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ANIMAL HUSBANDRY AND FAUNAL EXPLOITATION IN HAMPSHIRE

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One feature of Hampshire archaeology is the scarcity of published bone samples compared with the large number of excavated sites. Animal bone studied during 1976-9 probably exceeds that studied by all workers up to that date.

Hampshire Bones - the Available Material

We must depend upon surrounding counties for a picture of animal husbandry and faunal exploitation in the Neolithic and Bronze Age (Shackley this volume). For the Iron Age the wealth of studied Hampshire bone includes large samples from Balksbury, Danebury and the Andover sites of Old Down Farm and Portway. Winklebury (Jones 1977a) was the first site dug by the Central Excavations Unit and to have its bones computer recorded using the Department of the Environment's coding schemes (Jefferies 1977; Jones 1977b). The work of Harcourt on Wessex Iron Age bones forms a basis for much of this account and I am grateful to him for permission to use his unpublished material.

Roman and Romano-British bone is gradually producing data, partly from the sites already mentioned, partly as in all periods from the accumulated results of many small excavations, and finally from urban centres, especially Winchester. The analysis of Owslebury bones will shortly take place and provide a useful overlapping sample. Roman Portchester (Grant 1975) represents a large and important collection.

Saxon bones from Portchester (Grant 1976) together with the considerable work at 'Hamwih', Saxon Southampton, provide a picture of these two distinctive settlements in at least Middle Saxon times. Melbourne Street (Bourdillon & Coy 1979) produced a core of data, including measurements, against which not only other Saxon bones but other Hampshire bones since analysed can be assessed.

Published later medieval material includes that from Portchester (Grant 1977) and a small amount from Southampton (Noddle 1975; Clutton-Brock 1975; Bourdillon 1979). Subsequent medieval material is largely from urban deposits ranging from multiperiod samples from Winchester Research Unit and Winchester City Rescue (large in bulk but usually inadequate when subdivided into phases, species, and material to answer specific questions); the increasing samples from Southampton with fewer problems of residuality; and interesting glimpses into the past of smaller places like Alton, Christchurch and Romsey. The level to which animal bones can be used for interpretation of the historic periods is well illustrated by the analysis of animal bone from Exeter (Maltby 1979).

Post-medieval material from well-dated contexts is essential to investigate the far-reaching but poorly documented alterations in conformation and maturation of our domestic stock which occurred in these centuries. Today's breeders are resorting to 'rare breeds' in an attempt to recover some of the genes that were lost from the main breeding stocks (Alderson 1978). A way in which archaeology can aid this is to pinpoint anatomical changes and demonstrate trends that may then tie up with documentation.

Bone studies in Hampshire have recently boomed but there is still a long way to go. The next few years should see the publication of a large corpus of important work. Computerisation can aid not only recording but comparisons of sites. It is already used to some extent by ourselves at the Faunal Remains Project (FRP), by Winchester Research Unit, by Southampton Archaeological Research Committee, and for Danebury. We now need to think most carefully what further samples are needed . My own opinion is that well-stratified bones from rescue excavations must be kept in the largest possible numbers and computer-recorded. At present we do not know enough to decide whether we can afford to discard anything.

The Domestic Animals

Bone evidence suggests that cattle has provided the major meat source in all periods of Hampshire's history since the Iron Age but not necessarily for all classes of people. Evidence of wild cattle, *Bos primigenius*, from archaeological sites in Wessex is mostly from Wiltshire and Dorset. The survival of the wild species alongside the smaller domestic forms is detailed for Fussell's Lodge and Windmill Hill by Grigson (1966, 63; 1965, 145); and Jewell shows that, at Snail Down Wiltshire at least, this was still so until the late Bronze Age (Jewell 1962,164). By the Iron Age the occasional large cattle bone, such as a metacarpal which appeared at Hamwih, are probably from extra large domestic beasts, perhaps castrates (Bourdillon & Coy 1979,).

Middle and late Iron Age cattle are well-represented but changes and variation within the Iron Age cannot yet be detailed nor size increases or perhaps increases in variation which occurred at the end of it (Grant 1977, 228). Harcourt's picture of the Gussage cattle as small and lightly-built with withers' heights of 100-113cm (Harcourt 1975a) is typical of the results we also obtain for Hampshire. Withers' heights are a useful concept especially alongside estimations of meat weight (Driesch & Boessneck 1974). Dorset and Wiltshire cattle are mostly small- or short-horned using the criteria of Armitage and Clutton Brock (1976, 331) but occasionally hornless. Hampshire cattle are similar in conformation and anatomy on sites studied so far although these are mostly chalkland sites.

It will be interesting to undertake detailed cattle studies once current sites are worked. Size changes can be the result of so many factors that a very large sample is necessary to separate, for example, local trends from regional and national trends. Kolb (1978) has shown the complexity of the interpretation of size in foxes. This complexity in studying a modern wild species with an accessible population suggests how difficult it will be to interpret size variations for archaeological domestic species where we only have the biased samples left to us by time. But general ecological principles must not be ignored. Fox sizes appear to be linked with night length, longer nights mean more mice and thus larger foxes, and not with climate, success of prey, or productivity of the area. There may be consistent factors acting on Iron Age cattle which are not necessarily anthropogenic. The theory that in the Iron Age numbers of cattle were more significant than size surely gives us the result rather than the reason. Their overall uniformity suggests a cattle type closely adapted to its way of life.

To any future investigation of overall size change we should add a study of changes in proportions, something which might better indicate selection trends, especially those brought about by man.

Although the genetic potential for all the variation in Hampshire's cattle was probably available in the native wild aurochs it is a difficult matter to prove local domestication and there is no practical reason why successive waves of immigrants to Hampshire could not have introduced their own cattle. How far-reaching such introduced genes would be is a matter for speculation. Post Iron Age higher maxima in measurement ranges may be a result of more human intervention in stock affairs and really large samples will be needed to show up multiple origins for any of these populations. It may be only by careful comparison with continental material (such as the close cooperation now between workers at 'Hamwih' and Dorstatt, Holland) that we shall be able to form opinions on this.

Saxon cattle go larger than Iron Age ones and are well-built. 'Hamwih' withers' heights range from 102 to 138cm (Bourdillon & Coy 1979, Statistical Appendix). Grant's work shows Roman and Saxon cattle at Portchester (Grant 1976, 281) to be similar in size with a smaller variation in size in the latter. Cattle build later diminishes but there are fluctuations within the medieval period which only larger samples, especially of early and late Saxon material can illuminate. Well-dated post-medieval material is rare. Metapodial measurements on cattle over the whole area should help to pinpoint cattle usage for draught : it is difficult to interpret this for individual specimens.

Horse was commonly eaten in the Iron Age and at Gussage was the second major meat source (Harcourt 1975a). It was butchered in the same way as cattle. Iron Age horses were slightly bigger than the cattle in terms of meat and withers' heights range from 102 to 145cm (10-14 hands) at Gussage. Our own results from Hampshire have so far fitted within these limits. Harcourt's theory of feral horses with annual round-up for selection of mature animals for use (Harcourt in preparation) is an interesting one although bones of immature horses have recently been found both at Old Down Farm and Chilbolton Down (Maltby 1978).

Earlier horse material is rare and regarded as wild in bone reports (Harcourt 1971, 350). Medieval horses are little studied as yet. 'Hamwih' produces scarcely any horse bone (Bourdillon and Coy 1979,); what there is represents again nothing more than a large pony but a sturdy one and quite adequate for most functions.

Rural Saxon sites like Ramsbury in Wiltshire (Coy 1977) produce a greater proportion of horse bone. In later medieval times donkey is occasionally found both on urban and rural sites but distinction of the two species except by teeth is difficult.

Ovicaprids (goat and sheep) and pig were the other main meat sources. In amounts of meat provided sheep were often second to cattle but the relative rôles of pig and ovicaprids fluctuate. Archaeological context is basic to any consideration of these relative rôles. An extreme example is the supposedly ritual context at Durrington Walls, Wiltshire (Harcourt 1971, 349) with its high proportion of pig. Grant (1977,214) makes interesting comments on relative rôles of sheep and pig at medieval Portchester. There is little future in drawing up tables of specific ratios for different sites and different periods as detailed analysis of individual context types will be far more rewarding. One major limitation in the use of past bone reports is their lack of information on exact archaeological context.

Methods of specific comparison are themselves under constant review and specific ratios should clearly state methods. Differential preservation for 'Hamwih' is discussed by Bourdillon (in press) who suggests that even with excellent preservation of bone in pits and little evidence of redistribution of meat only a very small proportion of bone survives. The calculation of minimum numbers of individuals becomes in this light a suspect practice.

Sheep and goat can be distinguished providing bones are sufficiently whole although criteria vary from site to site and it is conceivable that the ease of separation itself may be an important indicator linked to plane of nutrition and intensity of selection. Sixteenth century sheep present problems highlighted by the Christchurch material (Coy 1980,   ) which suggest that medieval 'goat' in bone reports could sometimes be sheep. Unmistakeable are the large male goat horn cores which are common on Hampshire urban sites and were probably imported for hornworking. Goats have been found now for the Hampshire Iron Age at Balksbury and Old Down Farm, Andover, but they were probably not used in Iron Age Wessex to the degree suggested by a recent BBC series. Goat played a minor rôle in the 'Hamwih' economy. In some later medieval contexts the expected fluctuations in the importance of sheep are distinguishable although on urban sites we must ensure that we are asking questions that relate to the type of context under examination.

Pigs had an important rôle in some Hampshire sites. By the Iron Age bone is from domestic pigs. The wild boar, Sus scrofa, occurs at many earlier Wessex sites and can be distinguished by its greater size especially in the third molars. Southampton Saxon pigs have an upper size limit somewhat higher than Wessex Iron Age pigs with withers' heights of 50-70cm compared with 50-60cm. At Melbourne Street, 'Hamwih', there was one large pig femur which could have been from a wild individual but otherwise pigs were obviously domestic with ranges for third lower molar length of 25-34mm compared with figures of 45-50mm for German archaeological Sus scrofa (Luhmann 1965, 21). Such pigs were eaten young. At 'Hamwih' 39% of pig jaws had not yet acquired third molars. In 18th century pigs this represented an age of less than 3 years (Silver 1963,265). Grant suggests that at Portchester Castle in all periods pigs were eaten in their second or third year (Grant 1977, 231). At Christchurch the only pig bones found in any quantity were in the medieval priory (Coy 1980,).

There is a reappearance of pig more like Sus scrofa in some better class medieval deposits with occasional heavy and well-sculptured bones, such as a humerus in a late 13th to early 14th century pit in Romsey, found along with such delicacies as calf head, fallow deer, fowl, oysters, and the remains of a 3kg cod (Coy 1975). Bones can be important indicators of social class and as such are used by Platt (1972,33) for Southampton.

Pig bones show a completely different fragmentation pattern from those of cattle and sheep and usually end up more on the periphery of sites. At R 27, M 3 motorway, this showed in a detailed computer-based analysis on the fragments which attempted to sort out the underlying patterns of bone deposition and survival as a preliminary to investigating real differences between different sites in their patterns of stock utilisation - or between different parts of the same site (Griffith 1978; Coy 1978a). The methods used there have been extended to all work computer coded by the FRP. The great attraction of pork bones for many carnivores has been appreciated since medieval times and may partly explain the peripheral effect.

Another domestic food source in Hampshire is the dog itself, eaten in the Iron Age as butchery marks demonstrate. Like most domestic animals dogs were often skinned, at least in the Iron Age. The dog varieties found in Hampshire generally fit the picture drawn by Harcourt (1974) with considerable variability by Roman times (Harcourt 1975b, 406)

Fowl, geese and ducks occur on Hampshire sites from the Iron Age onwards. We can assume that the fowl were domestic provided their bones are carefully distinguished from those of the native blackcock Lyrurus tetrix which, according to Gilbert White was seen on a beagling trip in the 18th century and according to Nicholson survived in the New Forest into the 20th century (Nicholson 1929, 57 & 93). One bone of this species was found in Melbourne Street material after it had gone to press. By Saxon times fowl are of great variety and include bantams and capons (Bourdillon & Coy 1979,).

Early domestic geese are as yet indistinguishable in their bones from their supposed ancestor the grey lag goose Anser anser. The 'Hamwih' birds have a wider distal tibiotarsus (the higher of the goose's two ankles) than the wide range of wild specimens measured by Bacher (1967 , 71) presumably because of greater weight in domestic birds. But the sample of each anatomical element is small and interesting theories following the examination of wing dimensions cannot be followed up until we have much larger samples. Southampton is not a greylag area and this and the adamance with which wildfowlers like Colonel Peter Hawker (1830,200) stress the superiority in taste of almost any other goose to the wild greylag suggest that the 'Hamwih' geese were domestic to some extent. Goose bones are common finds on all the Hampshire medieval sites studied so far. In addition to eggs from all three domestic species down would be a valuable product of goose culture and their watchdog qualities must not be overlooked.

The distinction of domestic duck from its presumed ancestor the mallard Anas platyrhynchos is also difficult until obvious domestic ducks are found in the later medieval period. Similarly bones of domestic pigeon bear a resemblance not only to those of the ancestral rock dove Columba livia but also to those of the related stock dove Columba oenas. Pigeon and squab bones are sometimes found in medieval collections.

Animal Husbandry and Usage

Inspite of the problems in the derivation of specific ratios some assessment of the relative rôles of the domestic species is of great historical and archaeological importance. In documented times the extent of documentation is never sufficient to tell us what we want to know and bones are often the only way of ascertaining diets and investigating stock usage and trade.

Tooth wear analysis is one way of attempting to reconstruct kill patterns and seems superior to epiphysis fusion analysis or at least to give quite different results (Bourdillon in press). Grant (1975,

437) and Payne (1973) have devised methods for tabulating detailed tooth wear . Both methods are easy subjects for adaptation to tooth by tooth computer recording and such details are included in our own and Winchester Research Unit's computer codings. Such detailed analysis by itself may help to pinpoint differences in animal populations in time and area and finally enable us to tie up town with countryside if we can obtain enough rural medieval samples. There is much more visible variation in a jaw containing teeth than in a long bone.

Once again large samples are essential if we are to work out kill patterns. A glut of immature sheep may only indicate wet years and consequent high parasite kill. Theoretical models, eg for milk, meat, or wool economies, have the grave limitation also that where the people may have been striving for a mixture of these we cannot predict the relative importance of each strategy in the minds of the people.

Models for the Iron Age that we have investigated seem too specialised in concept for what we actually see in Hampshire. Results from R 27, a banjo site on M 3 motorway, suggest that all the major domestic species were kept (Griffith 1978 and Table 1). Griffith also attempted to fit the R 27 results into the models for usage suggested by Payne (1973,) but samples were very small and recent collation of a wider series of results for the Iron Age in Hampshire and elsewhere by Maltby suggests that sheep more closely mirror feral populations such as those on St Kilda (Jewell et al 1974,). How one distinguishes between a natural and an artificial cull is a mystery although man may presumably select an animal for culling some time before it succumbs to winter or want and very detailed tooth wear work may eventually enable us to say exactly at what time of the year animals died.

Species found at R27 Table 1

An Iron Age 'Banjo' Enclosure, M 3 Rescue Committee

domestic species		no. fragments
horse		
* cattle		
* sheep		
goat		
* pig		
dog		
domestic fowl		

wild species - probably exploited

red deer	Cervus elaphus
badger	Meles meles
fox	Vulpes vulpes
hare	Lepus sp
duck	cf Anas platyrhynchos
woodcock	Scolopax rusticola

also found

common shrew	Sorex araneus
stoat	Mustela erminea
woodmouse	Apodemus sp
water vole	Arvicola terrestris
vole	Microtus sp
common toad	Bufo bufo

* butchery evidence for eating on at least one occasion

Skeletons of whole sheep found in Iron Age pits and ditches are sometimes butchered. One such animal was found in the boundary ditch at Old Down Farm. This site benefited from very careful collection of the bone by those involved in the excavation. This enabled articulating bones to be identified and butchery marks, often only present as fine cuts, to be examined in detail (Foot 1978).

Marks on bones occur as a result of a succession of processes: killing, carcase preparation, jointing, preparation for the table, carving, and individual treatment during eating. No methods in use in Britain for computer recording of these marks yet seems really satisfactory and methods will need further evolution if we are to make detailed comparisons between sites and periods perhaps using some of the ideas of Biddick and Tomenchuk (1975). Everyone is now too busy balancing the economics of computerisation and even of bone studies themselves and really detailed analysis which will answer these questions is not an economic proposition. Bird bones often bear fine scratches and cuts only visible under a lens and searching for these is a lengthy and tedious process.

The position of such marks on the Melbourne Street fowl bones suggested that meat may have been removed from the long bones with a sharp knife in a deliberate manner, scraping or cutting muscle chunks at their insertion or origin. Such theories, like those relating to bone objects, can only be tested by experiment.

Medieval bone studies must obviously be linked with work on documentation. Not only can one support the other but the discrepancies between the two are often of great significance and can tell us more about the nature of differential preservation. This point has been dealt with in detail for Winchester botanical remains by Green (1979,). Computerisation of large quantities of documentary clues as described by Biddick (in press) for the Peterborough manors may be one way of accumulating relevant information for the study of animal husbandry.

Wild Fauna

Red deer Cervus elaphus was the most consistently exploited wild mammal on most Neolithic, Bronze Age, and Iron Age sites. Harcourt argues for Gussage-All-Saints, Dorset, that the contribution of hunting could have been greater than the bones indicate if on-the-spot butchery was practised (Harcourt 1975a). Red deer played only a minor rôle in Hampshire unless such a practice took place but tender cuts of red deer calf may not leave any recognizable bone and small pieces of bone from the meat-bearing parts like ribs, pelvis, vertebrae and scapula may not always be distinguishable from those of cattle.

Similarly Melbourne Street's 80,000 fragments produced only 12 postcranial bones of red deer. Distinction of red and fallow deer Dama dama is possible for some bones (Bosold 1966) given a supporting modern collection. Absence of fallow in the large Saxon collections from Southampton fits currently accepted theories (Corbet 1974) that fallow was introduced, or reintroduced, to Britain after the Norman invasion. Red/fallow distinctions are complicated by the remarkable similarity of antler coronets in the two species and the enormous variation in both species which causes an overlap in size and large discrepancies between modern and archaeological material.

This problem area highlights a major difficulty in archaeozoological work - for detailed anatomical studies it is necessary to have just the right modern comparative material not merely any specimen of the species involved (Coy 1978b).

Fallow plays a significant part in the diet of some classes of later medieval society all over Hampshire. Roe deer Capreolus capreolus is present in Neolithic, Bronze Age, and Iron Age sites in Wessex in small amounts. Only 7 roe deer fragments were found at Melbourne Street but contemporary Saxon material in Wiltshire at Ramsbury (Coy 1977) in a more rural setting demonstrated some exploitation of young roe.

Wild horses, cattle, and pigs have been discussed above. Other wild species exploited in all periods are those important for furs, with changes in emphasis from period to period. The fate of the brown bear Ursus arctos in Hampshire is unknown. There is, however, a Neolithic record for Ratfyn in Wiltshire (Stone 1935, 61). Beaver is recorded for the Neolithic at Durrington Walls, Wiltshire (Harcourt 1971, 345) and beaver remains were found in a mid-Saxon context at Ramsbury, Wiltshire (Coy 1977). The species may even have survived into medieval times in particular areas like the Somerset levels (Darvill & Coy in press) but this is less likely for Hampshire.

The commoner remains of badger (Meles meles), fox (Vulpes vulpes) pine marten (Martes martes), stoat (Mustela erminea) and weasel (Mustela nivalis) are occasional finds. Evidence from bones of skinning is sometimes recognizable but not always sought neither do we know how often such species were eaten, eg as badger hams. Some of them may have been killed for their predatory activities rather than primarily for skins. Most of them are easy to catch and are usually hard hit if man has a reason for catching them. The evidence for wolf (Canis lupus), wildcat (Felis sylvestris), and polecat (Mustela putorius putorius) is complicated by the possibility of bones of related domestic species; respectively the dog, cat, and ferret. Wolf bones were found from early excavations at Balksbury (Harcourt 1969, 54) and suspected by Grant (1977, 232) at medieval Portchester, and a possible wildcat bone from pre-barrow levels of R 4 on the M 3 excavations (Fasham 1979, 11).

Cat carcases found in Roman Portchester (Grant 1975, 384) are assumed to be domestic as were the earlier kitten remains from the middle period of the Iron Age settlement at Gussage, Dorset (Harcourt 1975a). The few remains of Saxon cats at Hamwih have some anatomical features in common with the wildcat Felis sylvestris and differences from later medieval cats which would repay further study. Noddle suggests that cat remains in medieval Southampton may be evidence for the use of cat skins (Noddle 1975, 333).

Hares and rabbits as well as having excellent fur are important meat sources and significant factors in the lives of certain people at certain periods. Old bone reports do not distinguish between the different species of hare: the varying hare Lepus timidus and the brown hare Lepus capensis. Prehistoric material probably represents the smaller timidus eg that at Windmill Hill, Wiltshire (Jope 1965,143).

The negative evidence for rabbit Oryctolagus cuniculus from Melbourne Street (Bourdillon & Coy 1979 ,) which seemed to confirm the currently accepted zoological theory that rabbits were introduced, or reintroduced, to Britain after the Norman invasion was shattered by the find of a partial scapula, in a reliably-dated Saxon layer, which resembles rabbit in both dimensions and anatomy. With 'Hamwih's' extensive trade this is insufficient evidence to postulate breeding populations of rabbits in the surrounding Hampshire countryside. Southampton provides evidence of post-1250 fallow deer, rabbit, and ferret, all three species important to the Norman way of life both in terms of food and sport (Noddle 1975; Bourdillon 1979).

Small mammal records for sites are suspect unless it is clearly stated exactly how they were retrieved. There are authentic records of well-stratified small mammals and amphibians, some of them from the bottom of deep storage pits. Apart from an absence of records for squirrels, dormice, and harvest mice the species found are those common today and the only ones worthy of mention are the house mouse, Mus musculus, and woodmice, Apodemus sp. These species could eat or contaminate large quantities of stored food. The former is known from a number of Hampshire Iron Age sites since Harcourt drew attention to it at Gussage (Harcourt 1975a) and here from at least the middle Iron Age. There is a lack of evidence for the theory that the water vole Arvicola terrestris has changed its habits and was more common near human habitation in the past (Jewell 1958,278). Water vole bones are found on chalk sites in Hampshire but the animals are still found there today. One died by falling into the excavations at Old Down Farm, Andover, and, as if to prove the point that people do not recognise them, it was brought to us as a rat.

Rats themselves are difficult species to distinguish and the introduction dates of the black or ship's rat Rattus rattus and the brown or sewer rat Rattus norvegicus are still unknown although the current theories are that the former came in after the crusades and the latter early in the 18th century. As with work on the rabbit the commonest problem is the possibility that the animal has burrowed into the level in which it is found. Evidence so far in Hampshire fits the current theories (Corbet 1974) although some of the rat material from Southampton is very early (Bourdillon 1979,).

Wild birds, fish and shellfish have been given much attention by the FRP as these important remains are usually neglected in favour of the more easily identified common mammals. A study of shellfish remains from Melbourne Street, Southampton (Winder 1979) showed the potential of oyster studies although only by accumulating data shall we be able to answer the ultimate questions such as the source of oysters.

Fish remains are rarely retrieved on prehistoric sites in Hampshire. There is more evidence from Roman, Saxon and later medieval urban deposits. Saxon fishing at 'Hamwih' largely exploited eel Anguilla anguilla and flatfish (Bourdillon & Coy 1979,) although more intensive sieving since by Sheila Hamilton-Dyer suggests a greater variety than previously supposed in each context and has given a better picture of the importance of eels. Later medieval deposits at Southampton, Christchurch, Alton, and Winchester show considerable exploitation of really big fish such as cod (Gadus morhua), ling (Molva molva) and conger eel (Conger conger).These were transported considerabl distances inland. Table 2 gives a fish list for 'Hamwih'.

There is surprisingly little evidence for wildfowl exploitation and most bird collections from the Iron Age onwards consist of fowl, goose and the occasional duck. There are occasional predatory and scavenging birds and birds that occur in surrounding habitats today (see Table 2 for a list for 'Hamwih' and Table 1 for R 27). Bird butchery results are sometimes surprising. Whereas Eastham (1975, 412) considers the great northern diver inedible those at Hamwih may not have agreed (Table 2). The taste of some wild species varies according to their recent diet and habitat and also according to the method of cooking as explained by Colonel Peter Hawker in his instructions on the preparation of coots for the table (Hawker 1830, 184).

The bird reports for Portchester (Eastham 1975, 1976 & 1977) and bird and fish reports for medieval Southampton (Bramwell 1975; Wheeler 1975) have opened a period of serious study of such material in Hampshire.

Animal Bones and Excavation

Although species lists and exotic finds still form the immediate contact between archaeozoologists and archaeologists in Hampshire and never-failing sources of interest for the public there are many other

Species Present at 'Hamwih' Table 2

Melbourne Street Excavations, Southampton Archaeological Research Cttee

domestic species		no. fragments
✱ horse		49
✱ cattle		23,896
✱ sheep		14,476
✱ goat		130
✱ pig		6,953
dog		23
cat		144
✱ domestic fowl		800
✱ domestic goose		353
probably exploited		
✱ red deer	Cervus elaphus	12(+antler)
✱ roe deer	Capreolus capreolus	8
wild boar ?	Sus scrofa	1
whale		5
✱ great northern diver	Gavia immer	2
✱ duck	Anas cf platyrhynchos	15
duck	Anas cf penelope	3
teal	Anas crecca	1
common buzzard	Buteo buteo	1
woodcock	Scolopax rusticola	2
great black backed gull	Larus marinus	1
herring/lesser black-backed gull	Larus argentatus/fuscus	5
✱ crow	Corvus corone sp	7
jackdaw	Corvus monedula	1
✱ songthrush	Turdus philomelos	1
redwing	Turdus iliacus	2
starling	Sturnus vulgaris	4
small passerines		2
thornback ray	Raja clavata	7
sting ray	Dasyatis pastinaca	1
elasmobranch vertebrae		2
herring	Clupea harengus	1
salmon	Salmo salar	2
eel	Anguilla anguilla	161
garfish	Belone bellone	1
whiting	Merlangius merlangus	5
pollack ?	Pollachius pollachius	1
cod	Gadus morhua	11
bass	Dicentrarchus labrax	15
scad (horse mackerel)	Trachurus trachurus	26
gilthead sea bream	Sparus aurata	1
mackerel	Scomber scombrus	4
grey mullet	Mugilidae	9
flounder	Platichthyes flesus	23
plaice	Pleuronectes platessa	10
plaice or flounder		428

also found:

woodmouse	Apodemus sp
short-tailed vole	Microtus agrestis
common toad	Bufo bufo
frog	Rana sp

✱ butchery evidence for eating on at least one occasion archaeological questions which can be directly related to bone data provided it is collected with these in mind. A popular account of the potential of animal bone analysis has been published through 'Rescue' (Coy 1978c)

Ideally it should be decided before excavation and at various stages throughout excavation what questions to ask of the bone material on site and what samples to take for different types of context. Normal sampling techniques are irrelevant in archaeological contexts except in rare cases (Uerpmann 1976) and samples are best taken according to the questions being asked of the particular deposit, eg certain layers and pits may contain obvious food remains but some deposits have formed slowly and therefore present a wider picture than pits filled as a result of one or two events. But each type of context has its own virtues - each will answer different questions. Even the bone from unpromising contexts may be of value for archaeological reasons: it may provide evidence of redeposition especially in urban work. With our increasing knowledge of changes in the domestic animals through time and the dates of introduction of certain wild species bone can even now suggest a date where other finds are absent or controversial. Such archaeological importance has been a feature of the work of the Winchester Research Unit bone team (Biddle in press).

Bones found in the primary silts of Hampshire ditches tend to end up at Harwell but recently details of the animal bone have been recorded before radiocarbon dating and this practice deserves to become standard, for the archaeozoological information from such bones may sometimes shed light on subsequent carbon 14 results especially where the dates are difficult to interpret. The material itself is often of particular interest. Both on prehistoric sites on M 3 and early levels at Southampton material sent for carbon dating has been some of the only deer bone on site.

We cannot forsee all the archaeological problems which will arise for a particular site but in using a single pass data recording system for all the FRP bone fragments we now hope in one operation to record all the information needed for detailed studies arising during the analysis of that site and complementary inter-site studies, and to record all these details before further post-excavational fragmentation and erosion occurs (Jones 1977b and Table 3).

Future studies may require information that we have not recorded or someone may wish to check our work and for these reasons the bones must be kept. One possible field for the future is the study of epigenetic characters on bones such as the position of foramina and to plot the frequency of different morphs in different populations. Although this work might ultimately throw light on ,eg, breed introduction, we cannot yet justify it in terms of expense as a very large sample of material would need to be recorded even for a feasibility study.

<u>Computerised Recording of Bone Data at the Faunal Remains Project</u>

Information is recorded from each bone fragment as in Table 3 using a teletype linked to a calliper with a digital display. Punched tape is produced containing a continuous record of all metrical and non-metrical data. Measurement entry is automatic avoiding likely sources of error in manual measurement. Each fragment is linked to an archaeological context number (usually a layer number) and no prejudgement is made as to the date of a particular deposit. This allows easy rearrangement if archaeologists alter phasings at a later date and material can be recorded before phasings are known and in any order. Recording could even take place on site.

In practice sites are recorded when final phasings are available as it is then possible to work through material according to phases as well as individual features and site areas. This shows up bone

Table 3

Scope of Computer Codes used at Faunal Remains Project

(the number of variables currently in each field is given in brackets)

SPECIES	There are over 1,000 possible vertebrate species for Britain. Only about 23 are common but an average mediaeval site may yield 60	
ANATOMY	The different anatomical elements	(350)
MEASUREMENTS	Up to 20 measurements routinely recorded	
SIDE OF BODY	Left, right, axial	(4)
FRAGMENTATION	Fraction and exact part of the whole bone represented by the fragment	(21)
GNAWING	Position, type, severity	(21)
BUTCHERY	Position, type, direction	(27)
BONE PATHOLOGY	Position, appearance	(28)
DENTAL PATHOLOGY	Position relating to individual teeth, type	(42)
HORN CORES	Coding relates to Armitage & Clutton-Brock 1977	(20)
SEX	Male, female, castrate by subjective assessment on basis of antlers, spurs etc	(3)
AGE	State of epiphysis fusion. Eruption stage of each tooth	(36)
AGE (Grant 1975)	Alternative codes giving eruption and detailed wear stage for each tooth	(30)
SPECIMEN NUMBER	Used for associating fragments, eg individual bones from a whole skeleton	
WORKING	Position and type of working. Can be used for finished bone and antler objects if there is any biological information still visible	(25)
CONDITION	Position and description of different degrees of eg erosion, friability, charring etc	(30)

Information for each fragment can be recorded using any of the above variables. The variables can be used in almost unlimited combinations, in particular the position variables - distal, proximal, midshaft, lateral, medial, dorsal, ventral, cranial and caudal, joint surface and internal- can in combination define an area on a bone with some precision.

joins, articulated remains, interesting associations, and other information more easily seen by examination than by computer analysis. General trends may also be suspected at this stage and can then be investigated using the computer.

After recording, the final phasings with their latest corrections are used for producing catalogues, measurement statistics, and more complex associations of information for the whole site or for any temporal or spatial subdivisions required. Once data have been recorded there is no limit to the investigations which could be programmed in the future on the information shown in Table 3. Print-out for bones from Hampshire sites processed in this way is sent to the excavator, the Ancient Monuments Laboratory, London, and the University of Southampton library alongside a summary report.

It is essential to maintain standardisation between the various users of the system - something incredibly difficult: the versatility of our colleagues in finding new ways of using code combinations to express different things never ceases to amaze us. Something even more horrifying in its implications when one goes over to data banks is the accuracy of the identifications made. This takes us back to the points made earlier about the importance of good modern comparative skeletal collections.

The Future of Animal Bone Studies in Hampshire

Experienced sorters of sieved samples are now working in both Winchester and Southampton Rescue units and this type of post is essential in such large-scale excavations. But decentralisation of bone identification to the units carries dangers as well as advantages. The advantages are a greater awareness of the wealth of material which might be extracted and greater care in its retrieval. There must be an awareness of the dangers of incorrect identification and interpretation by the units themselves and sufficient supportive help and modern comparative material to take the work to publication. Some functions can be regionalised. In bone studies a centralised literature and information base and modern comparative collection with associated specialist/s, perhaps even a centralised computer recording base, makes good economic sense but each large archaeological undertaking must have its bone specialist, even if only a visiting one, and it is essential that bone analysts work with the site as their canvas if results of archaeological significance are to be achieved. Supportive help from specialist organisations like the British Museum (Natural History) will always remain occasionally necessary.

We still need much larger samples if we are to approach any believable estimation of the populations we are attempting to reconstruct in bone studies, whether they are the sheep populations of 13th century Hampshire or the populations of typical 15th century artisan meal residues. Every sample or sub-sample we handle is still producing new information and there seems no way yet of predicting the find of a feature with specially rich preservation of bone.

The comments above clearly point to a lack of material in some periods and context types. In Hampshire, apart from early prehistoric material, we need more bone samples of Roman, early Saxon, and early post-Saxon date; more rural material in all periods; and a deliberate strategy for post-medieval samples. Only by maintaining the current good relationship between specialists and both amateur and professional archaeologists that is a part of Hampshire archaeology can we ensure that we will fill these gaps in the future.

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