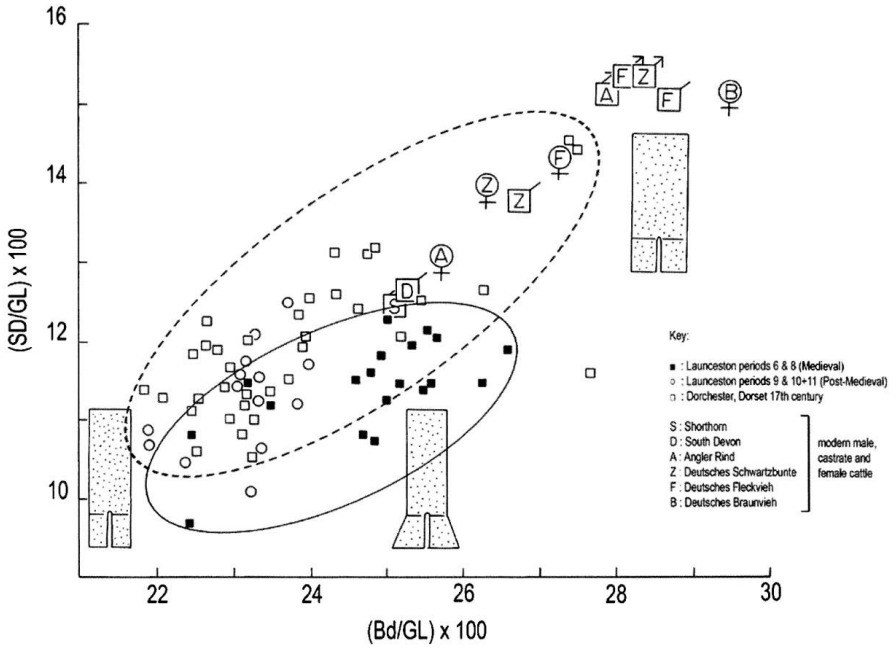

FIGURE 18.9

Variation of cattle metatarsal shape at Launceston Castle, Dorchester, and in some modern breeds. A plot of the minimum shaft width index (SD expressed as a proportion of the metatarsal length GL) against the distal width index (Bd as a proportion of GL). The data from Dorchester are from Davis (1987), and the modern data are averages of samples from Fock (1966). Note how the shape (indicated by the sketches) changed between the medieval and post-medieval periods

In recent times there has been some debate concerning the timing and tempo of agricultural improvements in medieval and post-medieval England. At one extreme the notion of a mid-18th-century Agricultural Revolution takes its origin from the influential book of Rowland Prothero (aka Lord Ernle; 1888; 1912). More recently historians have suggested that greater care and selective breeding of ruminants were underway already in the 16th and 17th centuries, quite some time before the reign of George III. This was made possible by general improvements to livestock nutrition: the introduction and spread of new fodder crops, innovations such as water meadows, and the increased use of horses for cultivation (Kerridge 1967; Dyer 1981; Langdon 1986; Campbell and Overton 1992); an early and perhaps more gradual change rather than a late and sudden revolutionary one. The size increase, we suggest, reflects increased sophistication of animal husbandry. Thus agricultural improvement in England was already under way in the 15th and 16th centuries. These zoo-archaeological findings from Launceston, with their early dates, corroborate the 'early/gradual' school of thought. In the medieval period animals were slaughtered relatively old and they were of a rather small size. In later centuries livestock was of a larger size and could be slaughtered at a younger age as the development of faster growing breeds meant that the optimum weight could be reached at an earlier stage of growth. Improvement in animal husbandry should be viewed more as a long-term and *gradual* development originating in Elizabethan times, rather than a *revolutionary* Georgian one.

The animal bones from Launceston Castle provide strong evidence of the sophistication of the diet of the occupants of the castle in the medieval period and the gradual decline in status of the site that occurred in post-medieval times. This zoo-archaeological study is also indicative of the vitality of agricultural practices in 16th- and 17th-century England, as reflected in improvement of livestock and changes in husbandry strategies.

18.2 THE FISH BONES

by Pippa Smith

Some 6861 fish bones were recovered from excavations and studied in 1995 at the Faunal Remains Unit, University of Southampton (Smith 1995). Of these, 4801 were recovered from sieved soil samples and the remaining 2059 from hand collection.

The bones came from deposits ranging from the late 11th to the 18th centuries (Periods 1 to 10), with only a single bone recovered from Period 11. The majority of the bones, however, came from just two horizons: the later-13th-century deposits, mainly in the south bailey area (Period 6), and 15th-century refuse from a pit in the North Gatehouse (Period 8).

No details of the sieving procedures were available and it is possible that differences in procedure mask some patterning in the data. Nevertheless, there is some measure of agreement between the sieved and hand-recorded data. In total, 31 species of fish were identified within the collection, although only a handful of these were numerically important; hake (*Merluccius merluccius*) was by far the most common. Of those bones recovered from sieving, 81% were unidentifiable, 11% were from hake, 3% from whiting, 2% from conger eel and 1% from cod. The remaining 28 species accounted for 3% of the total bones.

For the hand-recovered bones a much lower proportion could not be identified (only 10%). Although hake bones still outnumbered the remainder (61% of all hand-recovered bones) the rank order of the remaining species differs, indicating the bias of hand recovery towards the larger-boned species. Thus, whiting, which is the second most common species in sieved assemblages, is the 8th most common in the hand collection. Seven species were only recovered from sieved assemblages: herring, wrasse, eel, scad, haddock, bass and mackerel, while five were only found in hand-recovered assemblages: Couch's sea bream, halibut, red sea bream, mullet and plaice.

To obtain some indication of the place taken by fish in the diet, the number of fish, bird and mammal bones from different periods was compared. This showed a decline in the proportion of fish in Periods 9 and 10. This decline was noted by Albarella and Davis (1996, 34; and above, Figure 18.3), who suggest that it reflects the demise in the aristocratic use of the castle and the reliance in Periods 9 and 10 upon the same sources of supply as the rest of the town.

Because of the small size of the collections from individual periods only the assemblages from Periods 6 and 8 could be compared. The same range of species occurred in both periods with hake, cod, conger and whiting predominating. There is little evidence for any significant change in the species exploited. A study of the skeletal elements present indicates a probable deficit in the number of bones from the neurocranial region and the junction between the head and the neck. This lack is seen in both periods. Some of these underrepresented bones are diagnostic to species, and so it is unlikely that this pattern is due to methodology. A small number of bones in each period showed signs of butchery.

The size of the hake from Launceston Castle was studied using a sample of 20 modern hake to gauge the relationship of specific vertebral measurements to total length. Using these data to estimate the size of the archaeological specimens showed that the smallest total length was 371mm and the greatest was 1207mm. There is a concentration, however, between 800mm and 1000mm from all measured elements except the dentary. This suggests that some size selection took place. Measurements of the precaudal vertebrae were

studied to see if it was possible to tell if the entire vertebral column was present. Because the shape of the hake vertebrae vary along the length of the column, it was possible to demonstrate a lack of bones from the area closest to the head. Taken with the lack of head bones from the back of the head this suggests that there is a real absence of part of the fish skeleton.

There were insufficient bones from other species to repeat this analysis although the range of measurements from all species is limited, suggesting that in these species too there was some size selection.

Discussion

Processing techniques

The presence of head bones, pre-caudal and caudal vertebrae of hake indicate that the fish were brought to the site whole. Despite this, the under-representation of the back of the head and those parts of the body closest to it suggest that some processing took place, although it is possible that this pattern can be explained in terms of differential survival, recovery or identification. This is thought to be unlikely, however, and the cleithrum, for example, is a robust, easily identified bone which is certainly lacking.

Since both head and vertebrae from the hake are found, the logical conclusion must be that the fish were brought to the site fresh. However, there is a method of preservation carried out in Holland since the 14th century which may explain the Launceston pattern: 'The fish is cut behind the gills and by a twist of the knife, the gills and stomach are removed, leaving the intestines behind to improve the taste ... The herring is immediately salted down in barrels' (Seeman 1986). If a similar technique had been used in Cornwall it would explain the deficiency in certain elements and would mean that the hake may well have arrived on site preserved, whether by smoking, salting, drying or pickling.

Documentary sources indicate that, inland, fresh fish was considered a luxury and cost substantially more than preserved fish (Cutting 1955). Since the majority of bones come from Periods 6 and 8, which other evidence confirms were times of high-status consumption on the site, this might argue against the fish being brought in ready-preserved, but if preservation took place on site, these missing bones might be expected to have been found somewhere in the excavations, especially since the south bailey excavations include a kitchen and midden levels associated with it.

A reference in the late 16th century in the expense accounts of the judges of assize to 'stock fish' may well refer to hake, since cod, the other likely candidate, is also named in this record (Cooper 1859, 21–39). The term 'stock fish' originally came from the *stocken*, sticks or poles upon which the fish were suspended to dry. If the hake were dried on poles passed between the opercular series this too might lead to the loss of the caudal portion of the skull and the nearby vertebrae. Although found in lower numbers, the cod and whiting bones from Launceston show a similar pattern, and these too may have come to the site in a dried or otherwise preserved state. The conger eel bones, however, suggest that the fish were split longitudinally, as was the case on the *Mary Rose* (Hamilton-Dyer 1995).

Source of the fish

The emphasis on hake and the presence of breams and mullets reflects the exploitation of local fishing grounds rather than the international trade which came through the larger ports such as Exeter. There is certainly no mention of hake in the local customs accounts of the port of Exeter (Kowaleski 1993). The likelihood is that the hake, and most of the other fish, were landed at one or more of the smaller south-western fishing ports, although in the absence of documentary evidence it is impossible to identify them.

There is no evidence for any change in source through time, although this conclusion has to be based mainly on the assemblages from Periods 6 and 8, but, as noted above, there is a decline in the quantity of fish in the later Periods (9 and 10), which may indicate that by the later 16th century the inhabitants of the castle relied more on local sources of protein rather than importing fish from the coast, at least 14 miles distant.

Conclusion

A local fishery has been identified with fish caught off the Cornish coast, processed and brought to Launceston. The pattern of exploitation remained constant from the later 13th to the 15th centuries, suggesting that the source of this trade remained the same. The high status of the site is in fact only represented by the presence of a few rarities, such as a large flatfish. The evidence suggests that most of the fish came to the site preserved, although the exact method of preservation is not known. This may suggest that fish formed part of the staple diet of the castle's inhabitants, while high-status dishes were mainly meat.