

BENI ARCHEOLOGICI - CONOSCENZA E TECNOLOGIE

QUADERNO 6

UOMINI, PIANTE E ANIMALI NELLA DIMENSIONE DEL SACRO

a cura di
Francesco D'Andria, Jacopo De Grossi Mazzorin e Girolamo Fiorentino



EDIPUGLIA

«Thou shalt take of the ram ... the right thigh; for it is a ram of consecration ...» some zoo-archaeological examples of body-part preferences

di *Simon J.M. Davis**

* *Instituto Português de Arqueologia*

Riassunto

Il presente contributo esamina quattro associazioni di resti di mammiferi provenienti da siti archeologici a Cipro, in Israele e in Inghilterra. Le caratteristiche insolite delle associazioni analizzate suggeriscono una selezione antropica intenzionale di determinate parti della carcassa, correlabile a pratiche rituali o semi-rituali. I casi presentati riguardano: il sacrificio di ossa calcinate dell'arto posteriore destro di pecore e capre provenienti dal Tempio di Apollo a Cipro (ca. VII secolo a.C.); le ossa dell'arto anteriore destro di pecore e capre dal sito dell'Età del Ferro di Tell Qiri, in Israele (XII-XI secolo a.C.); un insieme di 185 crani, alcune mandibole, scapole e pelvi di bovini, nonché un cranio di uro, dal tumulo dell'età del bronzo di un personaggio importante a Irthlingborough, in Inghilterra (ca. 2500 a.C.); le ossa dell'arto posteriore di un daino dal castello medievale di Launceston (XIII-XV secolo), sempre in Inghilterra. Le associazioni provenienti da questi quattro siti gettano luce su alcune pratiche inusuali dell'antichità.

1. Introduction

Different parts of the animals we eat today have different values. A sirloin steak costs more than the feet or the tail, and special importance is often attached to specific parts like the head, which in some cultures is highly prized and in others considered of little value. In our own thinking, side of body also has significance, with left and right having very different connotations. The English word “sinister” – suspicious, dishonest, harmful – is derived from the same word in Latin that means left side. Both “part of body” and “side” were clearly important in the biblical command (*Exodus*, 29) that forms part of the title of this article. Are these words reflected in the zoo-archaeological record and does it have any bearing upon the rituals of our ancestors?

Animal bones found on archaeological sites are usually haphazardly scattered remains of what people ate in antiquity. BRAIN (1967; 1969) was the first to show that the frequencies of different parts of the animal skeleton found on an archaeological site usually reflect differences in rates of post-mortem destruction. Dense parts,

especially teeth, but also bones or parts of bones like the astragali, distal humeri, distal tibiae and distal metapodials, are more likely to withstand destruction and are therefore more commonly found during an excavation.

Occasionally the zoo-archaeologist encounters animal bones that belong to very specific parts of the skeleton. These may be interpreted as butchery or industrial waste. One example is the concentration of cattle horn cores from 17th/18th century AD Cutler Street in the City of London that ARMITAGE (1978) suggested derived from a horner's workshop. Another is an unusually large number of sheep foot bones from 17th/18th century AD Walmgate in York, England, which O'CONNOR (1984) interpreted as waste from a tannery. A somewhat unusual example comes from 15th-16th century Norwich, England, where MORENO GARCÍA (in press) found 270 left and 122 right goose metacarpals (the metacarpal is the bone at the tip of the wing). She explains the bias towards left side in terms of curvature of the feather and its use for quill pens. Left and a right feathers curve in different directions and a right-handed person prefers to write with a left feather since it curves

away from the eyes (RIDDLE 1943). These bones, according to Moreno García, are probably the refuse from a quill-dresser's workshop.

A number of interesting finds of specific parts of animals in archaeological contexts have been described that appear to be more of a ritual or sacrificial nature. One example comes from the 11th/12th century AD Canadian Arctic where flippers, tail and tongues of the Bowhead whale (*Balaena mysticetus*) were preferentially placed near wealthy households of whalers and in a major ceremonial structure (WHITRIDGE 2002). Another example comes from Sudan where during the Kingdom of Kerma (3rd-2nd millennium BC) cattle crania were sometimes placed around the edges of graves. Bucrania were positioned as if they were a living herd, large males in front, followed by females, some accompanied by calves – perhaps all killed simultaneously at the time of the funeral. In one instance, as many as 5.000 bucrania were found (CHAIX, GRANT 1992; GRANT 2001). In ancient Greece the gods received burnt offering of specific parts of the carcass such as the sacrum, tail and thighbones, sometimes wrapped in layers of fat, while most of the animal, including the choice cuts of meat, was cooked and consumed by human participants in the sacrifice (ISAAKIDOU ET AL. 2002; FORSTENPOINTNER in press). ISAAKIDOU ET AL. (2002) studied the bones from the Mycenaean "Palace of Nestor" (c. 1200 BC; Pylos southwest Peloponnese). There they found five discrete groups of burnt animal bones, mostly cattle and red deer, that contained the same selected range of body parts – left and right mandibles, humerus and femur. Knife marks on these bones, they suggest, indicated that they had been stripped of meat before burning, which may be evidence for the Mycenaean practice of animal sacrifice that in later Greek tradition, entailed burning selected parts of the carcass previously stripped of meat. The animal bones from a Doric temple at Asea (c. 500 BC; Arcadia), comprised large numbers of heavily burnt fragments of sheep/goat femora, patellae, tail vertebrae and sacra (VILA 2000). Both right and left sides were present, and most came from adults. In addition Vila found nearly 40 shafts of femora from neonatal/infant piglets or

lambs. CHENAL-VELARDE (2001) found something similar at Eretria (8th century BC, Euboia, also in Greece). In the sacrificial deposit 93% of the caprine bones were burnt femora, while in another sector of the site she noted a marked under-representation of this bone! At a sanctuary dedicated to Apollo FORSTENPOINTNER (in press) found a strong preference for bones from the right side of the animal and at the Artemision at Ephesus, (now in western Turkey), he notes a predominance of caprine femora, and cattle tail vertebrae. Clearly these are examples of selection of particular parts of the animal for sacrifice. Besides anatomical selection, particular species were offered to deities – cattle to Hera, pigs to Demeter and Persephone, and goats to Dionysos, Apollo, Artemis and Aphrodite (VILA 2000). BECKER (2000) has surveyed evidence for the inclusion of animals or their parts with human burials. She suggests that an emotional link between man and animal must have remained intact after death and that animals were considered to serve a similar function in both life and death.

In the course of my studies of animal remains from archaeological sites in the eastern Mediterranean and England I have encountered four unusual assemblages of food-animal (sheep, goat, cattle and deer) bones. They comprised very particular parts of the skeleton that almost certainly represent some kind of ritual rather than craft or economic practice. One, from Bronze Age England, is interpreted as a ritual in which an important *man* was revered and consists of the covering of his skeleton with over 185 cattle skulls, and a smaller number of mandibles, scapulae and pelves (DAVIS, PAYNE 1993). Another, from a Medieval English castle, is interpreted as a kind of ritual in which an important *stratum of society* was revered and consists of a marked preference for hind limbs of fallow deer (ALBARELLA, DAVIS 1996). Two examples from Iron Age Israel and Archaic Cyprus (DAVIS 1987; 1996) are interpreted as rituals in which *deities* were revered, and comprise right limb bones of sheep and goat – fore limbs in Israel and hind limbs in Cyprus. My aim here is to briefly describe these four strange collections.

The four examples with their dates are as follows:

- Launceston Castle, Cornwall, England (late 13th and 15th centuries AD)
- Temple of Apollo, Kourion, Cyprus (Archaic, 8th-6th century BC)
- Tell Qiri, Jezreel valley, Israel (Iron Age 12th-11th centuries BC)
- Irthlingborough barrow, Northants, England (Bronze Age, c. 2.500 BC)

Launceston Castle, Cornwall, England (Medieval)

The Normans built Launceston Castle in the late 11th century AD. It remained a high status residence for two or three centuries and subsequently declined in importance. Andrew Saunders excavated it between 1961 and 1982 (SAUNDERS 1973; 1984). The huge collection of animal bones from this site comprised mainly sheep, cattle and pig. Fallow deer too were present in significant numbers. While the body-part distribution of the sheep, cattle and pig did not reveal any particular preference, most of the fallow deer bones derived from the hind limbs. Especially common were tibia, astragali, calcanea and metatarsals (Tab. 1). Pelves of fallow deer were not found, and their absence suggests that the hind limbs were brought into the castle already detached from the animal. This prevalence of Cervid hind-limb bones is interesting and has been noted at several other castles in England. Some examples include: Barnard Castle (JONES *ET AL.* 1985); Sandal Castle, West Yorkshire (GRIFFITH *ET AL.* 1983); Prudhoe Castle, Northumberland (DAVIS 1987); Okehampton, Devon, (MALTBY 1982) and Scarborough Castle, Yorkshire (WEINSTOCK 2002). The preference for hind-quarters of large deer seems to characterise high status sites: perhaps an example of what HARRISON (1577 III, 1:94) meant when he wrote of the English nobility's predilection for «...*some portion* of the redde or fallow deere...» (my italics). It was apparently customary in Medieval England for the aristocracy to be offered what was considered the choice part of the hunted animal – its haunch. Perhaps it was not a ritual in the conventional

	Periods 6+8 (medieval) MNI
Incisor	2
Dp ₄ + P ₄	7
M _{1/2}	8
M ₃	6
Scapula (glenoid)	0
Humerus (distal)	4
Radius (distal)	2
Metacarpal (distal)	6
Femur (distal)	3
Tibia (distal)	38
Astragalus	33
Calcaneum	19
Metatarsal (distal)	40
First phalanx (proximal)	9
Third phalanx	1

Tab. 1. - Minimum numbers of animals as represented by different parts of the fallow deer (*Dama dama*) skeleton from medieval periods 6 and 8 at Launceston Castle, Cornwall, England. Note the clear preference for bones of the hind limb.

sense but something that might be called “almost ritual” – homage paid to the nobility.

Temple of Apollo, Kourion, Cyprus (Archaic, 8th-6th century BC)

One mile west of the ancient city of Kourion in southern Cyprus is the site of the Temple of Apollo Hylates. In the 1980s the late Diana Buitron-Oliver excavated the circular Sanctuary or Archaic precinct and a Semicircular Altar at this site (BUITRON-OLIVER 1996). These localities are dated to the late 8th to 6th centuries BC. Most of the animal bones (Tab. 2) from these two areas were calcined and highly fragmented suggesting that they had been heated to a high temperature. They had suffered some warping and all had shrunk to less than half their probable original size. The most common animals represented are caprines (sheep and goat). Bones of these two animals are difficult to identify to species at the best times, and the severe treatment they have suffered enhanced this difficulty, although several better-preserved astragali, calcanea and metapodials indicate that both species are represented. Some of the limb bones could be separated according to the state of

fusion of their epiphyses – unfused (juvenile) and fused (adult). 67 of the 79 distal tibiae are unfused, and 100 of the 114 calcanea had an unfused *tuber calcis*. These data indicate that the majority of animals sacrificed were young. Indeed some of the bones' articular surfaces are pitted and wrinkled indicating incomplete ossification. Many very young, perhaps even newborn animals were offered up.

Of great surprise was the discovery that nearly all the bones in this sacrificial assemblage of animal remains derive from the right hind limb. Which parts of the limb were represented? The scarcity of pelvic girdle bones and the abundance of *caput femoris* (thighbone head) suggest that right hind limbs were excised at the femoral-pelvic joint.

Metatarsals and phalanges (foot bones), which have very little meat around them, are also rare, suggesting these were removed prior to sacrifice. Why the preference for right hind limbs? Is this an example, albeit in Cyprus, of what the Bible commands? It may have been a characteristic of Cypriot culture during the first millennium BC. The possibility that this preference for right hind limbs of caprines is somehow linked to the veneration of Apollo seems likely. John Watson (see JAMESON 1988), studied the animal bones from the middle and back rooms of the Temple of Apollo at Halieis, Argolid (Greece, 5th century BC). He identified bones of very young sheep/goat tibiae, metatarsals and pelvises from a minimum of 12 animals. Most came from the right side – respectively 10:1, 9:2 and 12:2. Tibiae of at least 49 very young pigs were also represented. Description of a similar preference for the right side, but fore-limb, from Iron Age Tell Qiri in Israel now follows.

Tell Qiri, Jezreel valley, Israel (Iron Age 12th-11th centuries BC)

In the mid 1970s Ammon Ben-Tor excavated Tell Qiri, an Iron Age, probably Canaanite, village in the Jezreel valley (BEN TOR, PORTUGALI 1987). The majority of the animal bones from the site were identified as sheep and goat (in approximately equal

	Left	L/R	Right
Mandibular teeth	3	12	1
Vertebra frags		7	
Ribs		6	
Scapula (glenoid)	1		-
Humerus (distal)		2	
Radius (distal)	1		2
Metacarpal (proximal)		1	
Pelvis (ischium)	2		4
<i>Caput femoris</i>		17	
Femur (distal condyles)		44	
Patella		42	
Tibia (distal)	5	1	73
Calcaneum (prox part)	10	7	97
Calcaneum (central artien.)	1		47
Astragalus	2	1	71
Metatarsal (proximal)	-		1
Phalanx 1		5	
Phalanx 2		8	
Phalanx 3		2	

Tab. 2. - Calcined sheep/goat bones (these are total counts) from the circular sanctuary and semicircular altar (8th - 6th century BC) at the Temple of Apollo, Cyprus. L = left, R = right, L/R = unassigned to side. NB: 67 of the 79 distal tibiae and 100 of the 114 calcanea are unfused (i.e. they came from juvenile animals).

proportions), some cattle as well as pig, fallow deer and gazelle. Of great interest however were the bones from five “cultic” loci dated to the 12th – 11th centuries BC. Nearly all come from the forelimbs and they are from the right side of the body (DAVIS 1987; see Tab. 3). The bones present are scapula (shoulder blade), humerus and radius. These are the bones that are surrounded with an abundance of meat. As at Kourion, the absence of foot bones (in this case the metacarpals and phalanges) that have very little flesh attached to them suggests that we are here dealing with meat offerings, though it was not possible to discover whether the meat had been removed prior to sacrifice as supposedly happened in ancient Greece (see above). Here again we may

	Left	L/R	Right
Scapula (glenoid)	2		78
Humerus (distal)	4		68
Radius (distal)	2		39
Metacarpal (distal)	0		0
Femur (distal)	1		1
Tibia (distal)	2		2
Calcaneum	2		3
Astragalus	1		1
Metatarsal (distal)		2	
Third Phalanges		3	

Tab. 3. - Counts of sheep and goat bones from five “cultic” loci at Iron Age Tell Qiri, Israel. L = left, R = right, L/R = unassigned to side. NB: of the right scapulae, humeri and radii, 26, 6 and 20 respectively were unfused (i.e. they came from juvenile animals).

have zoo-archaeological evidence for the Biblical preference for sacrifice of the right side of part of an animal, (although *Exodus* 29, mentions the right thigh rather than the right fore-quarter). Clearly the priests at both Kourion and Tell Qiri had a very specific preference for one limb only in their sacrificial rites – right forelimbs in Israel and right hind limbs in Cyprus. Does this shared preference signify some kind of relationship between the ancient Semitic and Greek worlds as FORSTENPOINTNER (in press) asks?

Irthlingborough barrow, Northants, England (Bronze Age, c. 2.500 BC)

The Early Bronze Age barrow at Irthlingborough on the river Nene in Northamptonshire, England, was excavated in 1986 under the direction of CLAIRE HALPIN (1987a; 1987b). This deposit is thought to represent a cairn of stones and bones which collapsed after the decay of a timber structure that once formed a roof over a burial pit. This pit contained the skeleton of an adult man accompanied by numerous grave goods whose exceptional quality indicates that he was of great importance. A substantial deposit of animal bones overlay this pit. These clearly derive from what we now believe to be the remains of some strange ritual practised in England almost 4.000 years ago. Nearly all the remains were cattle teeth. Five

maxillary teeth, on the basis of their larger size, are presumed to have belonged to an aurochs, the wild cattle. What parts of the skeleton were represented? As Tab. 4 shows, most were upper teeth that must have come from at least 184 skulls (i.e. 1100 divided by 6; the number of molars in each skull). There were also a smaller number of mandibular teeth, scapulae and pelvis. Essentially there were no other parts of skeleton. This kind of anatomical representation – many skulls, fewer mandibles and girdles, and almost no long bones, ribs and vertebrae – is extremely unusual. Preservation factors can be ruled out as an explanation for this strange distribution of parts of the skeleton. There were, for instance, only 3 distal humeri, one of the heaviest and strongest bones, compared with 144 occipital condyles, a more fragile part at the back of the skull. The deposit may well have originally comprised the skulls, mandibles, scapulae and pelvis of at least 40 cattle together with the skulls alone of at least a further 145 cattle without any other parts of the skeleton (i.e. the total number of cattle slaughtered was c. 185). Closer inspection of the numbers of different cattle teeth reveals an interesting pattern of loss, and may provide a clue as to the state in which the skulls were originally incorporated into the barrow. While a total of 1100 upper molars and 200 lower molars was found, the number of premolars decreases towards the front of the mouth in both upper and lower jaws. Only 1 incisor was found where there would originally have been 272. Incisors and premolars are smaller teeth, which, after death, tend to fall out of the jaw more readily than the molars. Molar teeth have spreading roots that anchor them more firmly into their sockets. It seems probable that the loss of incisors and premolars occurred during a delay between slaughter and burial in the barrow.

What does all this mean? The simplest interpretation would be to suggest that all the 185 cattle were killed and eaten at the site. The quantity of meat that they would have provided is formidable, conjuring up images of large scale feasting on the banks of the river Nene. 185 cattle would have provided at least 40 tons of meat, which on a ration of 1 Kg per person per day would feed 40.000 people for a day, or 500 people for 2,5 months. One

possible scenario would involve the killing of the animals and large-scale consumption of meat in the course of ceremonies taking place over a relatively short period near the barrow. The skulls could have been stacked on one side for weeks or months during which the incisors and many of the pre-molars were lost, and then piled on the cairn and buried. Another possibility is that only 40 or so of the cattle were killed and consumed in this way at the site, and that the remainder of the skulls came from animals slaughtered and eaten elsewhere, and brought to the site and piled on the cairn as tokens.

Are there modern parallels? In parts of Madagascar, where cattle reflect status and wealth (MACK 1986), elaborate funeral rites are still carried out involving large numbers of cattle. The dead are buried and following a period during which the corpse is reduced to dried bones, the skeleton of the deceased is disinterred, and then re-buried. A feast, in which beef is an important ingredient, accompanies this secondary burial, called *Famadihana*. The accompanying feast for which many cattle are sacrificed, may last several days, or even a whole month, and involves elaborate preparations and very great expense, even reducing the family of the deceased to poverty. In parts of southern Madagascar however, *Famadihana* is not practised, so the dried human bones cannot be seen. Instead, cattle skulls – perhaps symbolising the desiccation of the human skeleton – are placed over the tomb or on some high place nearby. These are skulls of cattle sacrificed during the funeral, whose number reflects the status of the deceased, the skull being an emblem of both virility and power.

Drawing parallels between modern Madagascar and ancient England is speculative to say the least. However, it is worth noting that in both cases funerary rites appear to have concentrated upon one species while the everyday diet is more varied: in Madagascar, goats, pigs and birds are eaten as well as beef, while sheep, pig and deer are commonly found in prehistoric sites in Britain as well as cattle. The Irthlingborough assemblage of cattle bones can be seen as a symbol of the power and status of the buried man, and adds weight to earlier suggestions (PIGGOTT 1962; GRIGSON 1984; GRANT 1991) that in prehistoric Britain as in Madagascar today, cattle had important symbolic as well as economic value.

	Left	L/R	Right
Skull		184	
(Upper Molars		1100)	
(P ⁴ and dP ⁴		288)	
(P ³ and dP ³		163)	
(P ² and dP ²		29)	
Mandibles	31		38
(Lower Molars		200)	
(P ₄ and dP ₄		43)	
(P ₃ and dP ₃		29)	
(P ₂ and dP ₂		7)	
(Incisors		1)	
Atlas		7	
Axis		1	
Scapula (glenoid)	32		33
Humerus (distal)	2		1
Radius (distal)	1		0
Metacarpal (distal)	0		1
Pelvis	15		12
Femur	1		0
Tibia	1		0
Calcaneum	0		0
Astragalus	0		0
Metatarsal (distal)	1		0
Phalanges		1	

Tab. 4. - Minimum numbers of different parts of the cattle skeleton, (and total tooth counts in parentheses) recovered from the Bronze Age barrow at Irthlingborough, Northamptonshire, England. L = left, R = right, L/R = unassigned to side.

2. Summary and conclusions

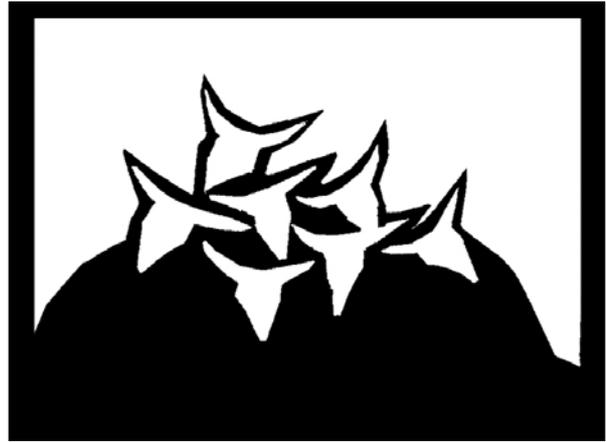
These four unusual collections of animal bones from archaeological sites in Israel, Cyprus and England all demonstrate how animal bones can occasionally reflect ritual practices in antiquity – whether it be the priests' offering to the gods, the reverence paid to men of very high rank or tributes offered to lords of the castle. Clearly in both Cyprus and Israel the precise location of the sacrificed limb, fore/hind, right/left – was important. In the Bronze Age of England it is clear that not only was the head of the animal revered but also the mandibles and girdle bones had some kind of special significance attached to them. And subsequently in medieval

times, but perhaps for mere reasons of taste and sheer quantities of flesh, the aristocracy was offered what was considered to be the best part of the deer – its haunch. These strange collections highlight the importance of considering faunal remains within their context and also paying special attention to the side of the carcass from which they derive.

Acknowledgements

I thank Jacopo De Grossi Mazzorin, Girolamo Fiorentino and Paul Arthur for inviting me to Lecce and for their very warm hospitality. Andrew Saunders, Amnon Bentor; Claire Halpin and the late Diana Buitron asked me to study the faunal remains from, respectively, Launceston Castle, Tell Qiri, Irthlingborough and the Temple of Apollo at Kourion. It is a pleasure to acknowledge Umberto Albarella and Sebastian Payne with whom I collaborated respectively on the studies of the bones from Launceston Castle and

Irthlingborough. Cathy Douzil, Umberto Albarella and Marta Moreno García all read and commented upon earlier versions of this text and Cornelia Becker, Gerhard Forstenpointner, Annie Grant, Marta Moreno García, Jaco Weinstock and Peter Whitridge told me about some their findings reported here, and Heinz Propper helped me with the German language.



Papercut by Cathy Douzil.

References

- ALBARELLA U., DAVIS S.J.M. 1996, *Mammals and birds from Launceston castle, Cornwall: decline in status and the rise of agriculture*, Circaea, York, 12, pp. 1-156.
- ARMITAGE P.L. 1978, *Hertfordshire cattle and London meat markets in the 17th and 18th centuries*, *The London archaeologist*, 3, pp. 217-223.
- BECKER C. 2000, *Tierknochenfunde – Zeugnisse ritueller Aktivitäten*, *Altorientalische Forschungen*, 27, pp. 167-183.
- BEN TOR A., PORTUGALI Y. 1987, *Tell Qiri a village in the Jezreel valley*, Qedem, 24, Jerusalem, Hebrew University.
- BRAIN C.K. 1967, *Hottentot food remains and their bearing on the interpretation of fossil bone assemblages*, Windhoek, Scientific Papers of the Namib Desert Research Institute, 32, pp. 1-11.
- BRAIN C.K. 1969, *The contribution of Namib Desert Hottentots to an understanding of Australopithecine bone accumulations*, Scientific Papers of the Namib Desert Research Station, 39, Dr. Fitz Simons Commemorative volume, pp. 13-22.
- BUITRON-OLIVER D. 1996 (ed.), *The Sanctuary of Apollo Hylates at Kourion: Excavations in the Archaic Precinct*, Jonsereide, Sweden, Paul Åströms förlag.
- CHAIX L., GRANT A. 1992, *Cattle in ancient Nubia*, in GRANT A. (ed), *Les animaux et leurs produits dans le commerce et les échanges, Animals and their products in trade and exchange*, *Anthropozoologica*, 16, pp. 61-66.
- CHENAL-VELARDE I. 2001, *Des festins à l'entrée du temple? Sacrifices et consommation des animaux à l'époque géométrique dans le sanctuaire d'Apollon à Érétrie, Grèce*, *Archaeofauna*, 10, pp. 25-35.
- DAVIS S.J.M. 1987a, *The faunal remains from Tell Qiri*, in Ben-Tor A., Portugali Y., *Tell Qiri a village in the Jezreel valley*, Qedem, 24, pp. 249-251.
- DAVIS S.J.M. 1987b, *Prudhoe Castle, Northumberland – the animal remains*, London' Historic Buildings and Monuments Commission, Ancient Monuments Laboratory report, 162/87.
- DAVIS S.J.M. 1987b, *Animal sacrifices*, in BUITRON OLIVER D. (ed), *The sanctuary of Apollo Hylates at Kourion: Excavations in the Archaic Precinct*, Jonsereide, Sweden, Paul Åströms förlag, pp. 181-182.
- DAVIS S.J.M., PAYNE S. 1993, *A barrowful of cattle skulls*, *Antiquity*, 67, pp. 12-22.

- FORSTENPOINTNER G. (in press), *Promethean legacy: investigations into the ritual procedure of "Olympian" sacrifice*, *Proceedings of "Zooarchaeology in Greece: Recent Advances"*, BSA studies series, pp. 197-207.
- GRANT A. 1991, *Economic or symbolic? Animals and ritual behaviour*, in GARWOOD P., JENNINGS D., TOMS J. (eds.), *Sacred and profane: archaeology, ritual and religion*, Oxford, Oxford University Committee for Archaeology, pp. 109-114.
- GRANT A. 2001, *The animal remains*, in WELSBY D.A. (ed), *Life on the desert edge. Seven thousand years of settlement in the Northern Dongola Reach, Sudan*, Sudan Archaeological Research Society Publication, 7, London, pp. 544-555.
- GRIFFITH N.J.L., HALSTEAD P.L.J., MACLEAN A., ROWLEY-CONWY P.A. 1983, *Faunal remains and economy*, in MAYES P., BUTLER L.A.S., *Sandal Castle Excavations 1964-1973*, Wakefield Historical Publications, Wakefield, pp. 341-348.
- GRIGSON C. 1984, *The domestic animals of the earlier Neolithic in Britain*, in NOBIS, G. (ed), *Der Beginn der Haustierhaltung in der 'alten Welt'*, Köln, Bohlaus, pp. 205-220.
- HALPIN C. 1987a, *Irthlingborough*, *Current Archaeology*, 9, pp. 331-333.
- HALPIN C. 1987b, *Irthlingborough Bronze Age barrow excavation*, in DIX B. (ed), *The Raunds Area Project: second interim report*, Northamptonshire Archaeology, 21, pp. 3-30.
- HARRISON W. 1577, *An historical description of the Islande of Britayne, with a briefe rehearsal of the nature and qualities of the people of Englande, and of all such commodities as are to be founde in the same*, London.
- ISAAKIDOU V., HALSTEAD P., DAVIS J., STOCKER S. 2002, *Burnt animal sacrifice at the Mycenaean 'Palace of Nestor'*, *Pylos*, *Antiquity*, 76, pp. 86-92.
- JAMESON M.H. 1988, *Sacrifice and animal husbandry in classical Greece*, in WHITTAKER C.R. (ed) *Pastoral economies in classical antiquity*, Cambridge Philological Society, Supplementary volume 14, pp. 87-119.
- JONES R.T., SLY J., SIMPSON D., RACKHAM J., LOCKER A. 1985, *The terrestrial vertebrate remains from The Castle, Barnard Castle, Historic Buildings and Monuments Commission*, Ancient Monuments Laboratory report, 7/85, London.
- MACK J. 1986, *Madagascar: island of the ancestors*, British Museum Publications, London.
- MALTBY M. 1982, *Animal and bird bones*, in HIGHAM R.A., *Excavations at Okehampton Castle, Devon, Part 2 - The Bailey*, *Devon Archaeological Society*, 40, pp. 114-135.
- MORENO GARCÍA M. (in press), *Mammal and bird bones from the Barbican Well (mid/late 15th to early 16th centuries)*, in ALBARELLA U., BEECH M., LOCKER A., MORENO GARCÍA M., MULVILLE J., CURL J., *Norwich Castle: excavation & historical survey 1987-98. Part3: A zooarchaeological study*, East Anglian Archaeology.
- O'CONNOR T. 1984, *Selected groups of bones from Skeldergate and Walmgate*, *The Archaeology of York 15 (1): The animal bones*, Council for British Archaeology.
- PIGGOTT S. 1962, *Heads and hoofs*, *Antiquity*, 36, pp. 110-118.
- RIDDLE W.H. 1943, *The domestic goose*, *Antiquity*, 17, pp. 148-155.
- SAUNDERS A.D. 1973, *Launceston Castle (SX 331846)*, *The Archaeological Journal*, 130, pp. 251-254.
- SAUNDERS A.D. 1984, *Launceston Castle Cornwall*, English Heritage, London.
- VILA E. 2000, *Bone remains from sacrificial places: the temples of Athena Alea at Tegea and of Asea on Agios Elias (the Peloponnese, Greece)*, in MASHKOUR M., CHOYKE A.M., BUITENHUIS H., POPLIN F. (eds), *Archaeozoology of the Near East IVB, Proceedings of the fourth international symposium on the archaeozoology of southwestern Asia and adjacent areas*, Groningen, ARC – Publicatie 32, The Netherlands, pp. 197-205.
- WEINSTOCK J. 2002, *The animal bone remains from Scarborough Castle, North Yorkshire*, English Heritage, CfA Report, 21/2002.
- WHITRIDGE P. 2002, *Social and ritual determinants of whale bone transport at a classic Thule winter site in the Canadian Arctic*, *International Journal of Osteoarchaeology*, 12, pp. 65-75.