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HIGHWAYS AGENCY

Archaeology on the A303 Stonehenge Improvement

Appendix 6: Animal bones

by Jessica M. Grimm

Wessex Archaeology

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By Matt Leivers and Chris Moore

With contributions from
Michael J. Allen, Catherine Barnett, Philippa Bradley, Nicholas Cooke, John Crowther, Michael Grant, Jessica M. Grimm, Phil Harding, Richard I. Macphail, Jacqueline I. McKinley, David Norcott, Sylvia Peglar, Chris J. Stevens, and Sarah F. Wyles

and illustrations by

Rob Goller, S. E. James and Elaine Wakefield

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Index of Appendices

Appendix 6: Animal Bone Analysis

Jessica M. Grimm

Methods

The bone material described in this report comes from the A303 road scheme near Stonehenge, Wiltshire. The nature of the excavations resulted in the recovery of small multi-period assemblages. None of these assemblages yielded enough identifiable material to make their results more-or-less valid for the whole site in a particular period. All analysis results should thus be treated with caution.

For each animal bone fragment, the following characteristics were recorded where applicable: species, bone element and side, fusion, mandible wear stages (following Grant 1982), sex and measurements (following von den Driesch 1976). For the distinction between sheep and goat, the data published by Prummel and Frisch (1986) were used. The positions of butchery marks and burnt areas were described using the pictorial system of Lauwerier (1988). Withers heights were calculated using Vitt (1952, horses) and May (1985, horses) and ages estimated using Habermehl (1975) and Jones (2006). Evidence of gnawing, condition (on a scale of 1–5) and zonation using the system of Dobney and Reilly (1988) was also recorded.

Conjoining fragments were counted as one bone in order to minimise distortion. Fragments that could not be identified to species or family were recorded as small, medium or large mammal or bird. Sheila Hamilton-Dyer (Southampton) helped with the identification of particularly gracile sheep remains and the bone of a polecat/ferret. A database with full details of all the bone found at A303 Stonehenge is held in the archive.

Results

The samples were taken from five sites, as in Table 1.

Taphonomy

The largest assemblage derived from the excavation of Site WA 50157, Area C where evidence for an enclosed Iron Age and Romano-British settlement was found. The majority of the material was in fair condition, but root-etched (Table 1). The later indicates that the remains were found relatively close to the surface. The high proportion of loose teeth shows that part of the material was probably reworked. This is also seen in the fact that a large proportion of contexts contained pottery dating from the Early Iron Age to the Romano-British period. The low number of gnawed bones is likely to be the result of marks being erased by root etching. In addition, the low proportion of burnt bone shows that burning waste was not a common practice either. The high percentage of identified bones (71%) reflects the fair preservation of the fragments. The number of complete bones is with 29% quite high. This is mainly due to two partial dog skeletons and the many loose teeth.

Table 1 Taphonomic data of the different excavations.

Excavation	*n*	*NISP*	*Gnawed (%)*	*Root etched (%)*	*Burnt (%)*	*Loose teeth (%)*	*Preservation*
50157	1006	717	5	58	3	38	Fair
50252	19	16	-	68	11	-	Poor
50412	22	16	-	23	9	5	Very poor
50527	2	1	-	100	-	-	Fair
50538	21	17	10	91	-	-	Fair

Site WA 50252, Area C

Late Bronze Age pit 4103 contained a right distal humerus fragment of sheep/goat and a sheep/goat mandible fragment. Romano-British ditch 3304 was mainly filled with intrusive rabbit bones. The rest of the bones came from undated contexts.

Site WA 50412, Area L

Late Bronze Age/Early Iron Age pit 507 contained a right distally fused cattle radius and Early Iron Age/Middle Iron Age pit 306 contained a fragment of large mammal bone. Romano-British ditch 2205 contained the left distally unfused radius of a pig (matching loose epiphysis found as well) and the proximal part of a left pig metatarsus III. Furthermore, one fragment each of a large and a medium mammal were found. The other bones from this excavation came from undated contexts.

Site WA 50527, Area C

Undated layer 606 contained a fragment of large mammal bone as well as a likely intrusive rabbit bone.

Site WA 50538, Area P

Early Bronze Age grave 1502 contained a cattle cranium fragment and a fragment of large mammal bone. The ancient disturbance of this grave (feature 1513) contained a cattle cranium fragment of the left side, a large mammal cranium fragment (probably cattle) and a right humerus shaft fragment of sheep/goat.

To the east of Longbarrow Crossroads, Middle Bronze Age pit 203 contained a fused right proximal humerus fragment of cattle as well as a large mammal fragment. Of the same date is rubbish pit 205. It contained eleven cattle bones, a piece of red deer antler, a right sheep/goat radius (distally unfused) and a fragment of large mammal bone. It seems that juvenile, subadult and adult cattle are present in this small assemblage. For the estimation of the height at the withers of cattle, the factors for metapodia as proposed by von den Driesch and Boessneck (1974) were used. As it was impossible to sex a right metacarpus, the mean of the factors were used: 6.15. This resulted in a height at the withers of *c*. 111 cm.

Site WA 50157, Area C

Faunal list

As stated above, the largest assemblage comes from excavation 50157. About half of the bones (n=523) are associated with the Early/Middle Iron Age enclosed settlement, whereas 297 bones are Iron Age/Romano-British in date. The rest of the bones came from undated contexts. The identifiable remains were of mammals, birds, and amphibians. The presence of small mammal and amphibian remains indicates the good preservation and the practice of sieving soil samples. Where possible, a distinction between sheep and goat was made, indicating only sheep.

According to the NISP, cattle and sheep/goat are equally represented in the EIA/MIA assemblage (Table 2). Small proportions of horse and pig were also present. It is likely that the remains of field mice and common frog are natural casualties. The left radius of a polecat might derive from a hunted animal, but a natural casualty is equally possible. As polecats are burrowing animals (or they confiscate the burrows of others), the bone might be of a more modern date. It is then possible that the bone derives from a male ferret rather than a female polecat.

Since cattle and horse are larger than sheep and pig, it is likely that beef and probably horsemeat were the main types of meat consumed. The MNI shows that people probably kept mainly sheep, complemented by smaller proportions of cattle and pig. Some horses and dogs were also kept. Pit 515 contained the complete left tarsometatarsus of a hen. The earliest occurrence in Britain of domestic fowl is thought to be at Houghton Down, Stockbridge, Hampshire (Hamilton 2000a, 139), where the skeletons of a rooster and a hen, as well as a few very immature bones possibly from a chick, were part of a 'special deposit' dated to the Early Iron Age (Danebury ceramic phase 3, *c*. 470–360 BC).

Table 2. Species list according to Number of Identified Specimen (NIS), bone weight (BW), and Minimum Number of Individuals (MNI) of the EIA/MIA assemblage

Species	*NISP*		*BW*		*MNI*	
	n	*%*	*g*	*%*	*n*	*%*
Mammal						
Cattle (*Bos Taurus*)	104	19.9	3920	54.1	5	19.2
Horse (*Equus caballus*)	24	4.6	1665	23.0	2	7.7
Sheep (*Ovis aries*)	4	0.8	33	0.5	7	26.9
Sheep/Goat (*Ovis/Capra*)	98	18.7	496	6.8		
Pig (*Sus domesticus*)	16	3.1	244	3.4	4	15.4
Dog (*Canis familiaris*)	80*	15.3	447	6.2	2	7.7
Field mice (*Apodemus* sp.)	31*	5.9	1	0	3	11.5
Polecat (*Mustela putorius*)	1	0	1	0	1	3.8
Bird						
Chicken (*Gallus gallus dom.*)	1	0	1	0	1	3.8
Amphibian						
Common frog (*Rana temporaria*)	1	0	0	0	1	3.8
Classes						
Large mammal	77	14.7	334	4.6	-	-
Medium mammal	85	16.3	99	1.4	-	-
Small mammal	1	0	0	0	-	-
Total	523	99.3	7241	100.0	26	99.8

* skeleton

In the identified to species assemblage dating to the Iron Age/Romano-British period, sheep/goat bones were by far the most common, followed by smaller proportions of cattle, pig, and horse (Table 3). Comparison by BW shows that beef followed by mutton was the most common type of meat eaten. Small proportions of pork and possibly horsemeat were also consumed. The MNI shows that sheep were the main livestock kept, supplemented by a few cattle, pigs, horses, and dogs. The piece of red deer antler might derive from a shed antler. Its presence thus does not mean that the people of this settlement hunted deer.

Table 3. Species list according to NIS, BW, and MNI of the IA/RB assemblage

Species	*NISP*		*BW*		*MNI*	
	n	*%*	*g*	*%*	*n*	*%*
Mammal						
Cattle (*Bos Taurus*)	51	17.2	1205	50.5	3	17.6
Horse (*Equus caballus*)	5	1.7	147	6.2	1	5.9
Sheep (*Ovis aries*)	5	1.7	48	2.0	8	47.1
Sheep/Goat (*Ovis/Capra*)	112	37.7	581	24.4		
Pig (*Sus domesticus*)	10	3.4	76	3.2	2	11.8
Dog (*Canis familiaris*)	6	2.0	123	5.2	2	11.8
Red deer (*Cervus elaphus*)	1	0.3	7	0.3	1	5.9
Classes						
Large mammal	15	5.1	81	3.4	-	-
Medium mammal	91	30.6	118	4.9	-	-
Small mammal	1	0.3	0	0	-	-
Total	297	100.0	2386	100.1	17	

Although the two chronological assemblages are quite small and might thus not be representative, the differences in species proportions are interesting. From about equal proportions of sheep and cattle in the EIA/MIA, sheep clearly dominates in the later period. The earlier period seems to continue the high cattle proportions of the Bronze Age, whereas the later period shows the Iron Age pattern. Similarly, the proportion of horse is higher in the earlier period. The disarticulated nature of the horse remains in both assemblages as well as a butchered bone from the earlier period indicates that these animals were eventually a food source as well. The consumption of horsemeat was characteristic of the native population, whereas it was almost unknown among the Romans. This might mean that the lower numbers of horse bones in the later period are a result of Roman influence. Pig proportions stay the same over time.

Representation of different anatomical elements

The analysis of the representation of different anatomical elements shows most skeletal elements present for cattle, sheep, pig and horse and thus suggests that these animals were slaughtered and their products processed locally.

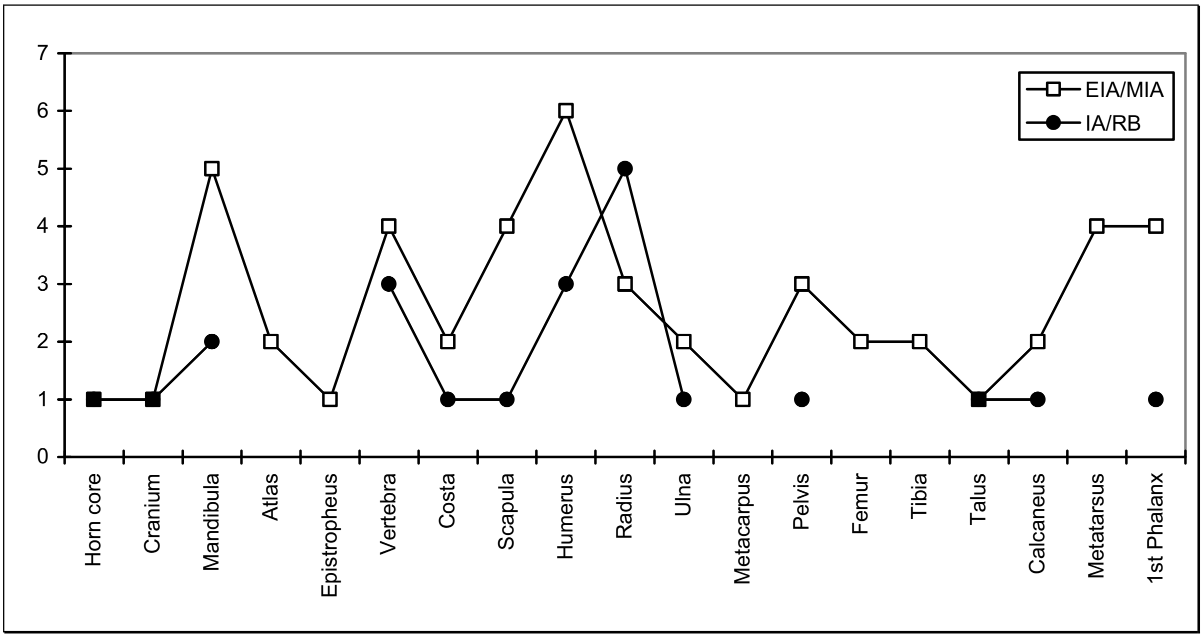

Figure 1 Representation of different anatomical elements (Minimum Number of Elements) for cattle

Looking in more detail at the distribution pattern for cattle it becomes clear that the assemblage contains a mixture of meat rich and meatless parts. Especially the elements of the meaty shoulder joint have a good representation in the earlier period. Similarly, primary butchery offal, like the mandible and feet, are also well represented (Fig. 1).

A different pattern is seen for sheep (Figure 2). Here especially the mandible and the tibia are well represented. This is a pattern well known from other assemblages from a wide variety of sites and has probably a taphonomic origin. Apart from some cheek meat and the tongue, the mandible is not a favourite meat cut. Removing the cheek meat or the tongue does not require the bone to be chopped up. It thus lands more or less undamaged into the soil archive. As it is quite dense, it survives normally very well. The same holds true for the distal tibia.

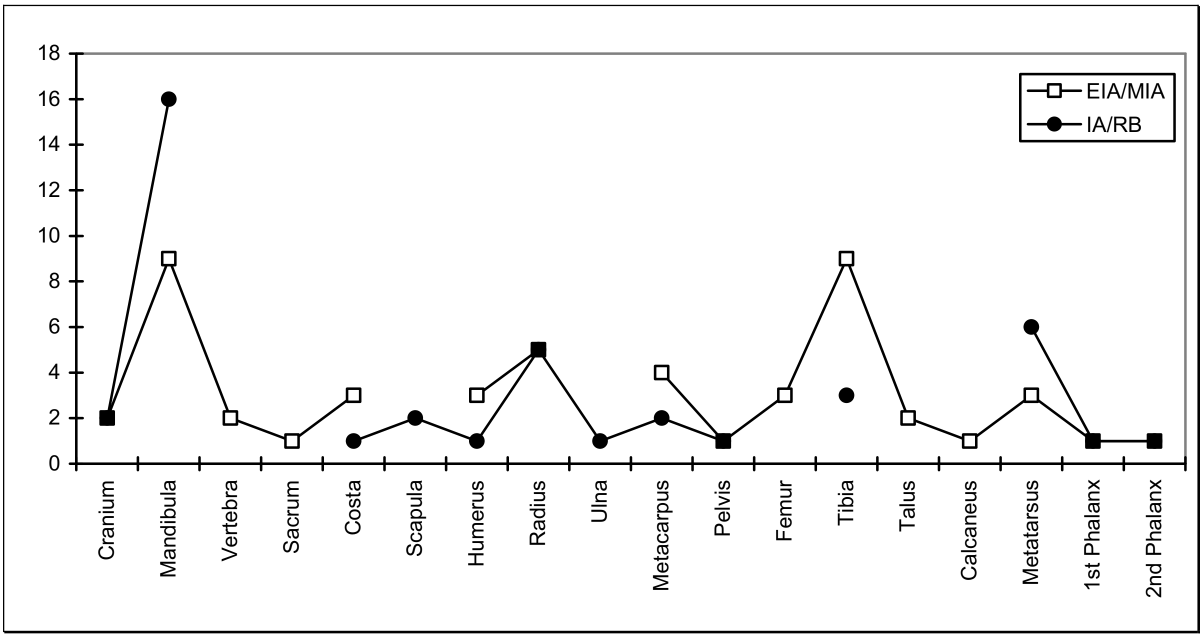

Figure 2 Representation of different anatomical elements (MNE) for sheep

Age analysis

It is likely that unfavourable taphonomic conditions bias the assemblages towards the less resilient bones of juvenile animals. However, neonatal sheep bones were found in pit 253 and enclosure ditch 541 both dating to the earlier period. One of the bones indicated an animal in the last part of the gestation period. Two further foetal sheep bones were found in IA/RB storage pit 434. These finds indicate that the sheep were being bred in the vicinity of the settlement.

Table 4 Stages of tooth eruption in sheep (after Jones 2006)

		Sheep/Goat		
Stage	*Tooth eruption stage*	*Age (months)*	*EIA/MIA (n)*	*IA/RB (n)*
A	Dp4 not yet in wear	0–1	-	-
B	Dp4 in wear, M1 not yet in wear	1–4	-	-
C1/2	M1 anterior cusp(s) only in wear)	3–7	-	-
C3/4	M1 at 3/4A, M2 not yet in wear	4–9	-	-
C5	M1 at 5A, M2 not yet in wear	6–10	-	-
C6+	M1 at 6A or more, M2 not yet in wear	8–13	-	-
D1/2	M2 anterior cusp(s) only in wear)	10–14	-	-
D3/4	M2 at 3 or 4A, M3 not in wear	11–20	-	-
D5	M2 at 5A, M3 not yet in wear	13–22	1	1
D6+	M2 at 6A or more, M3 not yet in wear	14–27	-	1
E1/2	M3 anterior cusp(s) only in wear	19–36	1	-
E3+	M3 central cusp(s) in wear, distal unworn	21–54	2	-
F5/8	M3 5G to 8G	2.5–4.5 years	-	2
F9/10	M3 distal cusps in wear, 9G to 10G	3.5–6 years	4	3
G	M3 at 11G, M2 at 9A	4–estimated 9 years	-	-
H	M3 at 11G, M2>9A	Estimated 6–11+ years	-	-
J	M3 at >11G	Estimated 8–13+ years	-	--

The sheep mandibles were aged using the system of Jones (2006). The ageing of the sheep/goat mandibles shows the presence of subadult and adult animals (Table 4). However, the sample is likely biased towards the less resilient bones of juvenile animals.

The only ageable cattle mandible comes from an EIA/MIA animal well over three years of age (M3 significantly worn). A horse mandible of the same period belonged to an animal below eleven years according to the wear of its lower incisors. The two ageable pig mandibles from the EIA/MIA assemblage belong to a sow of 16–24 months of age as well as to an animal aged 12–16 months when it died. The only ageable pig lower third molar from the IA/RB period indicates an animal of *c.* 2 years.

Table 5. EIA/MIA cattle fusion data

		EIA/MIA Cattle				
Age (months)	*Epiphysis*	*No. fused*	*%*	*No. non-fused*	*%*	*Total*
7–10	Scapula	2	-	-	-	-
	Pelvis	1	-	-	-	-
12–15	Radius p.	3	-	-	-	-
15–20	Humerus d.	2	-	-	-	-
20–24	Phalanx I p.	4	-	-	-	-
24–30	Tibia d.	1	-	-	-	-
Total		13	100	0	0	13
42	Femur p.		-	1	-	-
42–48	Tibia p.	1	-	1	-	-
	Femur d.	1	-	-	-	-
	Humerus p.	1	-	-	-	-
60	Vertebra	4	-	-	-	-
Total		7	78	2	22	9
Total		20	91	2	9	22

Table 6. IA/RB cattle fusion data

		IA/RB Cattle				
Age (months)	*Epiphysis*	*No. fused*	*%*	*No. non-fused*	*%*	*Total*
12–15	Radius p.	4	-	-	-	-
20–24	Phalanx I p.	1	-	-	-	-
Total		5	100	0	0	5
42–48	Radius d.	-	-	1	-	-
	Humerus p.	-	-	1	-	-
60	Vertebra	-	-	1	-	-
Total		0	0	3	100	3
Total		5	63	3	37	8

The analysis of the epiphyseal fusion data indicates that the found EIA/MIA cattle were mainly mature (Table 5). This is in accordance with the found mandible. Only about a fifth of the cattle were slaughtered below the age of 42–60 months. The few data available for the IA/RB cattle show that they died between 12–24 and 42–60 months (Table 6).

Table 7. Sheep/goat fusion dates for the EIA/MIA assemblage

			Sheep/goat				
Age (months)	Epiphysis	No. fused	%	No. non-fused	%	Total	Interval %
c. 5	Pelvis	1	-	-	-	-	-
5–7	2nd Phalanx	1	-	-	-	-	-
7–10	1st Phalanx	1	-	-	-	-	-
15–20	Tibia d.	1	-	1	-	-	-
Total		4	80	1	20	5	20
36	Calcaneus	1	-	-	-	-	-
42	Humerus p.	1	-	-	-	-	-
	Tibia p.	1	-	-	-	-	-
	Femur d.	1	-	-	-	-	-
48–60	Vertebra	1	-	-	-	-	-
Total		5	100	0	0	5	-
Total		9	90	1	10	10	

Table 8. Sheep/goat fusion dates for the IA/RB assemblage

Age (months)	*Sheep/goat Epiphysis*	*No.fused*
3–4	Radius p.	3
c. 5	Scapula	1
5–7	2nd Phalanx	1
7–10	1st Phalanx	1
15–20	Tibia d.	1
20–24	Metapodia d.	1
Total		8

The sheep fusion data for the EIA/MIA indicates that 20% of the animals died below the age of 5–20 months (Table 7). However, most of the bones derived from skeletally fully mature animals. The small IA/RB assemblage only contains fused bones (Table 8). These results are comparable to the analysis of the dental ages.

In both assemblages, horse and dog are represented by fused bones only. Furthermore, the unfused proximal part of a pig femur dating to the EIA/MIA was also found.

Sex analysis

In some animal species, the bones show enough sexual dimorphism to separate the males from the females. This can be based on the visual form of a particular skeletal element or the analysis of some particular measurements of a skeletal element.

The following bones could be sexed in the EIA/MIA assemblage:

- a pig mandible could be attributed to a sow.
- a sheep pelvis could be attributed to an ewe.
- the complete dog burial in storage pit 327 belonged to a bitch based on the humerus table test (Ruscillo 2006).
- the absence of a spur on a tarsometatarsus of chicken indicates a hen.

Breed
To get an idea of the size of the animals, height at the withers were calculated using complete suitable bones. Such bones were only present in the EIA/MIA assemblage. The following results were obtained:

- a left sheep/goat calcaneus from storage pit 527: *c*. 52 cm (Teichert 1975).
- A right horse tibia from storage pit 630: *c*. 123 cm (May 1985) which is a small horse according to the tables published by Vitt (1952).
- The complete skeleton of a bitch from storage pit 370: *c*. 52 cm (Harcourt 1974; Clark 1995).

The undated skeleton of a bitch from grave 356 belonged to a dog with a height at the withers of *c*. 42 cm.

Butchery marks
The accumulation of cut and chop marks on particular skeletal elements point to the use of the carcass (see, for instance, Uerpmann 1977; Lauwerier 1988; Ewersen 2004). As some marks occur during butchering practices: skinning and partitioning of the carcass, other marks are the result of food preparation.

Only eleven definite butchery marks were observed on the material from excavation 50157. A left cattle calcaneus from pit 514 showed disarticulation chops on the dorsal side of the *processus coracoideus*. These might result from separating the foot off the lower leg. A left sheep/goat talus from storage pit 527 showed transverse cut marks on the middle part of the dorsal side indicating skinning. Storage pit 630 contained part of a right horse scapula showing filleting cuts on the *margo thoracalis*. A right ulna fragment of cattle from the same pit showed a possible disarticulation cut on the lateral side of the *processus anconeus*. Furthermore, a right horn core base fragment of cattle had been chopped off the skull. Storage pit 527 contained the left pelvis and a sacrum of sheep. As both remains where exceptionally slender and showed similar butchery marks, they probably came from the same old ewe. The pelvis showed signs of disarticulation of the hip joint as the rim of the acetabulum was damaged. In addition, chops on the ventral side of the ilium were seen which probably resulted from separating the pelvis from the sacrum. Filleting cut marks were seen on the ventral side of the ischium. The possibly corresponding sacrum showed chop marks on one of its wings. These probably originated from separating this bone from the pelvis. All the above bones data to the EIA/MIA.

The undated dog skeleton from grave 356 showed several cut marks on its bones related to skinning. The right radius and tibia were cut on the dorsal side of the distal end. The left talus also showed cut marks. As, in order to keep the knife sharp, the person skinning will try to avoid bone contact, it is not surprising that these were they only marks seen.

Pathology
Apart from the pathological dog bones from undated grave 356, all pathologically changed bones date to the EIA/MIA. Two adult cattle mandibular hinges (pit 253 and 547) showed a pitted area on the articular surface. This phenomena is frequently seen in assemblages from different areas and periods. In her review of palaeopathology in prehistoric and historic Ireland, Murphy (2005, 15) states that it is probable that these lesions were related to cattle excessively ‘chewing the cud’.

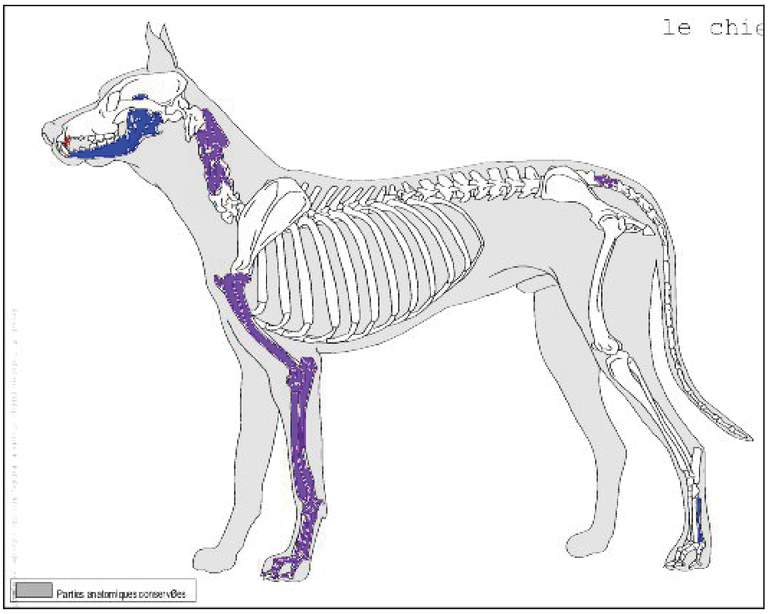

Figure 3. Dog from storage pit 327 (template M. Coutereau)

All other pathology was seen in the dog remains. The partial skeleton of a bitch found in storage pit 327 (Fig. 3) shows extensive patches of rough callus indicating inflamed elbow joints and a probable healed fracture of the left hind paw (Figure). The pathology in the left elbow comprises of an irregular porous callus on the *epicondylus lateralis*/*crista supracondylaris lateralis* (articular surface not affected). This is where the *capsula articularis* would be and thus the inflammation affected the joint capsel as well. The left ulna showed slight patches of porosity on the *tuber olecrani*, *incisura trochlearis* and *processus coronoideus*. Furthermore, small patches of new bone were seen on the area of the shaft making contact with the radius. The left radius showed a large patch of new bone formation mid shaft on the cranial (15 x 10 mm) and caudal (43 x 12 mm) side where the bone makes contact with the ulna. A small patch of new bone was also found near the distal end on the caudal-medial side where the distal ulna articulates. The pathology on the right side consists of the radius showing a rough, pitted, striated callus on the cranial side of the proximal part (articulation not affected); this falls within the capsula articularis. Furthermore, the ulna shows a large irregular callus (striated) on the proximal part of the ulna (articulation not affected). A smaller smooth new bone deposit was seen above and around the nutrient foramen. A small irregular callus deposition was also seen on the os carpi accessorium.

Figure 4. Left distal humerus and right proximal ulna of the dog from pit 327

Pit 333 contained the articulating cranium and mandibles of an adult dog. The form of the skull is mesaticephalic and the well-worn teeth in the lower jaws are crammed and encroach onto the vertical ramus. The dog skull and mandibles show multiple and probably unrelated traumata and signs of inflammation (Fig. 5). A small patch of new bone formation was seen below the right eye socket (inflammation). Furthermore, a large irregular depression was visible below the left eye socket (trauma of the maxilla, zygomaticum and lacrimal). This is likely due to a blow with a blunt object that eventually healed. The os nasal and incisivum are cracked on both sides and a small splinter of the right incisivum was broken off, slightly displaced and fused with nasal and incisivum. This damage to the nose is likely the result of a healed blow directed from above on this area. Furthermore, the right canine probably broke off during lifetime. The I1 and I2 are missing on both sides and the maxillary bone has resorped with no alveoli visible. The P1 is missing on right side and the alveolus has started to fill in.

Figure 5. The dog skull from pit 333

The corresponding lower jaws of the above-described skull show some pathological changes as well. Some new bone formation was seen around the symphysis of the right mandible. The incisors and canines are missing in both jaws; bone resorption has erased the alveoli resulting in a very pointy chin. The trauma seen in the lower jaws is probably related to the blow on the nose. This dog was, judging from the wear on the teeth, clearly mature when it died. It is likely that two separate blows (one or two events) were responsible for the distortion of the face and chin. These blows might result from beating by humans, kicking by animals, dog fighting or bear beating. The inflammation on the rim of the right eye socket might be the result of an inflamed lacrimal sac/canal.

Iron Age/Romano-British ditch 362 contained cranial fragments, articulating atlas and epistropheus as well as a nearly complete left tibia of dog. It is possible that all these remains are from the same adult individual. A small flat discrete round nodule of bone (*c*. 7 mm across) was visible on the shaft of the tibia. It is possible that this is an ossified haematoma.

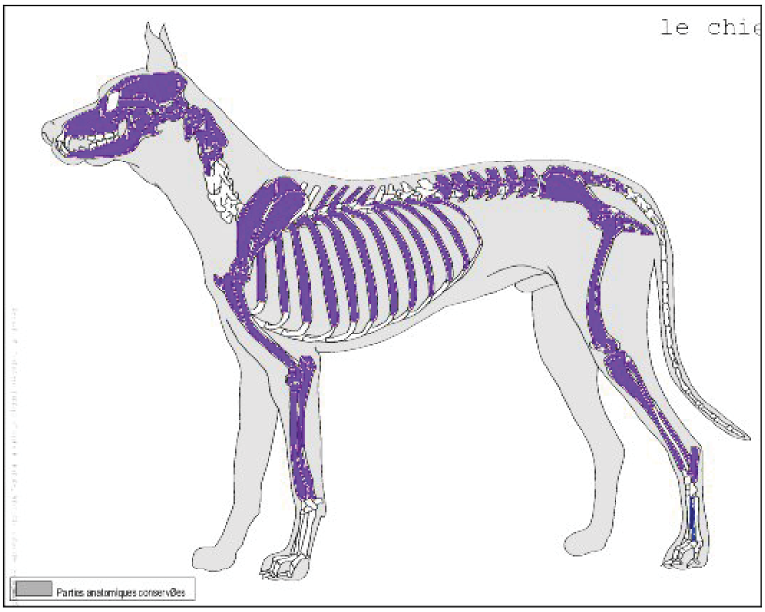

Figure 6. Dog from grave 356 (template M. Coutereau)

Undated grave 356 contained the skeleton of a bitch (Fig. 6). All teeth have erupted, but are only slightly worn. All epiphyses have fused as well, but the sutures of the skull are still very visible. This dog was thus skeletally mature, but not old. This dog had a height at the withers of *c*. 42 cm. The shape of the skull was mesaticephalic and the teeth in the jaws are crammed and encroach on the vertical ramus. Some pathological changes were seen in the right hip joint. The pelvis itself probably showed a not fully healed (fused) fracture across the acetabulum. A large callus deposit was seen on the rim and back of the *facies lunata major*. Probably corresponding with this fracture was the presence of a small smooth irregular nodule on the caudal rim of the caput (*c*. 3 mm across) just below the *fovea capitis*. The fracture seen in the right pelvis might well be the result of a kick by a human or an animal.

Depositional practices

This section explores possible differences between the disposal of the different animals. The earlier described (partial) dog skeletons are omitted.

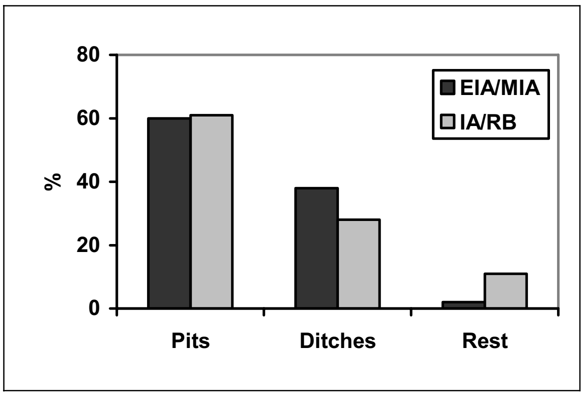

Figure 7. Provenance of EIA/MIA and IA/RB animal bone

Figure 7 shows that the provenance of the animal bone material for both periods is quite similar. This means that differences in overall species proportions are probably not due to differences in provenance and related taphonomy.

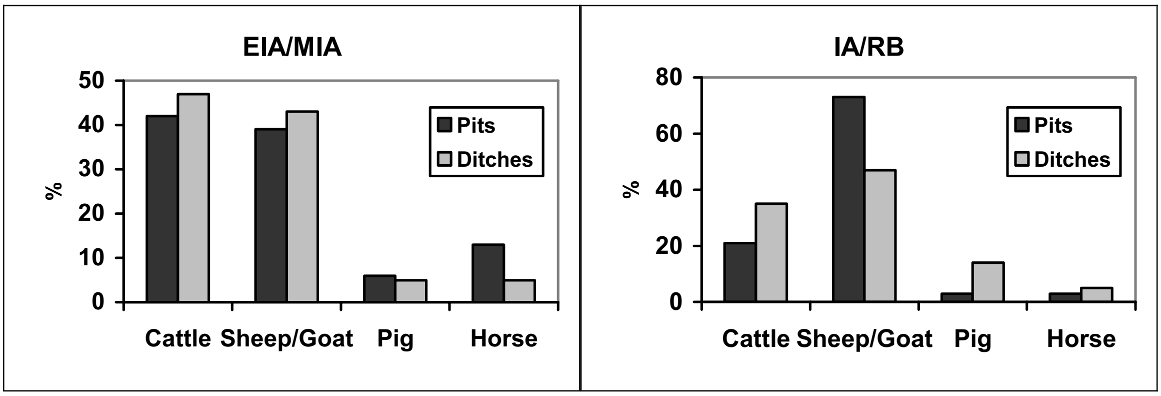

Figure 8. Species proportions for pits and ditches per period

In the earlier period, no real differences in species proportions seem to have existed (Fig. 8) between pits and ditches. The differences in horse bone proportions might well been incidental as only very few of them were found. Greater differences are seen in the proportions of the later period with sheep bones dominating in the pits and cattle bones dominating in the ditches. This is a common pattern and can probably be explained by the assumption that the more fragile bones of smaller animals are better preserved in primary deposits. It is likely that pits were being filled in intentionally and disused ditches filled in only gradually. The fact that the pig remains do not seem to follow the sheep/goat pattern is probably incidental as the database is very small.

Summary and synthesis

The animal bone material analysed mainly represents waste from an Early/Middle Iron Age enclosed settlement near Scotland Lodge, Winterbourne Stoke. Settlement activity seems to have continued well into the Romano-British period as pottery from some contexts spans the Iron Age–Romano-British period. Furthermore, small quantities of Bronze Age bone were recovered from pits and a burial near the later settlement. Taphonomic analysis showed that at least part of the assemblage is probably reworked. However, preservation was fair with a high proportion of root-etched bones. The bulk of the bones derive from the usual domesticates (ie, cattle, sheep/goat, pig, and horse) and wild species were probably not important in covering the protein demand of the inhabitants. This is a common observation made for this period (Hambleton 1999, 14). The assemblage contains a high proportion of dog bones partly due to the find of a skeleton.

It should be kept in mind that the very small assemblages from A303 Stonehenge are probably not representative and that any differences seen with comparative material might thus be purely incidental. In her study of Iron Age assemblages from across Britain, Hambleton (1999, 40) excludes all sites which have a cattle+sheep+pig NISP below 300 or a MNI below 30 as these assemblages are probably not representative. With a combined NISP of 222 and a corresponding MNI of 16, the EIA/MIA assemblage from A303 Stonehenge would thus not qualify. However, following below are some comparisons between the analysed assemblages and contemporary assemblages. Comparisons that are more detailed are only possible for the slightly larger assemblage dating to the EIA/MIA.

Comparative material includes the large assemblage from Danebury, the large assemblages from the Danebury Environs Project sites, Micheldever Wood (all Hampshire), and the small assemblages from Warren Hill and Coombe Down South on Salisbury Plain, Wiltshire. The bone report for Gussage all Saints, Dorset, did not contain NISP quantifications or standard age data recording and was therefore excluded (Harcourt 1979, 150–60). The larger assemblages from Danebury, Houghton Down, Suddern Farm, Nettlebank Copse and Micheldever Wood can be used confidently as comparisons.

Looking at species proportions it becomes clear that sheep remains usually dominate in Iron Age assemblages (Table 9). A possible change in species proportions was seen for the material from A303 Stonehenge with equal proportions of sheep/goat and cattle in the earlier period, changing to a much higher proportion of sheep/goat in the later period. Contrary, at Houghton Down, Stockbridge, Hampshire, the species proportions for the two periods are very similar. Similar to A303 Stonehenge, the proportion of dog is quite substantial and (partial) dog skeletons were also found.

Table 9. Species proportions (%) for some Iron Age sites

Site	*Author*	*Period*	*Type*	*NISP*	*Cattle*	*Horse*	*Sheep*	*Pig*	*Dog*
A303 Stonehenge	This report	EIA/MIA	Enclosed settlement	523	32	7	31	5	25
A303 Stonehenge	This report	IA/RB	Enclosed settlement	297	27	3	62	5	3
Danebury	Grant 1991	EIA-LIA	Hillfort	241,530	21	3	61	12	3
Houghton Down	Hamilton 2000a	EIA/MIA	Enclosed settlement	3569	22	4	50	7	17
Houghton Down	Hamilton 2000a	LIA/RB	Enclosed settlement	1941	22	6	47	6	19
Suddern Farm	Hamilton 2000b	EIA/MIA	Settlement	6521	25	8	52	10	6
Suddern Farm	Hamilton 2000b	IA/RB	Settlement	5700	33	4	49	4	9
Bury Hill	Hamilton 2000c	MIA	Hillfort	989	16	47	34	2	1
Nettlebank Copse	Hamilton 2000d	EIA	Settlement	2217	12	4	53	19	11
Nettlebank Copse	Hamilton 2000d	LIA	Banjo enclosure	4172	29	5	44	14	7
Micheldever Wood	Coy 1987	MIA	Banjo enclosure	2473	34	4	47	13	2
Micheldever Wood	Coy 1987	LIA/RB	Banjo enclosure	957	34	9	37	16	4
Warren Hill	Powell *et al.* 2006	EIA/MIA	Enclosed settlement	310	40	5	43	10	2
Coombe Down South	Powell *et al.* 2006	EIA/MIA	Settlement	826	34	5	48	8	5

Slightly different is the situation at the Iron Age hill fort of Danebury, Hampshire, where higher proportions of sheep and pig are seen. The proportion of cattle is quite similar to that at Houghton Down. Horse and dog proportions are much lower and similar to the later phase of A303 Stonehenge. These differences can possibly be explained by the fact that Danebury is a hill fort whereas A303 Stonehenge and Houghton Down are enclosed settlements. However, the huge amount of animal bones recovered from the extensive excavations at Danebury are likely less hampered by 'abnormal' results due to intra-site differentiation than the small assemblages from the other two sites.

Another quite different pattern is seen for the assemblage from Bury Hill which is dominated by horse. As the peak slaughter age was around 6–7 years, Hamilton (2000c) suggests that the people living at the hillfort managed semi-feral horse herds. The horses would be rounded up annually and the prime stallions would be used for meat, riding, and charioting with the mares being set free for herd continuity. This would explain the absence of neonates, which would be indicative of horse breeding.

Domestic fowl was introduced in Britain somewhere in the Iron Age. Small quantities of its bones were found on all sites, but Bury Hill and Warren Hill. The find of special deposits of these birds at Houghton Down dating to the Early Iron Age might indicate its novelty status at the time.

Only scant aging evidence is available for the A303 Stonehenge assemblage dating to the EIA/MIA. It suggests that cattle were mainly kept well into maturity and that sheep/goat of all ages (including foetal/neonate) were present. The later indicates the on-site breeding of sheep. As pigs are only kept for their meat, it is likely that these animals were killed at a sub-adult age. Horse and dog were only represented by skeletally mature bones. Comparing these results with the data from the Iron Age sites quoted in Table 9, it seems that in general a higher proportion of cattle and sheep were slaughtered younger. The picture for Danebury is more complicated with a higher proportion of juveniles killed in the earlier period compared to the later period. And although, the cattle age data seems comparable with the EIA material from Nettlebank Copse, both assemblages were quite small. As at A303 Stonehenge, pigs were subadult and most horses were adult in the above quoted assemblages. The dogs found at Houghton Down and Danebury were of juveniles, adults and old adults. Additionally, foetal/neonate dogs were found at Suddern Farm and Nettlebank Copse.

Comparing the few height at the withers values for sheep, horse and dog dating to the EIA/MIA, it becomes clear that the values obtained from the A303 Stonehenge assemblages are comparable to those from the above quoted sites (Tables 10–12). Measurements for cranial and post-cranial elements from all sites are given in Tables 13 and 14 respectively

Table 10. Height at the withers of horse

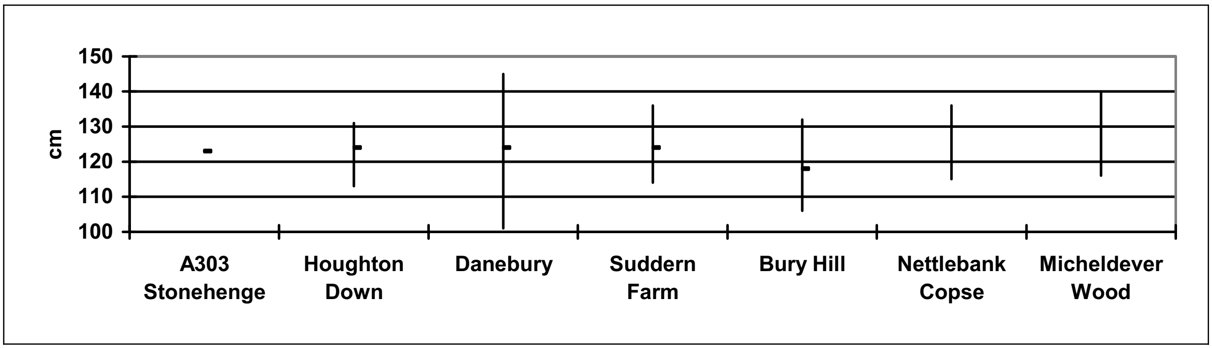

Table 11 Height at the withers of sheep

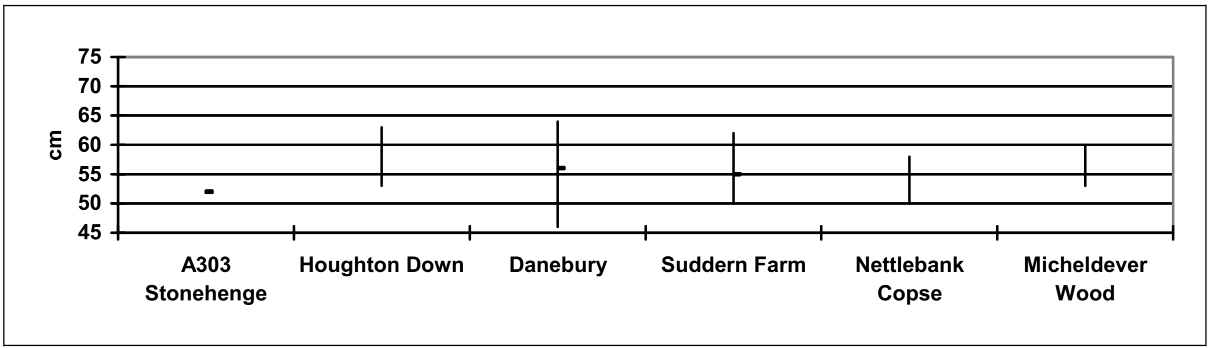

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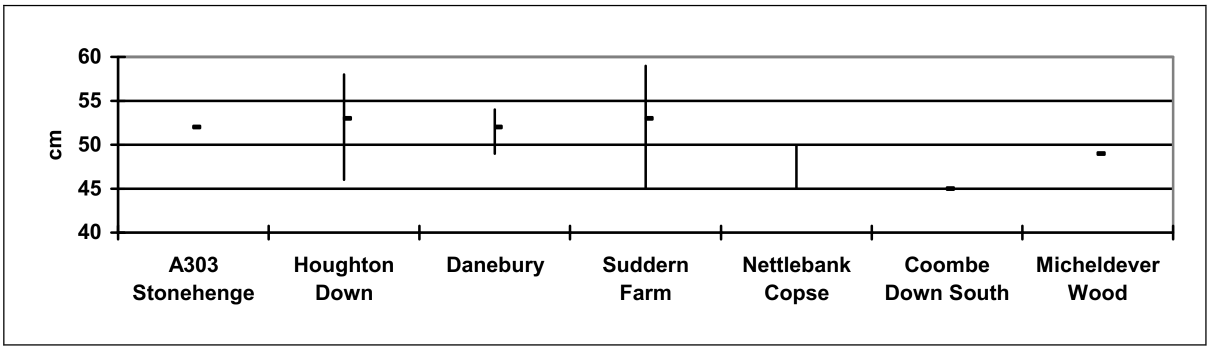
Table 12. Height at the withers of dog



Summarising the analysis it becomes clear that the presence of most skeletal elements for cattle, sheep, pig and horse indicates that these animals were butchered on the site. The age and sex analysis suggests that cattle were mainly kept for their secondary products like traction, milk and manure, whereas sheep were probably also kept for their meat. Pigs would have been kept as 'waste-to-meat-converters'. Horses and dogs were probably not primarily kept for their meat, but were occasionally eaten. Chickens were kept as poultry. The site was thus probably self sufficient with regard to meat and eggs.

Dogs might have had a special status as a partial dog skeleton was found in pit 327. The gross pathological changes in its elbow joints indicate an invalid animal that was possibly put to death to prevent further suffering (It is possible that Hamilton (2000a, 138–9) describes a similar pathology on a dog elbow from Houghton Down. However, as no photograph is published, this cannot be verified.) Although the traumata on the dog skull found in pit 333 suggest that is was severely beaten, hit by the hoof of an animal or used for fighting, the wounds had obviously healed. As the dog missed most of its front teeth and had possibly problems with its eyesight and smell, it is likely that somebody took care of the creature. Similar traumata were seen in an old male dog from Houghton Down and Danebury (Brothwell 1995, 213). On the other hand, butchery marks were seen on some dog bones from all sites. Most of them resulted from skinning, but some must have come from meat removal.

Comparison of the results with comparable sites showed many similarities. The people at most of these sites practiced a mixed farming economy with hunting being of minimal importance. Domesticated animals played an important role as suppliers of primary products (meat, bone, skin etc.) and secondary products (milk, wool, manure, traction etc.). It seems that the enclosed settlement at A303 Stonehenge was one of many similar rural settlements dotting the region in the Early/Middle Iron Age.

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Table 13 Cranial measurements

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*1*	*2*	*3*	*4*	*5*	*6*
EIA/MIA	370	dog	mandibula	L	>6–12	138.1		131.8	117.6	111.2	
?	357	dog	mandibula	Both	>6–12	111.9	111.6	107.3	96.3	92.2	93.3
?	357	dog	cranium	Both	>6–12	155.0	147.0	139.0	40.0	99.0	
EIA/MIA	332	dog	cranium	Both	>6–12	178.0	166.0	156.5	44.9	112.2	

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*7*	*8*	*9*	*9a*	*10*	*10L*
EIA/MIA	562	sheep/goat	dens inf	R	F9/10						17.8
IA/RB	573	sheep/goat	dens inf	R	F5/8						17.6
EIA/MIA	520	sheep/goat	dens inf	L	E3+						19.3
IA/RB	317	sheep/goat	dens inf	R	F9/10						19.2
EIA/MIA	539	sheep/goat	mandibula	L	F9/10						21.0
EIA/MIA	350	sheep/goat	dens inf	L	F9/10						21.0
?	528	sheep/goat	dens inf	R	F9/10						21.3
IA/RB	363	pig	dens inf	R	7						29.1
EIA/MIA	539	sheep/goat	sacrum	N/A	>48–60						
EIA/MIA	345	pig	mandibula	Both	adult				36.4		
IA/RB	573	sheep/goat	mandibula	L	F9/10	61.2	42.9	18.7			18.8
IA/RB	573	sheep/goat	mandibula	L	F9/10	68.4	46.9	21.3			19.8
EIA/MIA	256	cattle	mandibula	L	9++	119.4	76.6	46.9			24.4
EIA/MIA	332	dog	mandibula	Both	>6–12		71.1	67.7		35.8	
EIA/MIA	370	dog	mandibula	L	>6–12	78.4	74.9	69.9		39.0	
?	357	dog	mandibula	Both	>6–12	67.2	63.8	59.8		32.1	
?	357	dog	cranium	Both	>6–12	75.0	75.0	91.0		56.0	
EIA/MIA	332	dog	cranium	Both	>6–12	88.8	86.5	102.3			

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*10B*	*11*	*12*	*13*	*13a*	*13L*
EIA/MIA	520	sheep/goat	dens inf	R	E3+	7.8					
EIA/MIA	562	sheep/goat	dens inf	R	F9/10	6.1					
IA/RB	573	sheep/goat	dens inf	R	F5/8	7.5					
EIA/MIA	520	sheep/goat	dens inf	L	E3+	6.8					
IA/RB	317	sheep/goat	dens inf	R	F9/10	7.5					
EIA/MIA	539	sheep/goat	mandibula	L	F9/10	7.7					
EIA/MIA	350	sheep/goat	dens inf	L	F9/10	7.9					
?	528	sheep/goat	dens inf	R	F9/10	8.0					
IA/RB	363	pig	dens inf	R	7	13.9					
EIA/MIA	345	pig	mandibula	Both	adult		73.0				
IA/RB	573	sheep/goat	mandibula	L	F9/10	7.3					
IA/RB	573	sheep/goat	mandibula	L	F9/10	7.6					
EIA/MIA	256	cattle	mandibula	L	9++	13.2					
EIA/MIA	332	dog	mandibula	Both	>6–12		37.6	33.9			23.6
EIA/MIA	370	dog	mandibula	L	>6–12		40.3	35.6			23.5
?	357	dog	mandibula	Both	>6–12		34.3	29.9	20.7		
?	357	dog	cranium	Both	>6–12		70.0	66.0	78.0	77.0	
EIA/MIA	332	dog	cranium	Both	>6–12		82.0	74.6	87.4	85.1	

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*13B*	*14*	*14a*	*15*	*15a*	*15c*
IA/RB	573	sheep/goat	mandibula	L	F9/10						14.3
IA/RB	573	sheep/goat	mandibula	L	F9/10						13.7
EIA/MIA	256	cattle	mandibula	L	9++					57.6	33.3
EIA/MIA	332	dog	mandibula	Both	>6–12	9.5	21.2				
EIA/MIA	370	dog	mandibula	L	>6–12	9.8	21.6				
?	357	dog	mandibula	Both	>6–12		19.0				
?	357	dog	cranium	Both	>6–12		29.0	28.0	57.0		
EIA/MIA	332	dog	cranium	Both	>6–12		34.9	32.9	67.2		

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*15L*	*15B*	*16*	*16L*	*16B*	*17*
IA/RB	573	sheep/goat	mandibula	L	F9/10		20.1				
IA/RB	573	sheep/goat	mandibula	L	F9/10		20.8				
EIA/MIA	256	cattle	mandibula	L	9++		40.6				
EIA/MIA	332	dog	mandibula	Both	>6–12	9.8	6.9		4.7	4.4	12.4
EIA/MIA	370	dog	mandibula	L	>6–12	9.6	7.2				12.1
?	357	dog	mandibula	Both	>6–12	8.2	5.8		4.1	4.1	10.2
?	357	dog	cranium	Both	>6–12			18.0			44.0
EIA/MIA	332	dog	cranium	Both	>6–12			21.0			53.2

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*18*	*18a*	*19*	*20*	*20L*	*20B*
EIA/MIA	332	dog	mandibula	Both	>6–12	53.0		23.9	21.2		
EIA/MIA	370	dog	mandibula	L	>6–12	53.8		25.2	20.8		
?	357	dog	mandibula	Both	>6–12	40.0		19.6	17.8		
?	357	dog	cranium	Both	>6–12	18.5	10.6	17.0		11.8	15.1
EIA/MIA	332	dog	cranium	Both	>6–12	19.5	13.4	18.5		13.9	16.5

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*21*	*21L*	*21B*	*22*	*23*	*24*
EIA/MIA	370	dog	mandibula	L	>6–12	43.0				161.1	162.4
?	357	dog	mandibula	Both	>6–12	36.7			135.0	131.9	134.6
?	357	dog	cranium	Both	>6–12		6.6	9.9	23.0		56.2
EIA/MIA	332	dog	cranium	Both	>6–12		7.7	11.2	23.1	61.0	61.1

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*25*	*26*	*27*	*28*	*29*	*30*
EIA/MIA	332	dog	mandibula	Both	>6–12		162.2				
EIA/MIA	370	dog	mandibula	L	>6–12		173.2				
?	357	dog	mandibula	Both	>6–12	133.8	141.0				
?	357	dog	cranium	Both	>6–12	33.0	55.2	17.8		53.8	
EIA/MIA	332	dog	cranium	Both	>6–12	35.1		18.0	16.3	61.3	102.5

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*31*	*32*	*33*	*34*	*35*	*36*
?	357	dog	cranium	Both	>6–12	31.9	39.6	26.9	56.3	33.4	32.9
EIA/MIA	332	dog	cranium	Both	>6–12	36.3	52.2	39.7	65.7	37.4	38.1

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*37*	*38*	*39*	*40*	*41*	*Har2*
?	357	dog	cranium	Both	>6–12	26.4	49.4	44.8	42.3	37.5	86.0
EIA/MIA	332	dog	cranium	Both	>6–12	29.3	53.5	46.0	43.7		102.4

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*HB*	*MX*	*PL*
?	357	dog	sacrum	N/A	adult			29.8
EIA/MIA	539	sheep/goat	sacrum	N/A	>48–60			72.8
?	357	dog	cranium	Both	>6–12	47.7	48.2	43.5
EIA/MIA	332	dog	cranium	Both	>6–12	65.7	52.1	50.7

Measurements mainly according von den Driesch (1976). Additional measurements by Harcourt (1974), Nussbaumer (1976; 1978), and Greenfield (2006)

Table 14. Post-cranial measurements

									Post-cranial			
Period	*Context*	*Species*	*Element*	*Side*	*Age*	*Sex*	*Bd*	*BF*	*BFcd*	*BFcr*	*BFp*	*BG*
EIA/MIA	634	cattle	humerus	R	>15-20		70.5					
MBA	50538.208	cattle	metacarpus	R	>24-30		61.1					
IA/RB	628	cattle	radius	R	>12-15						60.8	
EIA/MIA	544	cattle	scapula	L	>7-10							41.8
EIA/MIA	633	cattle	scapula	R	>7-10							44.0
?	226	cattle	talus	R	adult		35.4					
EIA/MIA	345	cattle	talus	R	adult		37.3					
EIA/MIA	345	cattle	tibia	R	>24-30		58.3					
IA/RB	363	dog	atlas	N/A	adult				33.0			
IA/RB	363	dog	epistropheus	N/A	>18-24					32.9		
EIA/MIA	370	dog	epistropheus	N/A	>18-24					33.8		
?	357	dog	femur	Both	>9-10		23.6					
?	357	dog	humerus	Both	>10	Female	25.0					
EIA/MIA	370	dog	humerus	L	>10	Female	33.4					
?	357	dog	radius	Both	>6-9		18.6					
EIA/MIA	370	dog	radius	L	>6-9		24.5					
?	357	dog	sacrum	N/A	adult					19.5		
?	357	dog	scapula	Both	>3-5							13.6
EIA/MIA	546	dog	scapula	R	>3-5							16.5
?	357	dog	tibia	Both	>8-12		16.5					
EIA/MIA	304	horse	2nd phalanx	N/A	>10-12						38.3	
EIA/MIA	207	horse	3rd phalanx	N/A	adult			47.3				
undated	127	horse	femur	R	>42		85.0					
EIA/MIA	634	horse	scapula	R	>10-12							35.6
EIA/MIA	555	Polecat/Ferret	radius	L	adult		6.9					
?	226	sheep/goat	radius	L	>3-4						23.8	
IA/RB	572	sheep/goat	tibia	L	>15-20		22.4					
Period	Context	Species	Element	Side	Age	Sex	Bp	Bpac	BPC	BT	CD	DC
EIA/MIA	634	cattle	humerus	R	>15-20					66.6		
EIA/MIA	634	cattle	metacarpus	R	adult		51.3					
MBA	50538.208	cattle	metacarpus	R	>24-30						94.0	
IA/RB	628	cattle	radius	R	>12-15		66.7					
EIA/MIA	370	dog	epistropheus	N/A	>18-24			28.5				
?	357	dog	femur	Both	>9-10		30.0				32.0	
EIA/MIA	370	dog	humerus	L	>10	Female					41.0	
?	357	dog	radius	Both	>6-9		13.7					
EIA/MIA	370	dog	radius	L	>6-9		18.7				35.0	
?	301	dog	tibia	Both	>8-12		29.2					
?	357	dog	tibia	Both	>8-12		27.5				31.0	
?	357	dog	ulna	Both	>6-8				11.8			
EIA/MIA	370	dog	ulna	L	>6-8				16.0			
EIA/MIA	530	domestic fowl	tarsometatarsus	L	adult	Female	10.4					
EIA/MIA	304	horse	2nd phalanx	N/A	>10-12		43.0					
EIA/MIA	376	sheep/goat	femur	R	>42							17.6
IA/RB	317	sheep/goat	metacarpus	R	adult		21.0					
?	226	sheep/goat	radius	L	>3-4		26.8					
EIA/MIA	345	sheep/goat	tibia	L	>42		33.6					

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*Sex*	*Dl*	*Dm*	*Dp*	*DPA*	*GB*	*GD*
?	528	cattle	centrotarsal	R	adult						47.1	
?	225	cattle	os malleolare	R	adult							24.6
?	226	cattle	talus	R	adult		31.0	31.0				
?	357	dog	humerus	Both	>10	Female			32.1			

EIA/MIA	370	dog	humerus	L	>10	Female			41.8			
?	357	dog	sacrum	N/A	adult						38.8	
?	357	dog	ulna	Both	>6-8					20.0		
EIA/MIA	370	dog	ulna	L	>6-8					25.5		
EIA/MIA	539	sheep/goat	calcaneus	R	>36						17.0	

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*Sex*	*GL*	*GLC*	*GLl*	*GLm*	*GLP*	*H*
MBA	50538.208	cattle	metacarpus	R	>24-30		180.0					
EIA/MIA	544	cattle	scapula	L	>7-10						56.1	
?	226	cattle	talus	R	adult				57.0	51.4		
IA/RB	363	dog	atlas	N/A	adult							28.2
?	357	dog	femur	Both	>9-10		141.0					
?	357	dog	humerus	Both	>10	Female	130.7	128.4				
EIA/MIA	370	dog	humerus	L	>10	Female	163.0					
EIA/MIA	370	dog	metacarpus II	L	>5-7		57.5					
EIA/MIA	370	dog	metacarpus III	L	>5-7		65.0					
EIA/MIA	370	dog	metacarpus IV	L	>5-7		64.1					
EIA/MIA	370	dog	metacarpus V	L	>5-7		54.7					
?	301	dog	metatarsus II	L	>5-7		48.6					
EIA/MIA	370	dog	metatarsus II	L	>5-7		62.7					
?	357	dog	radius	Both	>6-9		125.4					
EIA/MIA	370	dog	radius	L	>6-9		161.0					
?	357	dog	sacrum	N/A	adult		31.9					
?	357	dog	scapula	Both	>3-5						23.1	
EIA/MIA	546	dog	scapula	R	>3-5						25.9	
?	357	dog	tibia	Both	>8-12		140.0					
EIA/MIA	370	dog	ulna	L	>6-8		188.0					
EIA/MIA	530	domestic fowl	tarsometatarsus	L	adult	Female	55.8					
EIA/MIA	633	horse	tibia	R	>42		312.0					
EIA/MIA	555	Polecat/Ferret	radius	L	adult		35.1					
EIA/MIA	539	sheep/goat	calcaneus	R	>36		45.8					
EIA/MIA	539	sheep/goat	sacrum	N/A	>48-60		75.8					
?	50252.3309	starling-size	femur		adult		25.0					

Period	*Context*	*Species*	*Element*	*Side*	*Age*	*Sex*	*H1*	*HB*	*HFcr*	*LA*	*Lad*	*LAR*
EIA/MIA	345	cattle	pelvis	R	adult		6.6					
IA/RB	363	dog	atlas	N/A	adult						16.1	
?	357	dog	pelvis	Both	adult							17.4
?	357	dog	sacrum	N/A	adult				9.4			
EIA/MIA	633	horse	pelvis	R	>10-12					55.0		
EIA/MIA	539	sheep/goat	pelvis	L	>5	Female				20.5		

Period	Context	Species	Element	Side	Age	Sex	LCDe	Lfo	LG	SB	SBV	SC
EIA/MIA	544	cattle	scapula	L	>7-10				48.0			
EIA/MIA	633	cattle	scapula	R	>7-10				47.8			
IA/RB	363	dog	epistropheus	N/A	>18-24		51.3					
EIA/MIA	370	dog	epistropheus	N/A	>18-24		45.9				25.7	
?	357	dog	pelvis	Both	adult			20.9		5.9		34.0
?	357	dog	scapula	Both	>3-5				20.1			
EIA/MIA	546	dog	scapula	R	>3-5				21.5			
EIA/MIA	530	domestic fowl	tarsometatarsus	L	adult	Female						4.9
EIA/MIA	633	horse	pelvis	R	>10-12			54.0				
EIA/MIA	634	horse	scapula	R	>10-12				47.3			
EIA/MIA	539	sheep/goat	pelvis	L	>5	Female		34.5		7.6		38.0

Period	Context	Species	Element	Side	Age	Sex	SD	SDO	SH	SLC
EIA/MIA	272	cattle	humerus	R	adult		33.8			
MBA	50538.208	cattle	metacarpus	R	>24-30		33.1			
EIA/MIA	544	cattle	scapula	L	>7-10					40.5

EIA/MIA	634	cattle	scapula	R	adult					48.3		
?	357	dog	femur	Both	>9-10		10.4					
?	357	dog	humerus	Both	>10	Female	9.1					
EIA/MIA	370	dog	humerus	L	>10	Female	11.3					
?	357	dog	pelvis	Both	adult				13.3			
?	357	dog	radius	Both	>6-9		9.4					
EIA/MIA	370	dog	radius	L	>6-9		12.5					
?	357	dog	scapula	Both	>3-5					18.6		
EIA/MIA	546	dog	scapula	R	>3-5					22.3		
?	357	dog	tibia	Both	>8-12		9.3					
?	357	dog	ulna	Both	>6-8			17.0				
EIA/MIA	370	dog	ulna	L	>6-8			22.3				
EIA/MIA	530	domestic fowl	tarsometatarsus	L	adult	Female						
EIA/MIA	304	horse	2nd phalanx	N/A	>10-12		37.0					
EIA/MIA	555	Polecat/Ferret	radius	L	adult		2.4					
EIA/MIA	539	sheep/goat	pelvis	L	>5	Female			13.2			

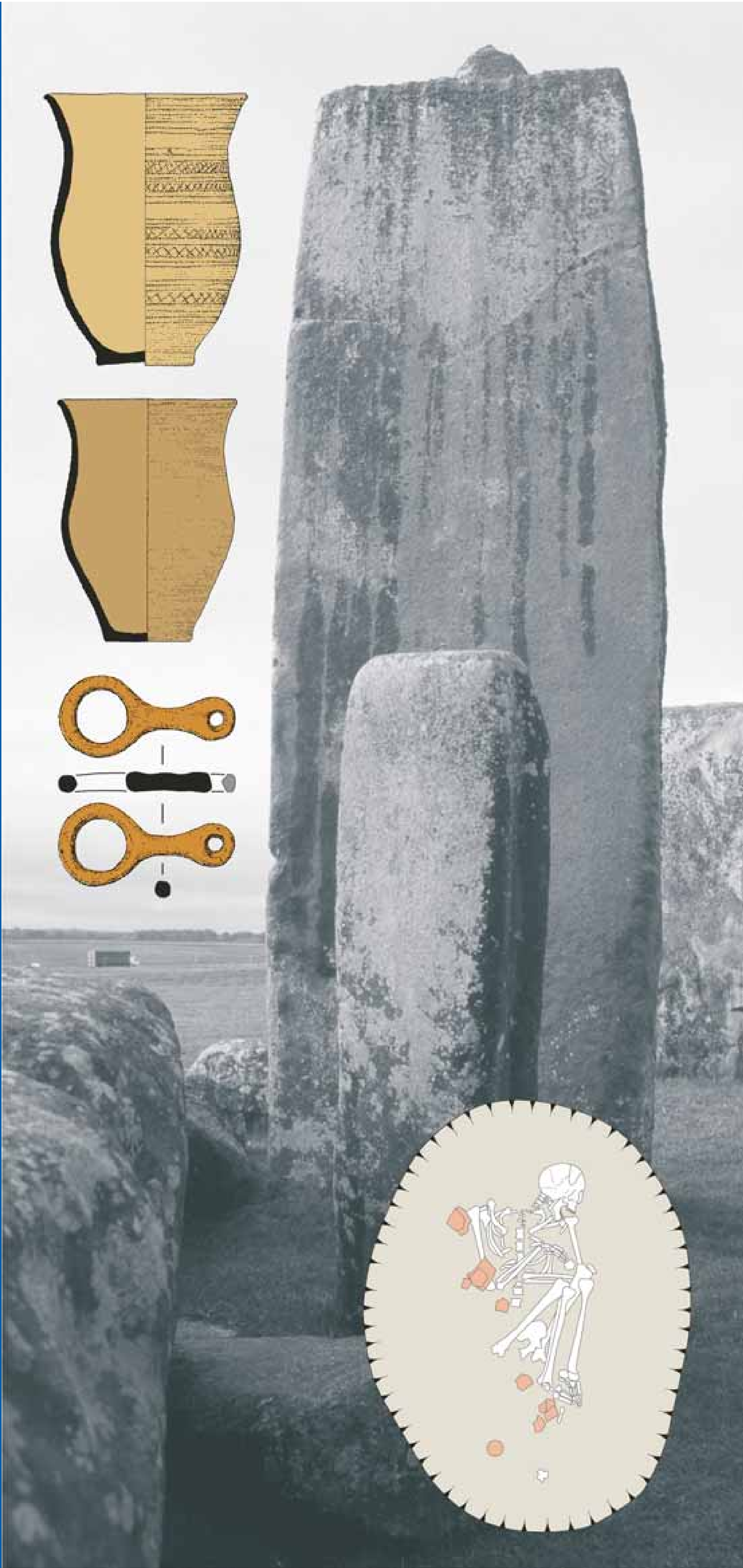
Measurements mainly according von den Driesch (1976). Additional measurements by Harcourt (1974), Nussbaumer (1976; 1978), and Greenfield (2006)

This volume reports on the archaeological works undertaken between 1998 and 2003 as part of the A303 Stonehenge Improvement highway scheme promoted by the Highways Agency.

The A303 trunk road and the A344 which pass Stonehenge are widely agreed to have a detrimental effect on its setting and on other archaeological features within the World Heritage Site. Around Stonehenge there is noise and visual intrusion from traffic and also air pollution. Each year nearly one million people visit the World Heritage Site and surroundings, using visitor facilities intended to cater for a much smaller number.

Many plans that might improve this situation have been examined, involving partnership working across many organisations. Common to all these has been the aim of removing traffic from the area of Stonehenge and at the same time addressing highways issues with regard to road capacity and safety.

This volume sets out the objectives of the extensive programme of archaeological work that was undertaken to inform the planning of the highway scheme, the methods used, the results obtained, and to explain something of the significance of works which provided a 12 km transect across the WHS and beyond: the first of its kind ever undertaken.



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