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Animals and Cotswold-Severn Long Barrows: a Re-examination

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In this paper new collaborative research is presented following a re-examination of the faunal remains and architectural evidence from a selected number of Cotswold-Severn long barrow sites. Five different loci of deposition are considered: 'pre-barrow' contexts; the chambers; the superstructure of the barrow and the ditches; the forecourt; and blocking material. These spatial locations were chosen following research that has demonstrated that these areas are likely to represent different temporal, as well as spatial, patterns of activity. While the faunal remains are diverse in character, common themes observed at the sites include: the deposition of complete or partial remains of foetal and young animals within chambers; the use of teeth and cranial elements within blocking material; and, within each temporal context, the absence of clear evidence for feasting and the importance of cattle, and the small but constant inclusion of wild mammals. This complexity of practice has the potential to mature our thinking regarding the nature of human–animal relationships within the early Neolithic of Britain and provide a secure foundation of evidence for subsequent interpretations.

There is a long and well-established view in Neolithic studies that long barrows were built as tombs for the dead. This view is based on, and at the same time has generated, excavation work at long barrow sites with the near exclusive aim of uncovering chambers or mortuary structures with the retrieval of human bone as its focus. There has been a re-consideration of the nature of Neolithic long barrow sites, but this has focused, once again, on the treatment of the human dead and the nature of mortuary practices (Barrett 1984; Wysocki & Whittle 2000; Darvill 2004; Benson & Whittle 2007). This discussion has been accompanied by research that concentrates on animals, and the important roles animals played within both the architecture of these sites and as part of rituals carried out in these spaces (Ray & Thomas 2003; Pollard 2005; 2006). Perhaps inevitably, the interpretation of the meaning of animals within such contexts has changed over time, in part reflecting prevailing theoretical paradigms, but interpretations are almost always formulated in relation to mortuary practice. Piggott (1954), for example, ascribed a secondary status to the practice of animal deposition in long barrow sites; in his terms this evidence was the result of feasting at the time of, or at least in the space of, the burial of the dead. Bradley (1984) and Barrett *et al.* (1991) have understood the inclusion of animals as some kind of equivalent practice to the deposition of human remains. Conversely, Thomas (1988; 1991) and Pollard (1993; 2005) have argued that there is structured depositional practice at work, with segregation between the domestic and the wild. The latter interpretations of structured deposition have at least attempted to consider the evidence for animal bone on its own terms.

While the significance of animals within such contexts is increasingly being acknowledged, it is clear that discrepancies still exist in the extent to which attention is paid to faunal remains. Where mention is made, they are mostly discussed in terms of their relationship with human remains, perhaps reflecting

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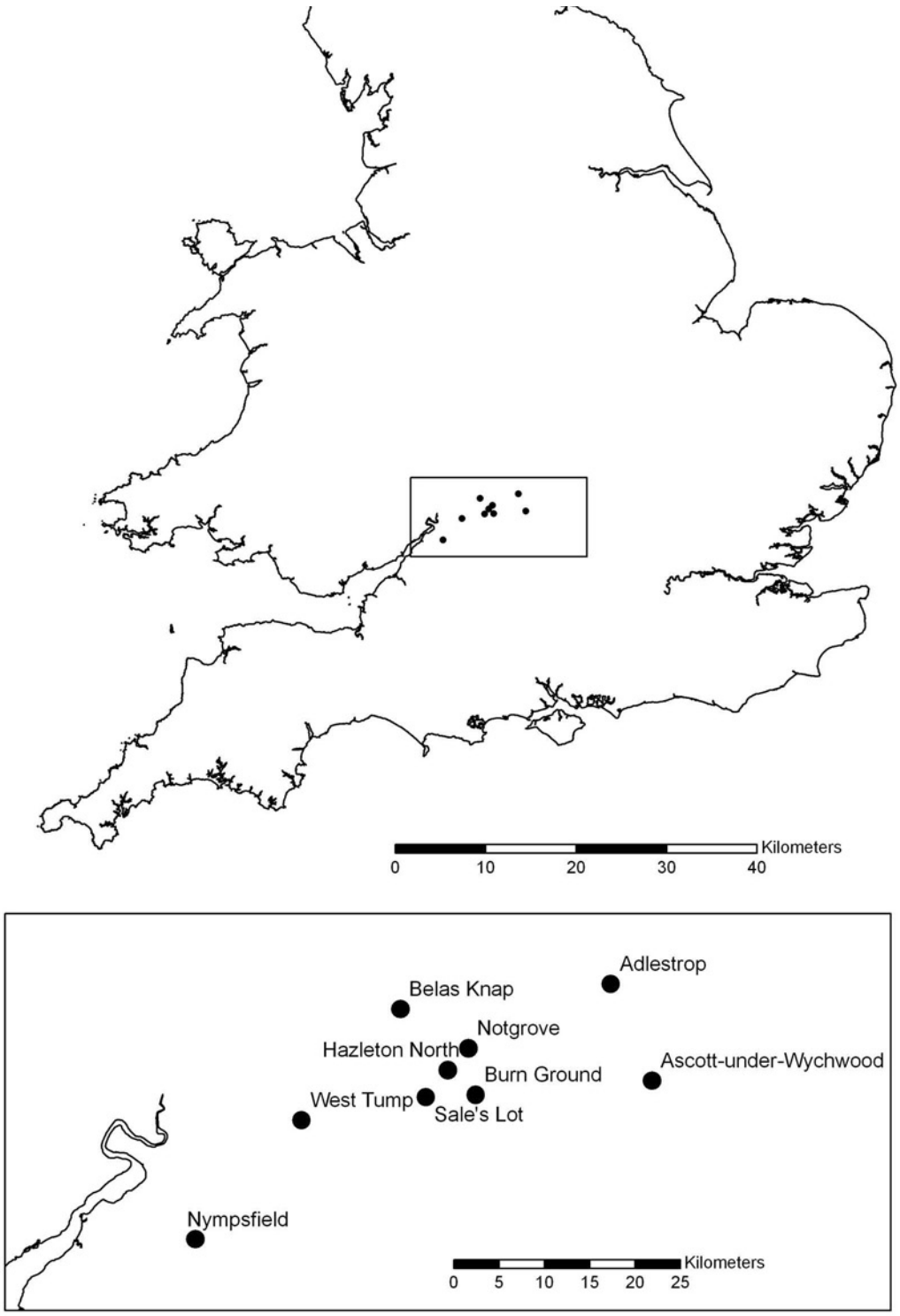

Fig. 1.
Location of study sites

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TABLE 1: SUMMARY OF STUDY SITES

Site	*Original report (s)*	*Archive location*	*Grid reference*
Adlestrop	Donovan 1938	Stroud Museum	SP 2537 2829
Belas Knap	Lawrence 1866; Berry 1929; 1930; Hemp 1929	Gloucester Museum	SP 0209 2554
Burn Ground	Grimes 1960	Gloucester Museum	SP 1042 1607
Notgrove	Clifford 1936	Cheltenham Museum	SP 0959 2119
Nympsfield	Buckman 1865; Clifford 1938; Saville 1979	Stroud Museum	SO 7939 0004
Sale's Lot	O'Neill 1966	Gloucester Museum	SP 0488 1576
West Tump	Witts 1881	Cheltenham Museum	SO 9114 1323

TABLE 2: NUMBERS & LOCATION OF NON-HUMAN ANIMAL BONES FROM ADLESTROP

TAXON	*AREA OF SITE*		*TOTAL*
	Burial chamber	*Surface soil*	
Pig (*Sus scrofa*)	24*	–	24
Dog (*Canis familiaris*)	1	–	1
Rabbit (*Oryctolagus cuniculus*)	15*	–	15
Unident. frags	2	1	3
TOTAL	42	1	43

Deposits including partial skeletons are indicated by *

in part a prevailing segregation of humans from non-human animals (Ray & Thomas 2003, 38). This discrepancy is particularly evident in Darvill's (2004) recent survey of the Cotswold-Severn long barrows, although this volume is by no means exceptional in this regard. Moreover, while the nature of specific deposits of animal bone is often described as being 'ritual' in nature (eg, Saville 1990, 262), all too frequently the meaning of those rituals is not discussed, nor their significance addressed in terms of human–animal relationships. Amongst the most serious issues, however, is that many interpretations rest on inaccurate or incomplete analyses of bone assemblages that were conducted in the late 19th and early 20th centuries (eg, Darvill 2004; Thomas 1988, 549–50). Recent studies have called into question the accuracy of these reports (Brickley & Thomas 2004).

During the same period, our architectural understanding of these sites has changed considerably; moving away from their perception as static objects towards an emphasis on dynamic process. In the past, archaeologists have tended to understand long barrow architecture in overly schematic terms: from a design or idea of form, to its translation into a physical object or end product. However, questions are now being asked of this material such as: when does building start at a long barrow site, and should early practices of making simply be interpreted as 'pre-barrow activity' (eg, McFadyen 2006; 2007a)? Recent research has also demonstrated that the sequence of building was far more complex than has previously been understood. For example, at many of these sites, the dead were incorporated into the monument whilst construction was taking place, not after it had been built (eg, Benson & Whittle 2007; Whittle *et al.* 2007). Furthermore, building was an activity that spanned at least two generations; few people would have seen the results of their labour as an end-product or architectural object (eg, Benson & Whittle 2007; McFadyen 2007b).

In this paper, new collaborative research is presented following a re-examination of the faunal remains and architecture of a selected number of Cotswold-Severn long barrow sites in Gloucestershire. The evidence presented is used to open debates concerning the nature and significance of the inclusion of animal remains at these sites and to provide a more accurate platform from which subsequent interpretative analyses can be based. A regional approach, focusing on site temporality, is favoured here in order to look in-depth at the detail of the evidence and in order to generate working ideas from the particular qualities of the material. There is a deliberate attempt here to hold back from making general statements about 'animal remains in tombs', hence parallels are primarily drawn between local sites.

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TABLE 3: NUMBERS & LOCATION OF NON-HUMAN ANIMAL BONES FROM BELAS KNAP

TAXON	*AREA OF SITE*			*TOTAL*
	Chamber A (west side)	*Chamber B (exterior of doorway)*	*Chamber B (outer wall)*	
Cow *(Bos taurus)*	–	3	1	4
Pig *(Sus scrofa)*	–	–	1	1
Rabbit *(Oryctolagus cuniculus)*	2	–	–	2
Unident. frags	–	1	–	1
TOTAL	2	4	2	8

MATERIALS

The faunal remains from six Cotswold-Severn long barrow sites located in Gloucestershire were re-analysed in this study (Fig. 1; Tables 1–7): Adlestrop, Belas Knap, Burn Ground, Notgrove, Nympsfield, and Sale's Lot. Three published sites were also used for comparison: Hazleton North (Levitan 1990) and West Tump (Brickley & Thomas 2004), Gloucestershire, and Ascott-under-Wychwood (Mulville & Grigson 2007), Oxfordshire.

At the majority of the sites, the level of contextual detail provided with the animal bones was sufficiently detailed to determine the approximate spatial location of the faunal remains. At West Tump the location of only a few of the animal bones was recorded, although the preservation of excavation diaries and dates on the storage bags has enabled a certain level of corroboration (Brickley & Thomas 2004, 5).

Whilst, for the most part, it was possible to directly identify the specimens noted in original published accounts, a number of problems were encountered during the re-analysis. First, it was not always possible to physically locate the specimens. For example, at Nympsfield, only the pig teeth from the blocking and a small collection of unprovenanced specimens could be found; however, a much more extensive collection was noted in the original reports (Bate 1938; Saville 1979), including an assemblage of cremated animal bone. At Notgrove, bank vole, cattle, horse, and pig were noted as being present in the forecourt deposits (Bate 1936, 156–7) but, again, these could not be located. Secondly, animal bones were identified that had not been originally reported. At Adlestrop only 'ox bones (metacarpals), two ox teeth, [and] numerous pig bones' were noted (Donovan 1938, 163), thus missing some of the more significant inclusions, such as the presence of a piglet skeleton within the chamber, as well as the location of the finds. Finally, in some instances, the location of the specimens noted in the original report differed from the location indicated by the archive. At Notgrove, according to the associated documentation, a partial calf skeleton was recorded from Chamber B; however, the published site report indicates that it came from Chamber E (Clifford 1936, 130). Such confusion can have marked implications for the way the find is interpreted due to the contextual associations. If the partial calf skeleton came from Chamber B, then it would have been associated with human skeletal remains; if the bones derived from Chamber E, the only associated finds were a fragment of Neolithic pottery and a flint flake. Despite these issues, the remainder of the dataset was sufficiently complete to enable a detailed analysis of the animal remains from these sites to be undertaken.

METHODS

An attempt was made to identify all fragments present in the small faunal assemblages from each of the sites (Tables 2–7). The tooth wear stages of Grant (1982) and Payne (1973; 1987) were recorded to determine the age of pig and cattle and sheep/goat respectively. The age of foetal and neonatal domestic mammals was established using the regression formulae of Regli (1963) and Bünger-Marek (1972) for cattle, Habermehl (1975) for sheep, and Gjesdal (1972) for pig. Bone preservation was recorded using a four-point scale (after Harland *et al.* 2003). Where possible, pigs were sexed using the morphology of the mandibular canine (Schmid 1972, 80).

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TABLE 4: NUMBERS & LOCATION OF NON-HUMAN ANIMAL BONES FROM BURN GROUND

TAXON	*AREA OF SITE*				*TOTAL*
	Entrance to transverse chamber	*Ante-chamber*	*Inner part of passage*	*N.W. transept*	
Cow (*Bos taurus*)	2	2	4	–	8
Sheep/goat (*Ovis/Capra*)	–	–	2	–	2
Pig (*Sus scrofa*)	1	4	1	–	6
Red deer (*Cervus elaphus*)	–	–	1	–	1
Roe deer (*Capreolus capreolus*)	3	–	1	–	4
Fox (*Vulpes vulpes*)	–	–	–	1	1
Cat (*Felis catus*)	–	–	–	1	1
Unident. frags	–	4	1	–	5
TOTAL	6	10	10	2	27

Antler tine fragments are not included

Taphonomy

As Barber (1988, 61) notes: 'the involvement of animal remains in the funerary rites of chambered tombs may be irrelevant, or can be so considered until unequivocal evidence for their association with the funerary function of the tombs has been recovered'. This is a key point, since there are a number of routes through which animal remains might accumulate within long barrow sites, that may at best confuse, and at worst lead to a complete misrepresentation of the evidence.

It is well recognised, for example, that many species of animal can become incorporated within archaeological sites during and after they have gone out of use, through burrowing, denning, or perching, or as prey food accumulations. Non-anthropogenic species are identified on the basis of their behaviour, coupled with the completeness and preservation of their skeletal remains: complete articulated skeletons, with good or different preservation, can indicate intrusive species. At Notgrove, 88% of the bones from the 'Passage', which included a semi-complete mole skeleton, together with disarticulated bat, small rodent, and amphibian bones, appeared 'fresh' with only localised exfoliation, in contrast to the bones from other areas of the site, raising immediate concern over their contemporaneity with the site's use. At Adlestrop, the 15 fragments of rabbit were clearly intrusive since this animal was not native to Britain until the medieval period (Veale 1957) and its burrowing habits are well known. Bones that were clearly intrusive on the basis of preservation, skeletal completeness, or animal behaviour have been excluded from this study.

For other animal bones, determining whether they are intrusive or not is less obvious, particularly where contextual detail in excavation reports is vague. A good example is provided by the presence of complete or disarticulated remains of larger mammals. In Scottish chambered sites, young sheep bones and skeletons are commonly encountered. While these could represent deliberate acts of deposition, this is not the only possible explanation. At Pierowall Quarry, Westray, Orkney, for example, the presence of an assemblage of sheep of which over half were younger than ten months, led McCormick (1984, 109) to suggest that these were weak animals that had sought shelter and died within the rubble of a collapsed revetment.

Detailed contextual descriptions of the location of animal bones combined with radiocarbon dating where doubts exist are clearly necessary, but these are typically lacking for animal bones. That said, radiocarbon dates do exist for two of the articulated animal skeletons from our study sites: the calf from Notgrove (Smith & Brickley 2006) and the piglet from Adlestrop (Martin Smith pers. comm.). Reassuringly, both of these returned early Neolithic dates, although the systematic dating of animal bones from these and other sites is a future research priority. The fact that some of the articulated skeletons derived from foetal animals (see below) also argues against the idea that these were sheltering animals.

It is possible that some of the animal bones derive from prey accumulations; however, only five bones (all from Notgrove) exhibited evidence of carnivore gnawing. Four additional gnawed specimens were recorded at West Tump, but only one of which could be provenanced with any degree of confidence (Brickley & Thomas 2004, 5). This evidence suggests

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TABLE 5: NUMBERS OF NON-HUMAN ANIMAL BONES FROM NOTGROVE

TAXON	*AREA OF SITE*									*TOTAL*
	Passage	*Chamber A*	*Chamber B*	*Chamber D*	*Forecourt*	*North Horn*	*South Horn*	*Throwout*	*Blocking*	
Cow (*Bos taurus*)	1	–	9*	3	–	1	–	2	1	17
Sheep/goat (*Ovis/Capra*)	–	–	3	2	3	1	2	–	–	11
Pig (*Sus scrofa*)	–	–	–	2	–	–	–	2	1	5
Horse (*Equid* spp.)	–	–	–	–	–	–	–	–	1	1
Red deer (*Cervus elaphus*)	–	–	–	–	–	–	–	–	1	1
Dog (*Canis familiaris*)	9	–	–	1	2	–	1	–	1	14
Mole (*Talpa europaea*)	8*		–	–	–	–	–	–	–	8
Red squirrel (*Sciurus vulgaris*)	3	–	–	–	–	–	–	–	–	3
Mustelid (*Mustela* spp.)	1	–	–	–	–	–	–	–	–	1
Rat/water vole (*Rattus/Arvicola* spp.)	1	–	–	–	–	–	–	–	–	1
Small rodent	6	–	–	–	–	–	–	–	–	6
Bat (*Chiroptera*)	3	–	–	–	–	–	–	–	–	3
Frog/toad (*Rana/Bufo* spp.)	2	–	–	–	–	–	–	–	–	2
Passerine	2	–	–	–	–	–	–	–	–	2
Unident. frags	26	9	40	2	16	2	3	6	–	104
TOTAL	62	9	52	10	21	4	6	10	5	179

Deposits including partial skeletons are indicated by *

that dogs, foxes, and cats, were not agents of accumulation and had little or no access to the material either before or after it was included within the chambers, and further supports the idea that a degree of control was exerted over the activities of scavenging animals at these sites (Smith 2006, 682).

Another taphonomic factor that might affect the representativeness of the faunal profile, is the efficiency of recovery. Although the animal bones were collected by hand, a practice that under-represents the bones of smaller animals and smaller anatomical elements (eg, Payne 1975), the level of recovery appears to have been generally excellent. At Notgrove, for example, three bat and several small mammal and amphibian bones were recovered, while at Nympsfield a deciduous pig 3rd incisor was retrieved. The faunal remains from all the sites considered were fairly well preserved, exhibiting limited exfoliation, although this did vary according to spatial location. For example, it was evident that bones from floor surfaces, such as those identified at Adlestop, were much more abraded, root damaged, and exhibited greater levels of exfoliation, than those from the chambers, or embedded within architectural structures.

THE ANIMAL BONES

One of the primary aims of this study is to determine the composition of the faunal assemblages from the selected long barrows and to establish if there are any similarities or differences in the patterns of deposition throughout the history of the same site and between different long barrow sites. Rather than review the faunal evidence from each site individually, therefore, the animal bones from five different loci of deposition are considered: 'pre-barrow' contexts, the chambers, the superstructure of the barrow and the ditches, the forecourt, and blocking material.[1] These locations have been chosen because they are likely to represent different temporal, as well as spatial, patterns of activity (McFadyen 2007a; 2007b; Whittle *et al.* 2007). It should be noted that extensive excavation of the barrow superstructure only occurred at Sale's Lot and Burn Ground, and thus it is only at these sites that possible features underneath the barrow can be investigated. Consequently, research into the roles animals played in the early parts of long barrow sites, and as part of the upstanding barrow architecture, should only be considered here as a starting point for work that would require further excavation.

Animals in 'pre-barrow' contexts

Archaeologists have long been confused as to how to explain earlier practices of making at long barrow sites, these practices have often been termed 'pre-barrow' activities and then simply side-lined or ignored. The existence of earlier activity is restricted to a small number of Cotswold-Severn type long barrows, eg Gwernvale (Britnell 1984), Hazleton North (Saville 1990), and Ascott-under-Wychwood (Mulville & Grigson 2007). Earlier activity had been recorded at Sale's Lot (O'Neill 1966) but no faunal remains from these deposits were noted during the reanalysis.

The two sites with the most extensive collections of faunal remains from 'pre-barrow' contexts are Hazleton North (Levitan 1990) and Ascott-under-Wychwood (Mulville & Grigson 2007). At the former, the majority of bones derived from midden deposits to the west of the later chambers and have been dated to the Early Neolithic. Although the assemblage was large, only 269 fragments of bone were identifiable (Levitan 1990, 200). Cattle, sheep, and pig were the most commonly represented species and the fact that the majority of skeletal elements were represented, and that many were burnt and possibly broken for marrow, indicates slaughter and consumption close to the site of deposition (*ibid.*, 203). This interpretation is supported by the fact the majority of animals were exploited for their meat. The absence of any clear patterning in the spatial distribution of the faunal remains and the small size of the assemblage led Levitan (*ibid.*) to conclude that it was impossible to distinguish whether they represent the end product of either domestic or ritual activity, although Saville in the same volume (1990, 253) regarded the activity to be of 'domestic character'.

A similarly substantial faunal assemblage from four different zones of 'pre-barrow' activity was recovered from Ascott-under-Wychwood (Mulville & Grigson 2007): hearths, pits, midden, and buried soils. This assemblage comprised both domestic and wild species. Finds of note from pit fills included a partial skeleton of a young pig and an abundance of calcined pig bone fragments, which may represent cremation activity. The domestic mammal bones within the

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midden appear to represent the waste of animals slaughtered and consumed on site. However, a high proportion of wild species, which are less abundant on 'domestic sites', drew the conclusion that it was 'not just a collection of 'usual' food debris but contains evidence of differential deposition' (*ibid.*, 253).

Rather than simply seeing this material as being the remains from 'domestic activity' or 'differential deposition', it is important to note that it had been accumulated together and that this earlier activity was extended into architecture. For example, at Ascott-under-Wychwood there was an important physical relationship whereby the midden had built up around and then over two timber structures. The two pairs of stone cists then cut the midden. The initial axial divide of the primary long barrow was constructed in this area between the two timber structures and the two pairs of stone cists. In these terms the animal bone in the midden was caught up in the barrow architecture. An outline can be drawn for similar kinds of connected practice at Hazleton North (McFadyen 2007b). The initial body of the cairn was built against an earlier timber structure and on top of the midden. For example, the eastern edge of one of the primary dumps of material [380] was over the midden and was formed by propping up stone material against what were probably the rotting stumps of the timber structure. The stone material that constituted primary dump [380] had a distinct form; indeed the vertical pitch of this material suggests that it was propped up against something else, and the western edge of [380] was perfectly in line with the line of posts that made up the eastern edge of the timber structure.

Animals in chambers

One of the most striking features of the faunal assemblages from within the central areas of the Cotswold-Severn long barrows was the presence of partial skeletons and isolated elements from young animals. At Notgrove, for example, nine bones from a partial calf skeleton (dated to the Early Neolithic; Smith & Brickley 2006) and three young sheep bones were recovered. The partial cattle skeleton comprised the zygomaticus, ulna, radius, humerus, metacarpals, sacrum, and the deciduous 3rd and 4th premolars. All but three of the unidentifiable fragments (NISP=40) from the chamber also appeared to belong to this animal. Metrical data reveal that the calf died *c.* 200–210 days after conception (Regli 1963; Bünger-Marek 1972) suggesting that it was an aborted foetus; the gestation period of modern domestic cattle is normally around 280 days (Bourdon & Brinks 1982). The three sheep bones present in Chamber B at Notgrove included one humerus that was 'perinatal' in size and another that derived from a foetus that died just 50–60 days after conception (Habermehl 1975); the gestation period for sheep typically ranges between 142–159 days (Ryder 1983, 12).

At Adlestrop a partial pig skeleton (dated to the Early Neolithic; Martin Smith pers. comm.) was recovered from inside the burial chamber. This specimen consisted of 23 fragments including both tibiae, femora, and metacarpals, three thoracic vertebrae, a mandible, and a number of loose teeth (Fig. 2). All post-cranial elements were unfused and the age was estimated to be 213–228 days after conception (Gjesdal 1972), making the animal approximately 100 days old. Finally, at Burn Ground, a cattle pelvis which must have derived from an animal considerably less than 7–10 months in age (Silver 1969), and the unfused distal end of a humerus of a perinatal mammal (probably sheep), were noted, while at Sale's Lot, an unfused fox/dog femur was recovered from the entrance pathway.

Parallels to the deposition of foetal and neonatal domestic mammals can be drawn at other sites in the area: at West Tump seven bones from a dog aged less than 6 or 7 months were identified (Brickley & Thomas 2004); at Hazleton North, eight fragments of a perinatal sheep were recovered from the south chamber in association with juvenile human remains (Levitan 1990, 209, 250); and a partial calf skeleton was recorded at Bown Hill (Darvill 2004, 171).

In addition to the inclusion of young animals, the chambers at some sites also had accumulations of teeth. For example, at Notgrove, the assemblage from Chamber D consisted almost exclusively of loose teeth, including: three cattle, two pig, one sheep/goat and one dog tooth. The original 1863 excavation at Belas Knap also revealed 'bones and tusks of boars' in Chamber B, alongside four human skeletons (two male and two female; Hemp 1929, 269), although these were not encountered during re-analysis.

Dogs also appear to have had an important place within the internal structure of the long barrows. Whilst the young dogs at West Tump and Sale's Lot have already been noted, at Notgrove, a large dog mandible was identified from Chamber A and eight

identifiable fragments were recorded from the 'Passage' – four metapodials (fore- and hind-limb) and four phalanges, all of which were fused where determinable. Based on size criteria, at least two animals were represented. The largest specimen (a 3rd metacarpal) was comparable in size to a modern reference female greyhound. The original excavation report for Nympsfield also indicates the presence of at least two different sizes of dog, in a grave containing parts of at least three human skeletons on the south side of the passage at the west end (Clifford 1938, 198). Furthermore, Levitan (1990, 209) records the presence of a complete dog scapula as the only identifiable element from the north chambered area at Hazleton North and dog bones were found associated with human remains at Eyeford Hill (Rolleston 1876, 157).

With respect to wild animals, the presence of squirrel and a large mustelid from the 'Passage' at Notgrove deserves mention, given the possible ambiguous status of carnivores (Pollard 2006). It is possible that their presence indicates the exploitation of their pelts: a plausible suggestion since three of the four specimens are metapodials. Alternatively, they could have derived from animals hunted by hawks or owls which were using the chamber as a perch. Four post-cranial bones were recovered from amongst the stones and filling of the entrance to the transverse chamber of the barrow at Burn Ground, including a complete articulating roe deer right humerus and radius and the shaft of a left roe deer humerus. Red deer was also indicated by the presence of an antler tine and a maxillary molar from the inner part of the passage of the main chamber, while roe deer (misidentified in the original report) was represented by a complete left radius. An articulating roe deer forelimb was also recovered from the passage at Hazleton North (Levitan 1990, 211).

Other than these finds, no additional patterns were discernable in the composition of the faunal assemblages from the internal structure of these monuments, and in many cases the total number of fragments was very small (Tables 3–6).

Animals in the superstructure[2] of the barrow and the ditches

While it is the central chambers of Neolithic long barrow sites that have received most archaeological attention, there is growing recognition through excavation of the importance of other architectural elements (Saville 1990; Benson & Whittle 2007). At Hazleton North, a very small number of bones were randomly distributed throughout the barrow matrix, all of which derived from domestic mammals (Levitan 1990, 204).

During Hemp's excavation at Belas Knap, the lower jaw of a small mustelid was recovered from the packing and cementing material in the body of the mound and this was re-analysed during the current study. As Hemp (1929, 281) notes, given the position of the mandible, this was probably accidentally incorporated into the cementing material when it was originally mixed. Within one of the bays at Ascott-under-Wychwood, the fill material included a large concentration of animal bone radiocarbon dated to the Early Neolithic and Mesolithic (McFadyen 2007b).

Evidence for the incorporation of animal bones within architectural elements also exists at Sale's Lot. The mandible of a neonatal small mammal was recovered from a clay soil deposit between the stones of the south-east surround of the burial chamber. Originally reported as cat (O'Neill 1966, 34), this

TABLE 6: NUMBERS AND LOCATION OF NON-HUMAN ANIMAL BONES FROM SALE'S LOT

TAXON	*AREA OF SITE*						*TOTAL*
	Barrow mound?	*Entrance pathway*	*NW edge of chamber*	*E revetment wall*	*SE surround of burial chamber*	*S outer ring wall*	
Cow (*Bos taurus*)	4	–	1	2	–	–	7
Dog (*Canis familiaris*)	–	1	–	–	–	–	1
Fox/dog (*Canis/Vulpes*)	–	–	–	–	1	–	1
Small mustelid (*Mustela* sp.)	–	–	1	–	–	–	1
Unident. frags	–	–	–	–	–	1	1
TOTAL	4	1	2	2	1	1	11

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Fig. 2.
The partial pig skeleton from the floor of the chamber at Adlestrop

specimen appears closer in morphology to dog, which would be considerably less than 4–5 months old (Silver 1969). O'Neill (1966, 34) observed that this specimen was not intrusive since it was located in undisturbed rubble stone packing in the wall of the burial chamber. Other structural features at Sale's Lot from which animal bones were recovered included: earthen debris in the east revetment wall (two cattle teeth); stone rubble adjoining the north-west enclosure edge of chamber 1 (an unformed cattle premolar); and stone rubble packing near the south side outside the outer ring wall (an unidentifiable mammal jaw fragment). The latter two specimens were stated in the original report as being 'associated with triangular marking stone' (*ibid.*, 33). From the plan of the primary barrow, which was circular in shape, it looks as if the structure was constructed from a number of radial off-sets (Fig. 3; see Carpentier *et al.* 2007 for a parallel). The off-sets created a series of compartments and two of these, directly to the north-west and south-east of the burial chamber, were infilled with large blocks of limestone. The unformed cattle premolar was found in the former context and the neonatal mandible in the latter (Fig. 3). Such finds probably represent accidental incorporation but, as these areas of long barrow sites have previously been considered incidental to study, it is important that these findings are noted here.

At Hazleton North, 57 antlers were recovered from the lower fills of the ditches which, like the red deer antler fragments found in similar contexts at Ascott-under-Wychwood, have been interpreted as tools used in construction (Levitan 1990, 205; Mulville & Grigson 2007). Such evidence led Darvill (2004, 119) to surmise that the mound 'was not treated as a location for artefact deposition, ritual or otherwise'.

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TABLE 7: NUMBERS OF NON-HUMAN ANIMAL BONES FROM WEST TUMP

TAXON	
Cattle (*Bos taurus*)	10
Sheep/goat (*Ovis/Capra*)	8
Pig (*Sus scrofa*)	3
Horse (*Equus* spp.)	2
Dog (*Canis familiaris*)	7
Red deer (*Cervus elaphus*)	4
Unident. frags	11
TOTAL	45

However, the evidence from Ascott-under-Wychwood and some sites restudied as part of this research project suggests that this interpretation masks a wide variability in practice. For example, in the fills of the southern ditch at Hazleton North, burnt bone and sherds from a single pot, tempered with bone and limestone, were mixed in a spread of charcoal and ashy soil (Saville 1990). Nearby, was a scatter of cattle, pig, and human bones that appeared deliberately sandwiched between groups of the antler picks.

At the other sites considered, the evidence for animals within architectural elements was either limited, such as at Nympsfield where human and animal bones were noted as being incorporated into the mound itself (Clifford 1938, 201), and Notgrove where only ten bone fragments were recovered from the north and south horn, or completely absent, such as at Adlestrop (Donovan 1938). However, this might reflect disinterest in excavating these parts of the sites, rather than a genuine absence.

Animals in forecourts

At Sale's Lot animal bones were noted as being 'conspicuously absent' from the forecourt area (O'Neill 1966, 33–4). Moreover, at Notgrove, only 21 bones derived from this area of the site and the majority were unidentifiable. Three of the identifiable bones came from sheep/goat, while the remaining two bones belonged to a small dog. Bank vole, cattle, horse lower cheek teeth, and pig were noted in the original report (Bate 1936, 156–7), but were not encountered during the reanalysis.

Animals in blocking material

Two of the selected study sites revealed evidence for the incorporation of animal bones within the blocking: Notgrove and Nympsfield. At Notgrove only five bones from the 'blocking' were restudied, all of which were identifiable: a complete unfused pig calcaneum; a very small fused dog ulna; and molars from red deer, horse, and cattle.

At Nympsfield, a much more extensive accumulation of animal bone was recovered from the blocking. The original report notes that the entrance blocking contained the remains of three humans and the bones and teeth of sheep/goat, ox, horse, and a large quantity of pigs (Clifford 1938, 202). Intriguingly, Clifford noted that one pig mandible was found carefully sandwiched between two pieces of 'Trigonia grit' (Clifford 1938, 202). One horse tooth was also found in the interface between the blocking and the area outside the barrow and another was found in the blocking of the west end. Unfortunately, only an assemblage of pig teeth could be relocated.

In total, 155 fragments of pig teeth were recovered (Fig. 4), the majority of which were loose mandibular teeth. Only two maxillary teeth were present and only eight teeth were still located within their alveolus. Table 8 presents a breakdown of the types of teeth that were present in this assemblage; based on the identification of incisor root tips, the assemblage must have derived from a minimum of nine animals. No side bias was noted where this could be determined.

The majority of teeth present derived from domestic pigs. However, the size of a number of specimens was sufficient to indicate the presence of wild boar (Table 8). For example, two lower 3rd molars had greatest lengths of 44.7 and 41.0 mm, which is within the range for wild boar (Bull & Payne 1988). While the assemblage of canines was fragmentary, all identifiable specimens were attributable to boars. A similar domination of male animals was also noted at Ascott-under-Wychwood, the only other site to report the sexual composition of the faunal assemblage (Mulville & Grigson 2007).

Regarding the age of the pigs that made up this deposit, no deciduous teeth were recorded and many of the loose 1st/2nd molars exhibited advanced wear. The wear patterns on three mandibular 3rd molars indicates that the domestic pigs were over 18 months old when they were slaughtered; the two wild boar specimens would have been killed at a greater

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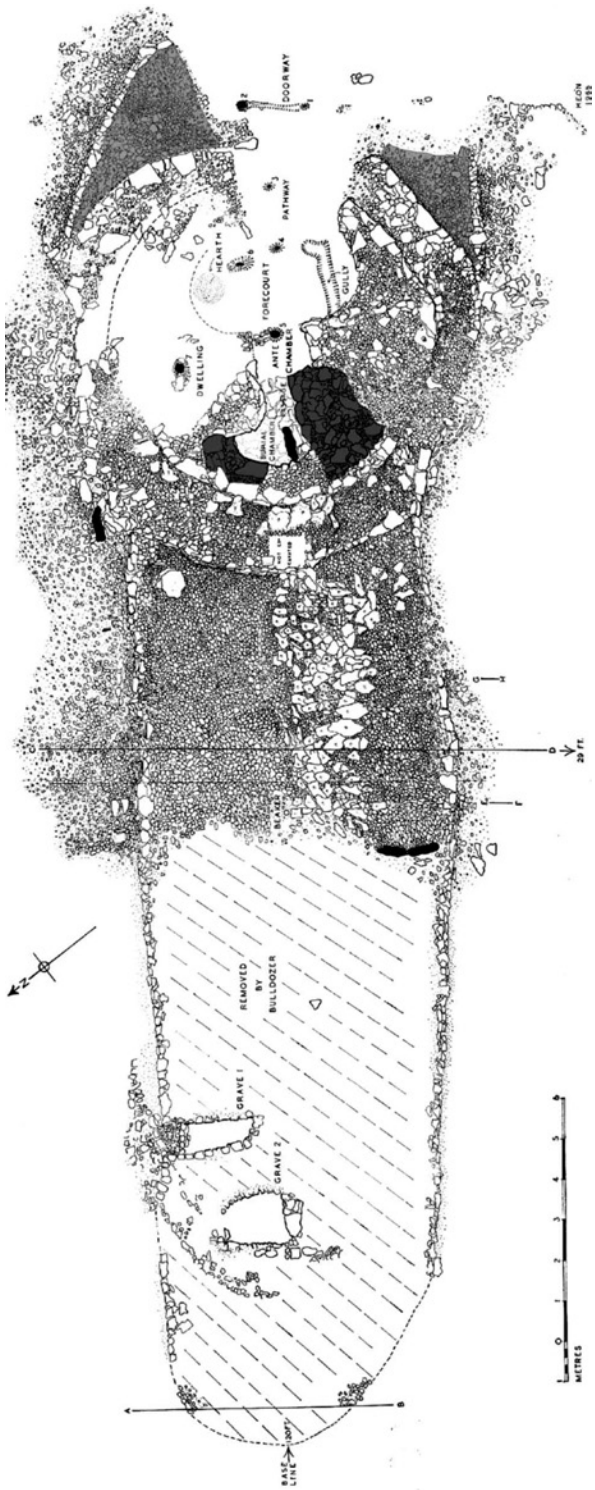

Fig. 3.
Radial structure at Sale's Lot (after O'Neill 1966)

age (at least 26 months; Matschke 1967; Deniz & Payne 1982).

Considering the unusual nature of this deposit it is necessary to speculate upon its taphonomic history. The almost complete absence of bone fragments could be taken to suggest that loose pig teeth were deliberately curated. This process would have presumably required pig skulls and mandibles to have been exposed until the soft tissues and ligament attachments had softened or rotted, before the teeth were deliberately extracted: while the single-rooted incisors may have fallen out or been removed relatively easily, this would not have been the case for the molars, which in younger pigs in particular are firmly anchored by their roots. The alternative explanation is that one or more taphonomic processes reduced an original assemblage of skulls and mandibles to their component elements, of which only the teeth were recovered during excavation. It is well recognised, for example, that loose teeth are recovered in much higher proportions relative to teeth embedded within mandibles or maxilla on sites that have experienced extensive fragmentation or post-depositional degradation, because these are the densest skeletal elements (Klein & Cruz-Uribe 1984, 71). Unfortunately, the available evidence does not permit either hypothesis to be excluded; however comparable deposits have been recorded at other sites. At Hetty Pegler's Tump (Uley Barrow) the jaws and teeth of wild boar were observed during the 1821 examination of the entrance blocking (Clifford 1966, 129). Moreover, at Hazleton North, 179 fragments of primarily pig and cattle bone (all but three of which derived from the head) were located in the forecourt area (Levitan 1990, 213); the pig bones consisted of four jaw fragments and 56 loose teeth, while cattle were represented by 26 loose teeth. Intriguingly, the pig teeth appear to be located more centrally, flanked on either side by the cattle teeth, leading Levitan to conclude that: 'skulls were set on top of the forecourt revetment and were crushed when it eventually collapsed'. Although outside of the study zone, accumulations of the 'heads and horns' of cattle were observed by William Cunnington during his excavations at Boles Barrow and Heytesbury North Field in Wiltshire (Field 2006, 127), while at Hanging Grimston, Yokshire, 20 pig mandibles were arranged around the façade (Kinnes 1992).

Belas Knap was the only other site within this study with bones within a blocking context. This site has a

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Fig. 4.
Collection of pig teeth from the blocking material at Nympsfield & original label

different form to both Nympsfield and Notgrove in that the chambers do not come off a central passage from the forecourt; rather there are four chambers which exit directly on the east, west, and south sides of the barrow. Because of this difference, it is possible to view the passages that lead to these 'side' chambers as comparable to the single passage at the other sites. In the exterior of the doorway of chamber B, an incisor and three cattle teeth were recovered alongside a small animal rib, while the assemblage from the threshold consisted of a lower 3rd molar of a wild boar, and an upper cattle molar. A split dog canine was also noted in the original report, however, this was not observed in the re-analysis. Referring to the internal wall across the entrance to chamber B, Hemp (1929, 268) notes that: 'outside and along the foot of this wall at ground level … were placed single bones and teeth of animals a few inches apart', thus implying deliberate and careful blocking.

DISCUSSION

It is apparent from this evidence that practices whereby animals became caught up within Cotswold-Severn long barrow sites were varied. There was no single common pattern of activity. Indeed such a finding would support the conclusion reached by Smith and Brickley (2006, 350), following their re-examination of the human remains from the chambers of these sites. In terms of significant findings, it would seem that partial skeletons, or isolated elements, belonging to foetal, perinatal, and young domestic mammals were often deposited in the chamber areas of long barrow sites. The only evidence for articulated adult animals is provided by the roe deer forelimbs at Burn Ground and Hazleton North. There is also a marked practice of depositing dogs, or parts of dogs, in these parts of the site at West Tump, Sale's Lot, Notgrove, Adlestrop, and possibly Nympsfield. Finally, animal teeth seem to have been used on two

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TABLE 8: COMPOSITION OF ASSEMBLAGE OF TEETH FROM BLOCKING DEPOSIT AT NYMPSFIELD

Tooth	*Frag. count*	*Unique specimens*	*Wild boar frags*
Incisor	93	43	6
Canine	23	8	–
Premolar	16	16	2
M1	1	1	0
M2	2	2	1
M1/2	8	8	0
M3	6	6	2
Molar frags	8	0	0

distinctive occasions as blocking material, or to mark the threshold of chambered architecture. In the following section we will reconsider earlier explanations for the presence of animals at long barrow sites in light of this new evidence and offer alternative views on the nature of human–animal interactions.

Previous interpretations

Piggott undertook one of the first interpretations of the faunal remains from long barrows in 1954 and 1962, and ascribed a secondary status to the deposition of the animal bone. In his terms, this evidence was merely the remnants of feasting. Thomas has built upon these ideas in his re-appraisal of the evidence from West Kennet long barrow in Wiltshire (Thomas 1991), by arguing that deposits of animal bones in forecourts are evidence for post-blocking feasting activity. However, both Thomas (1991, 146) and Saville (1990, 257) maintain that the deposits of animal bones at Hazleton North, Rodmarton, Uley, and Gwernvale (all within the study area), are still the result of contemporary feasting. The evidence presented in this study offers little support for either feasting hypothesis. Moreover, in the faunal report from Gwernvale it was noted that: 'the quantities of bone are insufficient for detailed analysis' (O'Connor in Britnell 1984, 153–4); thus, there is no faunal evidence that would indicate anything approaching feasting activity. Furthermore, at Hazleton North the 'feasting' activity was originally interpreted by the faunal analyst as reflecting ritual practice (Levitan 1990, 213).

Bradley (1984) and Barrett *et al.* (1991) have understood the inclusion of animals as some kind of equivalent practice to the deposition of human remains, an interpretation that has also been proffered for Late Neolithic Orkney (Jones & Richards 2003). However, supporting evidence for this practice has not been forthcoming from this analysis. Indeed in many cases animal remains appear to have been deliberately associated with human remains, rather than acting as metaphors or standing in for them. For example, at West Tump a young dog was found associated with a juvenile, while at Nympsfield, at least two different types of dog were recovered from a grave; there is no suggestion of the burial of an animal standing in for the burial of a human because both human and animal were deposited in the same context. Instead it is speculated that the inclusion of dogs reflected their 'intensely social' relationship with people and that deceased dogs could be treated like deceased people (Morey 2006, 158, 164), in part perhaps a reflection of the significance placed on the transformative role of these animals (Pollard 2006, 140; Smith 2006). Additionally, at Adlestrop, the remains of a young pig were deposited inside the chamber, in addition to a single butchered pig calcaneum. Such evidence implies that different kinds of process led to the deposition of animals, one more akin to the burial of the animal and the other following butchery and possible consumption.

Considering the evidence for cattle and pig cranial elements within the forecourt area at Hazleton North, which may have originally been 'placed on top of the forecourt revetment' (Levitan 1990, 213), Darvill suggests that animal heads were used as protective talismans or totemic symbols (2004, 135). However, the fragmented nature of these animal remains and the fact that the assemblage largely constitutes loose teeth should be noted. While it has to be recognised that taphonomic factors may have led to the preferential destruction of mandibles or maxilla, a further possibility is that *loose* teeth were deliberately curated for deposition. The evidence from Nympsfield supports this idea, since large numbers of loose pig teeth were recovered, with almost no evidence for associated cranial bones. Furthermore, these teeth derived from blocking material in the passage; in this context it is difficult to maintain the idea that they represented totemic symbols hanging from the façade of the architecture. Loose teeth have also been recovered from blocking contexts at Belas Knap, Hetty Pegler's Tump, and Notgrove. Irrespective of their taphonomic history, it is clear that the deposition

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of teeth, whether loose or otherwise, in and around the forecourts and blocking of Cotswold-Severn long barrows was significant.

Based on interpretations of the faunal data from Horslip, Wiltshire and Thickthorn Down, Dorset, both Thomas (1991) and Pollard (1993; 2005) have argued that there were complex patterns of structured deposition of material culture at these sites, with segregation between the domestic and the wild, exemplified by the separation of pottery from red deer antler in the primary ditch fills. What is interesting, is that re-analysis of the fauna as part of this study has not provided evidence of differential treatment within or between the assemblages of bone in terms of wild or domestic animals. With so much attention paid to the introduction and importance of domesticated animals in the Neolithic, we would like to mark as important the small but constant treatment of wild animals in long barrow sites. For example, at Burn Ground, both wild and domestic mammals occurred together and at Nympsfield both wild and domestic pig teeth were present in the blocking material. Moreover, wild animals appear throughout the life history of the long barrow sites (Fig. 5). It is particularly noteworthy that the proportion of wild species in 'pre-barrow' contexts – which have been variously interpreted as middens, domestic settlement activity, or earlier incarnations of 'ritual' structures and are amongst the earliest known Neolithic structures – is largely the same as those in later contexts associated with the construction, use, and disuse of the monument. Furthermore, domestic and wild animals do not appear to have been treated any differently. For example, at Burn Ground cattle, pig, red deer, and roe deer were all recovered from the inner part of the passage of the main chamber. Such similarity in deposition argues against the notion of any kind of segregation deliberately being played

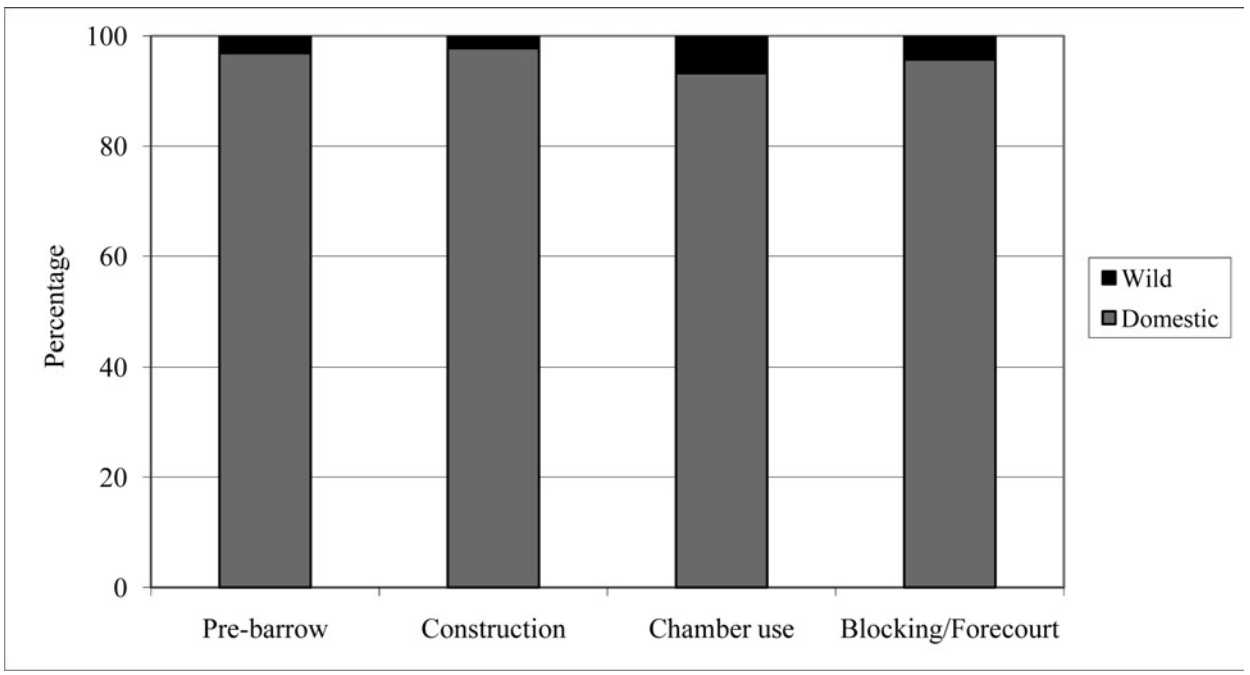

Fig. 5.
Comparison of the proportion of wild & domestic animal bones in different depositional contexts at nine Cotswold-Severn long barrow sites. Antler fragments have not been included in this analysis due to variability in the quality of their reporting and the fact that their status may have been different to other animal remains, since they were frequently used as tools. To minimise the inclusion of intrusive animals only the following species have been considered: cattle, sheep/goat, pig, and dog (domestic); wild boar, aurochs, roe deer, and red deer (wild)

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out within these sites, although certain wild animals may have received differential treatment; roe deer for example are occasionally represented by articulated remains.

Finally, the symbolic and economic significance of cattle has been well attested in Neolithic studies (Grigson in Ashbee 1966; Kinnes 1985; Hodder 1990; Ray & Thomas 2003; Pollard 2005; 2006). While the evidence from the re-examined sites cannot be used to dispute this argument, it is clear that cattle were not recovered in significant quantities compared with other species (Tables 2–7), and the importance of cattle within society was not articulated by differential treatment at these sites. Even where cattle were numerically abundant, such as at Ascott-under-Wychwood, they were almost absent from the cists, being instead confined to the buried soil, midden, barrow make-up, and quarry pits (Mulville & Grigson 2007). There does seem, however, to be something to be made from a relationship between the axial divide and/or areas of rapid constructional infilling of the superstructure and cattle skulls. Skulls are present, and seem to be used as architectural materials, at Ascott-under-Wychwood (Mulville & Grigson 2007; McFadyen 2007b), and at the earthen long barrow sites of Fussell's Lodge and Beckhampton Road (McFadyen 2007a, 23). For example, at Beckhampton Road in Wiltshire, two cattle skulls with the cervical vertebrae still attached were incorporated into rock rubble that was then enclosed in stacks of turf that also surrounded the axial stake line of the barrow. It is interesting to note, then, that there was a similar treatment to the same parts of the same kind of animal at a Cotswold-Severn and an earthen long barrow site. The deposits were also within the same temporal context within both sites: the construction of the superstructure. Furthermore, the architectural techniques that were involved in the construction of the upcast mounds of Cotswold-Severn and earthen long barrows were very similar.

New ways of thinking

So what evidence do we have at these sites? Clearly there are some common features amongst the assemblages examined. For example, many long barrows contain the articulated and disarticulated remains of foetal and young animals, and the blocking of these sites can include large quantities of loose teeth. How then do these patterns reflect upon the nature of human–animal relationships in the Early Neolithic? It is important to articulate from the outset that there is not some kind of singular prescriptive practice, or one paradigm, that explains human–animal relationships. Moreover, the idea that a species could represent or stand in as a symbol for a single facet of life, sometimes implied in earlier studies, is unsustainable. Taking pigs as an example, this research shows the diversity of ways a single species was used within these sites: at Ascott-under-Wychwood several neonatal domestic pigs were butchered and deposited in a pit with other occupation evidence during the 'pre-barrow' phase; at Adlestrop the remains of a foetal pig and a butchered calcaneum were deposited inside the chamber; and at Nympsfield large numbers of pigs teeth had been incorporated into the blocking material of the chamber. Thus, it is not only the type of animal that is meaningful, but it is the temporal context from which the animal is recovered that helps us to explore the nature of the relationships being expressed. This paper seeks to extend evidence for occupation into architectural construction by emphasising the connection between pits and midden features, and midden features and chambers, rather than separating them out into a simple-stated order where buried soil was sealed below an upcast mound (and thus associated with occupation) and chambers were within a long barrow mound (and thus associated with the burial of the dead and ritual activity). It should be remembered that foetal pigs were found in both contexts, which perhaps points to similarities in the treatment of animals in these contexts and the comparative practices that generated these assemblages. It is in the context of the blocking material of the chamber, and the incorporation of loose pig teeth, where difference lies; a much later temporal context and one that is related to the closing down of the site rather than its construction.

The significance of depositing young domestic animals is difficult to establish. At West Tump there was a clear association between a young dog and a young adult and at Windmill Hill, Wiltshire, associations between infant burials and young animal skeletons were noted (Whittle *et al.* 1999). This may suggest that the young age of both the dog and the person marked them out in some way and necessitated similarity in treatment during deposition. One alternative explanation, however, is that these young animals refer to the fact that certain activities took

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place at particular times of the year. For example, the foetal calf at Notgrove and pig at Adlestrop were both around 200 days old following conception, while the sheep at Notgrove was much younger. This evidence could support the idea of seasonal disposal practice, an interpretation also drawn at Hazleton North (Levitan 1990, 211). In this context, the fixation on the age of the young person and the young dog at West Tump may therefore obscure our understanding of the nature of this deposit; it may again represent a temporal act of deposition, perhaps indicating the importance of long barrows within seasonal cycles of activity across the landscape as Edmonds (1999, 62) has suggested.

The presence of animal bones within architectural contexts also supports the idea that architecture was marked or constructed through the deposition of animals. The cattle skulls incorporated into the long axis of the mound at Ascott-under-Wychwood and Beckhampton Road (Mulville & Grigson 2007; McFadyen 2007a), together with mandibles and teeth embedded within structural elements, support the view that animals were intimately related to particular areas or aspects of construction. Perhaps we should concentrate more on how imbricated practices of occupation, burial, and construction were, as Pollard (2006, 143) has suggested for the relationship between people and animals, and how butchery may have been an activity that was a part of architectural practice, rather than skipping to the meaning of the deposit and the importance of an identification between cattle, people and 'mortuary context' (Pollard 2006, 138–9).

CONCLUSIONS

The evidence presented in this paper questions previous interpretations of the significance of animals within Cotswold-Severn long barrows, which have largely been undertaken without full consideration of the zooarchaeological evidence, and often rest on incorrect or partial analyses published at the end of the 19th and beginning of the 20th centuries. While much more research needs to be conducted on this topic, particularly combining the artefactual, human skeletal, and architectural evidence, this study has highlighted new characteristics into how animals became incorporated into Cotswold-Severn long barrow sites, which has only been possible though an integrated approach of studying both faunal remains and the various architectural contexts.

Endnotes

[1]Traditionally, accounts of these sites refer to the chambers, ditches, superstructure (the upcast mound and all of the stone or wood partitions within it), and forecourt in terms of the construction and use of the monument. There are often features such as hearths, timber structures, pits, and middens underneath the upcast mound, but these are described in terms of the occupation of the site before a monument was built. Similarly, but at the other end of the spectrum, blocking material is understood in terms of the decommissioning of the monument. This paper is questioning this order to things by suggesting that the hearths, timber structures, pits, and middens were incorporated into architectural construction, that chambers could have been freestanding before the mound was constructed, and that forecourt and blocking materials are both late temporal contexts.

[2]This term refers to the upcast mound and the stone or wood partitions within it, such as the axial divide and its off-sets or bays.

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BIBLIOGRAPHY

Ashbee, P. 1966. The Fussell's Lodge long barrow excavations, 1957. *Archaeologia* 100, 1–80

Barber, J. 1988. Isbister, Quanterness and the Point of Cott: the formulation and testing of some middle range theories. In J.C. Barrett & I.A. Kinnes (eds), *The Archaeology of Context in the Neolithic and Bronze Age: recent trends*, 57–62. Sheffield: John R. Collis

Barrett, J.C. 1984. The living, the dead, and the ancestors: Neolithic and early Bronze Age mortuary practices. In J.C. Barrett & I.A. Kinnes (eds), *The Archaeology of Context in the Neolithic and Bronze Age: recent trends*, 30–41. Sheffield: John R. Collis

Barrett, J. Bradley, R. & Green, M. 1991. *Landscape, Monuments and Society: the prehistory of Cranborne Chase*. Cambridge: University Press

https://doi.org/10.1017/S0079497X00000463 Published online by Cambridge University Press

Bate, D.M.A. 1936. Appendix VII. In Clifford (ed.) 1936, 156–7

Bate, D.M.A. 1938. Appendix VII. In Clifford (ed.) 1938, 212–13

Benson, D & Whittle, A. (eds) 2007. *Building Memories: the Neolithic Cotswold Long Barrow at Ascott-under-Wychwood, Oxfordshire*. Oxford: Oxbow

Berry, Sir J. 1929. Belas Knap long barrow, Gloucestershire; report of the excavations of 1929. *Transactions of the Gloucestershire & Bristol Archaeological Society* 51, 273–303

Berry, Sir J. 1930. Belas Knap long barrow, Gloucestershire. Second report of the excavations of 1930. *Transactions of the Gloucestershire & Bristol Archaeological Society* 52, 123–50

Bourdon, R.M. & Brinks, J.S. 1982. Genetic, environmental and phenotypic relationships among gestation length, birth weight, growth traits and age at first calving in beef cattle. *Journal of Animal Science* 55, 543–53

Bradley, R.J. 1984. Studying monuments. In R.J. Bradley & J. Gardiner (eds), *Neolithic Studies*, 61–6. Oxford: British Archaeological Report 133

Brickley, M. & Thomas, R. 2004. The young woman and her baby or the juvenile and their dog: re-interpreting osteological material from a Neolithic long barrow. *Archaeological Journal* 161, 1–10

Britnell, W.J. 1984. The Gwernvale long cairn, Crickhowell, Brecknock. In W.J. Britnell and H.N. Savory (eds), *Gwernvale and Penywyrlod: two Neolithic long cairns in the Black Mountains of Brecknock*, 41–154. Cardiff: Cambrian Archaeological Monographs 2

Buckman, J. 1865. Notes on an ancient British tumulus at Nympsfield opened by the Cotteswold Club. *Proceedings of the Cotteswold Naturalists Field Club* 3, 184–8

Bull, G. & Payne, S. 1988. Components of variation in measurements of pig bones and teeth, and the use of measurements to distinguish wild from domestic pig remains. *Archaeozoologia* 2, 27–65

Bünger-Marek, I. 1972. *Beitrag zur Altersbestimmung von Feten des Deutschen Schwarzbunten Rindes insbsesondere auf Grund von Längenmassen*. University of Hannover: unpublished Thesis

Carpentier, V.; Ghesquière, E. & Marcigny, C. 2007. *Archéologie en Normandie*. Paris: Éditions Ouest-France

Clifford, E.M. 1936. Notgrove long barrow, Gloucestershire. *Archaeologia* 86, 119–161

Clifford, E.M. 1938. The excavation of Nympsfield long barrow, Gloucestershire. *Proceedings of the Prehistoric Society* 4, 188–213

Clifford, E. 1966. Hetty Pegler's Tump. *Antiquity* 40, 129–32

Darvill, T. 2004. *Long Barrows of the Cotswolds and Surrounding Areas*. Stroud: Tempus

Deniz, E. & Payne, S. 1982. Eruption and wear in the mandibular dentition as a guide to ageing Turkish Angora goats. In B. Wilson, C. Grigson & S. Payne (eds), *Ageing and Sexing Animal Bones from Archaeological Sites*, 155–206. Oxford: British Archaeological Report 109

Donovan, H.E. 1938. Adlestrop Hill barrow, Gloucestershire. *Transactions of the Gloucestershire & Bristol Archaeological Society* 60, 152–64

Edmonds, M. 1999. *Ancestral Geographies of the Neolithic. Landscape, Monuments and Memory*. London & New York: Routledge

Field, D. 2006. *Earthen Long Barrows: the Earliest Monuments in the British Isles*. Stroud: Tempus

Gjesdal, F. 1972. Age determination of swine foetuses. *Acta Veterinaria Scandinavica Supplementum* 40, 1–29

Grant, A. 1982. The use of tooth wear as a guide to the age of domestic ungulates. In B. Wilson, C. Grigson & S. Payne (eds), *Ageing and Sexing Animal Bones from Archaeological Sites*, 99–108. Oxford: British Archaeological Report 109

Grimes, W.F. 1960. *Excavation on Defence Sites, 1939–1945. Vol 1. Mainly Neolithic and Bronze Age*. London: HMSO, Ministry of Works Archaeological Report 3

Habermehl, K.-H. 1975. *Die Altersbestimmung bei Haus-und Labortieren*. Berlin/Hamburg: Paul Parey

Harland, J.F., Barrett, J.H., Carrott, J., Dobney, K. & Jaques, D. 2003. The York System: an integrated zooarchaeological database for research and teaching. *Internet Archaeology* 13 (http://intarch.ac.uk/journal/issue13/harland_index.html)

Hemp, W.J. 1929. Belas Knap long barrow, Gloucestershire. *Transactions of the Gloucestershire & Bristol Archaeological Society* 51, 261–72

Hodder, I.R. 1990. *The Domestication of Europe*. Oxford: Blackwell

Jackson, J.W. 1929. Report on the remains from Belas Knap, Gloucestershire. In Hemp (ed.) 1929, 271–2

Jones, A. & Richards, C. 2003. Animals into ancestors: domestication, food and identity in Late Neolithic Orkney. In M. Parker-Pearson (ed.), *Food, Culture and Identity in the Neolithic and Early Bronze Age*, 45–51. Oxford: British Archaeological Report S1117

Kinnes, I.A. 1985. Circumstance not context: the Neolithic of Scotland as seen from outside. *Proceedings of the Society of Antiquaries of Scotland* 115, 115–57

Kinnes, I. 1992. Non megalithic long barrows and allied structures in the British Neolithic. London: British Museum

Klein, R.G. & Cruz-Uribe, K. 1984. *The Analysis of Animal Bones from Archaeological Sites*. Chicago: University Press

Lawrence, W.L. 1866. Examination of a long barrow in Gloucestershire. *Proceedings of the Society of Antiquaries of London* (2nd ser.) 3, 275–82

Levitan, B. 1990. The non-human vertebrate remains. In Saville (ed.) 1990, 199–214

Matschke, G.H. 1967. Aging European wild hogs by dentition. *Journal of Wildlife Management* 31(1), 109–13

McCormick, F. 1984. Large mammal bone. In N.M. Sharples (ed.), Excavations at Pierowall Quarry, Westray, Orkney. *Proceedings of the Society of Antiquaries of Scotland* 114, 108–12

McFadyen, L. 2006. Building technologies, quick and slow architectures and early Neolithic long barrow sites in southern Britain. *Archaeological Review from Cambridge*. 21(1), 117–34

McFadyen, L. 2007a. Neolithic architecture and participation – practices of making in early Neolithic Britain. In J. Last (ed.), *Beyond the Grave: New Perspectives on Barrows*, 22–9. Oxford: Oxbow

McFadyen, L. 2007b. Making architecture. In D. Benson & A. Whittle (eds), *Building Memories: the Neolithic Cotswold Long Barrow at Ascott-under-Wychwood, Oxfordshire*, 348–353. Oxford: Oxbow Books

McFadyen, L., Benson, D. and Whittle, A. 2007. The long barrow. In Benson & Whittle (eds) 2007, 79–136

Morey, D.F. 2006. Burying key evidence: the social bond between dogs and people. *Journal of Archaeological Science* 33, 158–75

Mulville, J. & Grigson, C. 2007. The animal bone. In Benson & Whittle (eds) 2007, 237–54

O'Neill, H.E. 1966. Sale's Lot long barrow, Withington, Gloucestershire. *Transactions of the Bristol and Gloucestershire Archaeological Society* 85, 5–35

Payne, S. 1973. Kill-off patterns in sheep and goats: the mandibles from Asvan Kale. *Anatolian Studies* 23, 281–303

Payne, S. 1975. Partial recovery and sample bias. In A.T. Clason (ed.), *Archaeozoological Studies*, 7–17. Amsterdam: North Holland Publishing

Payne, S. 1987. Reference codes for wear stages in the mandibular cheek teeth of sheep and goats. *Journal of Archaeological Science* 14, 609–14

Piggott, S. 1954. *The Neolithic Cultures of the British Isles*. Cambridge: University Press

Piggott, S. 1962. *The West Kennet Long Barrow: Excavations 1955–56*. London: HMSO

Pollard, J. 1993. *Traditions of Deposition in Neolithic Wessex*. University of Wales College Cardiff: unpublished Thesis

Pollard, J. 2005. Memory, Monuments and Middens in the Neolithic Landscape. In G. Brown, D. Field & D. McOmish (eds), *The Avebury Landscape. Aspects of the Field Archaeology of the Marlborough Downs*, 103–14. Oxford: Oxbow

Pollard, J. 2006. A community of beings: animals and people in the Neolithic of Southern Britain. In D. Serjeantson & D. Field (eds), *Animals in the Neolithic of Britain and Europe*, 135–48. Oxford: Oxbow/Neolithic Studies Group Seminar Paper 7

Ray, K. & Thomas, J. 2003. In the kinship of cattles: the social centrality of cattle in the early Neolithic of southern Britain. In M. Parker-Pearson (ed.), *Food, Culture and Identity in the Neolithic and Early Bronze Age*, 37–44. Oxford: British Archaeological Report S1117

Regli, K. 1963. Beitrag zur Altersbestimmung von Feten des Simmentaler und Freiburger Fleckviehrindes insbsesondere auf Grund von Messungen an Gliedmassenknochen. Zürich: unpublished thesis

Rolleston, G. 1876. On the people of the long barrow period. *Journal of the Royal Anthropological Institute* 5, 120–73

Ryder, M.L. 1983. *Sheep and Man*. London: Duckworth

Saville, A. 1979. Further excavations at Nympsfield chambered tomb, Gloucestershire, 1974. *Proceedings of the Prehistoric Society* 45, 53–91

Saville, A. 1990. *Hazleton North: the Excavation of a Neolithic Long Cairn of the Cotswold-Severn Group*. London: English Heritage Archaeological Report 13

Schmid, E. 1972. *Atlas of Animal Bones for Prehistorians, Archaeologists and Quaternary Geologists*. New York: Elsevier

Silver, I.A. 1969. The ageing of domestic mammals, In D. Brothwell & E. Higgs (eds), *Science in Archaeology* (2nd edn), 283–302. London: Thames & Hudson.

Smith, M. 2006. Bones chewed by canids as evidence for human excarnation: a British case study. *Antiquity* 80, 671–85

Smith, M. & Brickley, M. 2006. The date and sequence of use of Neolithic funerary monuments: new AMS dating evidence from the Cotswold-Severn region. *Oxford Journal of Archaeology* 25(4), 335–55

Thomas, J. 1988. The social significance of Cotswold-Severn burial practices. *Man* 23(3), 540–59

Thomas, J. 1991. *Rethinking the Neolithic*. Cambridge: University Press

Veale, E.M. 1957. The rabbit in England. *Agricultural History Review* 5(1), 85–90

Whittle, A., Pollard, J. & Grigson, C. 1999. *The Harmony of Symbols. The Windmill Hill Causewayed Enclosure, Wiltshire*. Oxford: Oxbow

Whittle, A., Barclay, A., Bayliss, A., McFadyen, L., Schulting, R. & Wysocki, M. 2007. Building for the dead: events, processes and changing worldviews from the 38th to the 34th centuries cal BC in southern Britain. *Cambridge Archaeological Journal* 17(1)

Witts, G.B. 1881. Description of the long barrow of West Tump in the parish of Brimpsfield, Gloucestershire. *Transactions of the Gloucestershire & Bristol Archaeological Society* 5, 201–11

Wysocki, M. & Whittle, A. 2000. Diversity, lifestyles and rites: new biological and archaeological evidence from British earlier Neolithic mortuary assemblages. *Antiquity* 74, 591–601