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THE ANIMAL BONES FROM THE BEAKER BARROW OF BEMP KNOLL, WILTSHIRE

Including an ox-hide burial and some bones from an Earlier Neolithic occupation

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Because of the complicated stratigraphy, and useage of the site over a long period of time, it has been necessary to to deal separately with the bones from each feature, viz:

(1) The Primary Burial Pit - the ox-hide burial - Beaker.

(2) The Barrow Mound - mostly Beaker.

(3) The Barrow Ditch - probably mostly Beaker.

(4) The Earlier Neolithic Pits.

(5) Ditch 2- date unknown.

(6) Ditch 4, level 1 - probably Romano-British

Dr. CAROLINE GRIGSON
March 1979

(1) ANIMAL BONES FROM THE PRIMARY BURIAL PIT - THE EXHIBITION BURIAL

By far the most complete, well-dated and interesting animal bones found at Hemp Knoll were in the chalk block filling of the primary human burial pit; this was of an adult male, possibly an archer, buried with some of his equipment including an archer's wrist guard. Charcoal from the pit has been dated to 1790 b.c. +-120 NPL .

SCHEDULE OF ANIMAL BONES IN THE PRIMARY BURIAL PIT

Loose angular chalk layer (? depth)	Roe deer complete, shed, antler with three points on top.
? level	Domestic ox complete skull.
2' 7" below edge of pit	*Domestic ox L navicula-cuboid, hind cuneiform, metatarsal and L hind external phalanges with seven sesamoids; L anterior cuneiform and L second and third phalanges.
2'10" - 3'3" below edge of pit (~~mainly~~ including fallen bones from hind leg above)	*Domestic ox L magnum, metacarpal and all internal phalanges and external first phalanx; R magnum, metacarpal and all phalanges except internal third (missing); metacarpal V; L hind internal phalanges; 10 sesamoids.
2'1" below edge of pit	*Domestic ox R. navicula-cuboid, hind cuneiform, metatarsal and all phalanges; 7 sesamoids.

* All these foot bones are definitely from the same animal.

THE ANIMALS PRESENT IN THE BURIAL PIT AND THEIR SIZE

The only killed animal present is a domestic ox: its four feet and almost complete skull almost certainly come from the same animal. The skull was very broken, before, during and after excavation, but was at one time almost complete. Restoration and hardening are still in progress, but it has still been possible to take a few cranial measurements. These definitely indicate that the skull was not that of a bull, and probably was not from a bullock either (although the sizes and proportions of early prehistoric castrates have not been worked out). In size and shape it closely resembles the cows ~~from~~ from Danish bogs that have been dated to the Neolithic (Degerbøl 1970; see also) and are proper in the proportional ranges for females in the species as a whole (Grigson 1975). The horncores, though incomplete, seem to have been rather long and were ovoid at the base: long horns ~~and~~ are usually considered to indicate castrates, and ovoid basal cross sections to indicate bulls (at least in later prehistoric and historic material (Armitage and Clutton-Brock 1976), but Nobis (1954 diagram 1) has shown that the basal cross section cannot be used to sex Neolithic cattle in northern Europe, and the author (forthcoming) had the same result for the cattle horncores at Windmill Hill. While the possibility of castration cannot be entirely ruled out it seems more likely that the length and ovoid section of the horncore are ~~more likely~~ due to the old age of the animal at death, which, combined with the feminine proportions of the skull as a whole, suggests that the bones represent an old cow.

The main point of interest is that this ~~skull~~ Beaker skull in no way resembles

DOM. CELTIC OX

Skull	least breadth of frontal	e164
	frontal length	e 242
	least breadth occipital	c 137
	length palatine & maxilla	180
	basal length	e445
	circumference of horn core base	184
	greatest cross section horncore base	67
	least cross section horncore base	47
	length of outer circumference of horncore	c263 (>205)
	length of upper toothrow	123
	length lower toothrow	118 (5 teeth)
	length of mandible from condyle	402
R. magnum	maximum breadth	33.3
	maximum thickness	31.0
L. ant. cuneiform	maximum breadth of proximal part	27.6

	Maximum length	proximal breadth	midpoint breadth	b. distal end shaft	distal breadth
L metacarpal	199	57.0	30.9	52.8	57.1
L metatarsal	219	48.3	27.5	50.5	52.6

L naviculo-cuboid	maximum breadth	50.3
	maximum thickness	50.6
L post. cuneiform	maximum thickness	35.8

	outer length	sagittal length	proximal breadth
First phalanges:			
R ant. internal	53.9	53.3	29.4
R ant. external	54.7	53.7	31.5
L post. internal	56.1	54.5	28.3
L post. external	55.5	55.0	28.4
Second phalanges:			
L ant. internal	31.9	37.1	29.5
L ant. external	32.0	38.2	29.4
L post. internal	33.1	38.5	28.1
L post. external	34.1	38.6	27.0

Third phalanges L ant. external	maximum length	70.0
ROE DEER		
Antler	circumference of burr	136 (Windmill Hill 73-148, n=11)

TABLE Measurement of animal bones from Primary Burial Pit (Beaker). Where bones ox bones (a.) roe deer antler
of both sides from the same animal are present only the measurements from one

the small, short-horned cattle, the so-called 'Bos longifrons', thought to be typical of the Bronze Age; anatomically it is more or less identical with the cattle of the Earlier Neolithic at Windmill Hill and it closely resembles the complete cows' skulls from Tilshead Lodge and Whitesheet Hill (Grigson forthcoming).

That the Hemp Knoll ox is of the large Neolithic type and comes from a cow is supported by the size and shape of the metapodial bones found with the skull. These too belong in the female range and are very similar to those thought to be of cows found at Windmill Hill and in the possible hide burial at Fussell's Lodge (Grigson 1966). They are also similar to those from Late Neolithic sites of Durrington Walls (Harcourt 1971) and Woodhenge (Jackson 1929); all these closely resemble the metapodials identified as female by Charles Higham (1969) in the Middle Neolithic site of Troldebjerg in Denmark (see figure 2).

AGE DATA *

As the distal epiphyses of both the metacarpals and metatarsals of the ox are fused to the shafts, the animal must have been at least 2½ years old, but the dense smooth surface suggests that they were actually much older than that. In the ox skull most of the sutures are closed, with the exception of the lower part of the interfrontal suture, some of the sutures in the temporal fossa are only partly fused, but the frontal/parietal suture on the edge of the temporal fossa is fued. Using Ussow's data (1901) this indicates an age of roughly 7-10 years.

Overgrowth of the supraorbital growth is beginning. All the permanent teeth (except for the lower second premolars) are present and well worn. The wear on the incisors suggests an age of roughly 6-10 years; that of the premolars and molars also indicates old age, but the wear here is uneven due to displacement of some of the teeth (see below). It seems to be about the same age as, or a little older than, the Chillingham Skull in the British Museum (Natural History) (1953.4.22.8) whose estimated age is 8 years (Grigson 1974); all in all an age of 9-10 years is most likely.

DENTAL PATHOLOGY

The lower second premolars are absent; this is quite a common anomaly in cattle, and here it is the reason for the shortness of the lower tooth row. In the left mandible the fourth premolar is tilted forward and the alveolus between it and the first molar has been destroyed, possibly as the result of food packing. The teeth are crowded in the left maxilla, particularly the fourth premolar and first molar, and the fourth premolar has been displaced outwards. There is quite a lot of intradental abrasion caused by crowding and wear, and there is general alveolar regression.

* epiphyseal fusion and tooth eruption times from Silver's (1963) figures for [illegible]

CAPTIONS

Figure 1. The Shape and Size of Early Cattle Skulls The black symbols represent Holocene wild cattle Bos primigenius in northern Europe and the open circles are Danish Neolithic domestic cattle. Size is indicated by $\log_e$ of the least frontal breadth multiplied by the basal length; shape is indicated by the basal length divided by the least frontal breadth.

The Hemp Knoll skull, represented by the star, is clearly in the same size and shape range as the Neolithic domestic females.

Figure 2. The Size and Shape of the Metacrapals of Early Cattle The larger black symbols represent Holocene wild cattle Bos primigenius in northern Europe and the smaller black symbols represent Danish Neolithic domestic cattle. The open circles and squares represent English cattle from Windmill Hill, Fussell's Lodge, Durrington Walls and Woodhenge.

The Hemp Knoll metacarpals, marked by a star, are clearly of the domestic female size and shape.

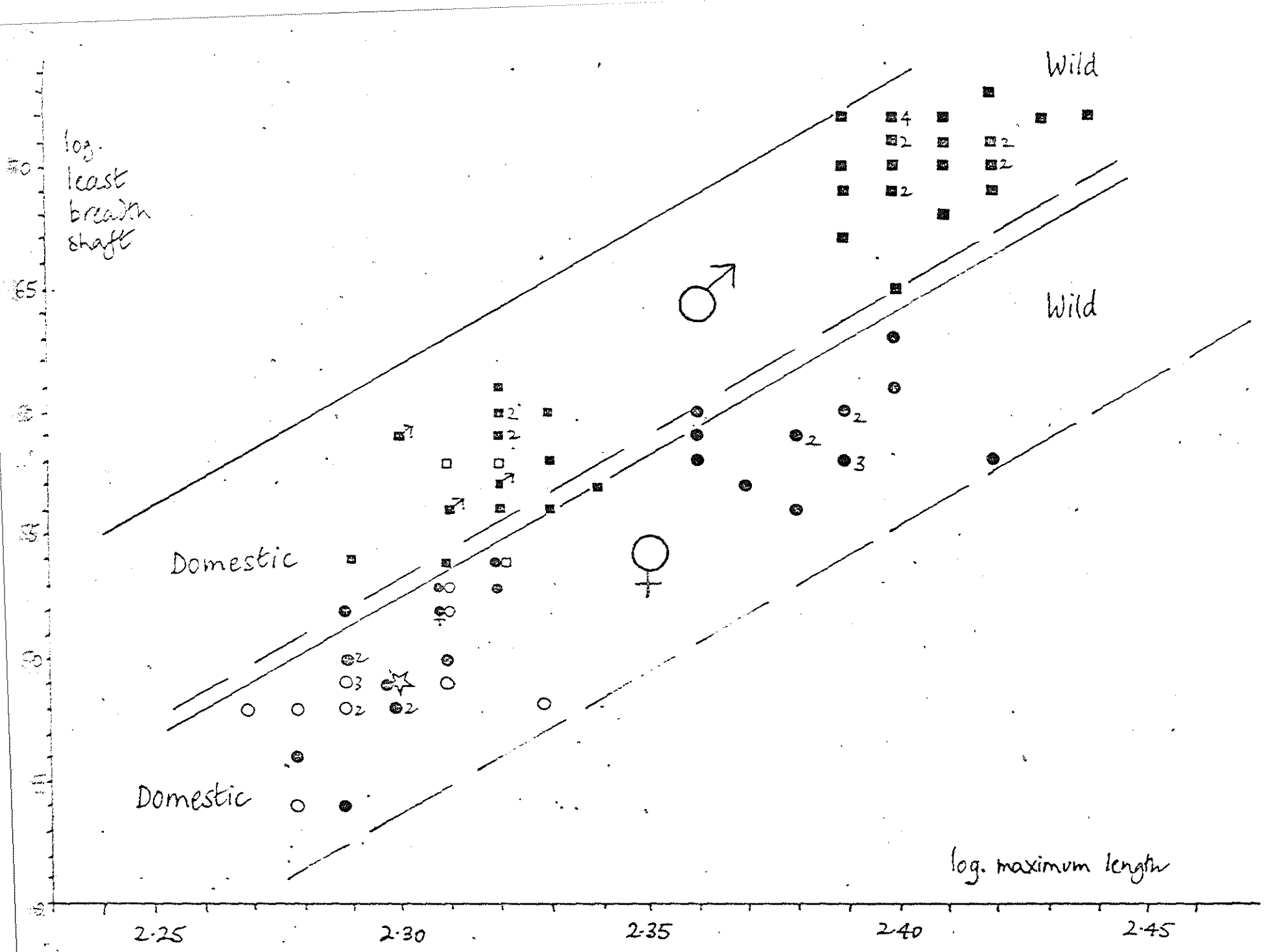

Figure 2

Figure 2

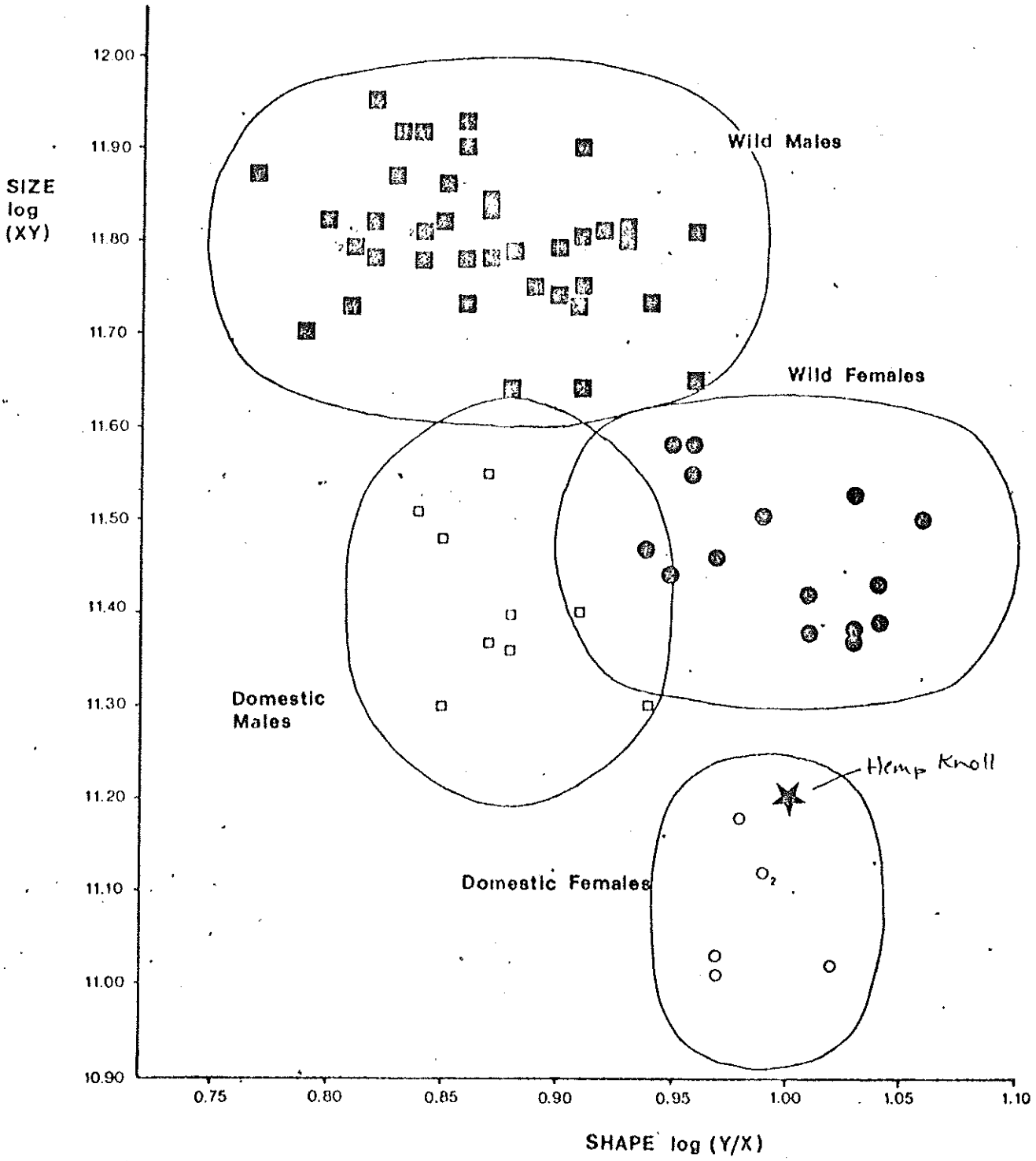
SIZE
log
(XY)
12.00
11.90
11.80
11.70
11.60
11.50
11.40
11.30
11.20
11.10
11.00
10.90
Wild Males
Wild Females
Domestic
Males
Domestic Females
Hemp Knoll
0.75
0.80
0.85
0.90
0.95
1.00
1.05
1.10
SHAPE log (Y/X)

Figure 1

(2) IMAL BONES FROM THE BARROW MOUND Mostly Beaker

As the mound was partly made by scraping up the surrounding surface some material from the Earlier Neolithic occupation may have been incorporated in it, and the mound itself has been weathered, damaged and interfered with in many ways since its construction. A sheep's skeleton in layer 1 of the mound was obviously modern, but most of the material in layers 2 and 3 is fresh and chalky and does not appear to have been weathered or buried in soil, and so it is probably contemporary with the ~~construction of the~~ mound and therefore with the construction of the burial pit.

SCHEDULE OF ANIMAL BONES FROM THE BARROW MOUND Mainly Beaker

Layer (1),	N.W.Quad	Sheep: modern skeleton.
Layer (2),	N.W.Quad	Ox: upper molar; lumbar vertebra. Pig: R tibia, part of shaft and distal end, distal epiphysis fused; R. ulna, fragment. Roe deer: antler, shed, very weathered; R humerus, complete; R. scapula, very broken; R metacarpal, complete; L tibia proximal end of shaft, proximal epiphysis unfused. Unidentified: 12 fragments including a lumbar vertebra (sheep or goat?) and dorsal spine of a vertebra (ox?).
"	N.E.Quad	Horse: R M^1. Ox: 2 L M^3; M_1 or M_2. Ox?: scapula, fragment of distal end. Sheep or goat: M_1 or M_2. Red deer?: metatarsal, shaft, very young.
"	S.W.Quad	Ox: M^3; lower molar fragment; hyoid fragment. Sheep or goat: M_1 or M_2; metacarpal, fragment. Sheep or goat?: radius, fragment of proximal end; rib fragment Red deer: R Scapula, fragment. Dog: R mandible, portion containing alveoli, but no teeth, from second incisor to first molar. Unidentified: 16 large mammal fragments; 5 smaller fragments
"	S.E.Quad.	Ox: L P_4; M_1 or M_2. Unidentified: 3 fragments.
"	?which quad.	Horse: sacral vertebra, complete, epiphyses unfused.
Layer (3),	S.W.Quad.	Domestic ox: R M^3, L P_4; lower molar fragment; scapula fragment; R tibia, fragment of shaft; metatarsal, fragment of proximal end. Aurochs?: R M_1 or M_2; R. scapula, fragment; R tibia, shaft fragment. Ox?: 3 rib fragments. Sheep or goat: M_1 or M_2; radius, fragment of shaft; L. tibia shaft. Unidentified: 24 fragments; rib fragment of sheep, goat or pig.
Surface of chalk, below barrow mound, burnt area of inhumation 1		Ox: lower molar fragment.

THE ANIMALS PRESENT AND THEIR SIZE

As in the other levels cattle predominate, but of 23 cattle bones and teeth 7 are large enough to have been from wild cattle Bos primigenius. There are two unmistakeable bones of horse. Horses are rare in the Earlier Neolithic, but are usually present in small numbers as a domestic animal from Beaker times onwards (Wijngaarden-Bakker 1974). Sheep or goats, domestic pigs, r deer, roe deer and a dog are also represented. ~~In fact apart from the complete bones of the roe deer, which must have a special significance (see below) this looks like a Bronze Age domestic fauna, with cattle, then sheep and then~~

Proximal phalanx anterior, internal	proximal breadth	38.6	25-39*, n=18 dom. 32-46* n=5 B.p.
	outer length	61.2	-
	sagittal length	62.5	49-55*, n=18, dom. 57-73*, n=5, B.p.
DOMESTIC OX			
Lower fourth premolars		22.5 Just worn	12.7 - 14.3, n=4
		20.1 Just worn	
Lower first or second molar		30.5 unworn	25 - 28, n=4
Upper third molars	greatest length of crown	27.8 mod. worn	
		28.0 mod. worn	27* sl. worn, n= 1
Upper molar		e29 sl. worn	24 - 31.2*, n=22
Astragulus	greatest length	63.7	64 - 69*, n=23
SHEEP OR GOAT			
Scapula	breadth "waist"	17.3	-
	greatest distal breadth	27.4	-
Tibiae	distal breadth	e22 ep. fused	23.5 - 24.6*, n=4
	least breadth of shaft	15.7	-
PIG			
Tibia	distal breadth	30.8 ep. fused	28.5*, n=1
ROE DEER			
Humerus (♂)	greatest length	156	156** ♂
	distal breadth	27.4	27.5** ♂
Metacarpal (♂)	greatest length	160	161** ♂
	proximal breadth	20.8	21** ♂
	least breadth shaft	13.0	11.5** ♂
Scapula	breadth "waist"	16.5	15.5 - 19.5**, n= 41
DOG			
Mandible	length premolar row	37.6	34.3 - 39*, n=7

TABLE Measurements of animal bones from Barrow Mound (mostly Beaker) compared with ranges of measurements from Late Neolithic/Early Bronze Age levels at Windmill Hill (Grigson 1965). Some of the cattle are so large that they must have come from the surochs Bos primigenius. The roe deer are also large and comparisons with bones of male roe deer from Bürgäschisee-Süd (**) show that they come from the large type of roe deer that was prevalent in Europe and Britain in prehistoric/times. For other abbreviations see Tables and .)

and early historic

Boessneck et al 1963

BARROW MOUND (MOSTLY BEAKER)		HEMP KNOLL	WINDMILL HILL
WILD (?) OX			
Lower first or second molar	greatest length of crown	36.6 sl. worn	25-28, n= 4
Proximal phalanx anterior, internal	proximal breadth	34.6	25-30*n=18 dom 32-46*n=6 B.p.
	outer length	61.2	-
	sagittal length	62.5	49-55*, n=18, dom. 57-73*, n=5, B.p.
DOMESTIC OX			
Lower fourth premolars		22.5 just worn 20.1 just worn	12.7 - 14.3, n=4
Lower first or second molar		30.5 unworn	25 - 28, n=4
Upper third molars	greatest length of crown	27.8 mod. worn 28.0 mod. worn	27* sl. worn, n= 1
Upper molar		e29 sl. worn	24 - 31.2*, n=22
Astragulus	greatest length	63.7	64 - 69*, n=23
SHEEP OR GOAT			
Scapula	breadth "waist"	17.3	-
	greatest distal breadth	27.4	-
Tibiae	distal breadth	e22 ep. fused	23.5 - 24.6*, n=4
	least breadth of shaft	15.7	-
PIG			
Tibia	distal breadth	30.8 ep. fused	28.5*, n=1
ROE DEER			
Humerus (♂)	greatest length	156	156** ♂
	distal breadth	27.4	27.5** ♂
Metacarpal (♂)	greatest length	160	161** ♂
	proximal breadth	20.8	21** ♂
	least breadth shaft	13.0	11.5** ♂
Scapula	breadth "waist"	16.5	15.5 - 19.5**, n= 41
DOG			
			34.3 - 39*, n=7

EVIDENCE FOR AGE AT DEATH AND NUMBERS OF EACH SPECIES PRESENT

Domestic ox
* (1) less than 2½ years; M_1 or M_2 unworn.
(2) " " 4 years: ulna not fused to radius
(3) 6 months-2½ years: M_1 or M_2 slightly worn
(4) 6 months - 5 years: upper molar slightly worn
* (5) 4-5 years; M^3 slightly worn
**(6) more than 5 years: 2 ~~R~~ L M^3 mod. worn.
* (7) much more than 4 years: R M^3 extremely worn.

Aurochs
* (1) 6 months - 2½ years; M_1 or M_2 slightly worn.
**(2) about 3½ years: 2 1 P_4 just worn.
(3) more than 1½ years: proximal phalanx with proximal ep. fused.

Pig
* (1) more than 2 years: tibia with distal epiphysis fused.

Sheep or goat
* (1) more than 1½ years; tibia with distal epiphysis fused.

Horse
*? (1) sacral vertebra unfused to epiphyses or other vertebrae - young(?)
* (2) about 5 years: M^1 (from comparison with horses of known age in ~~BMNH~~.

Dog
* (1) mandible with permanent teeth from canine to first molar erupted, age more than 5 months.

Roe deer
* (1) Male, adult, humerus and metacarpal with all epiphyses fused.
* (2) Tibia with proximal epiphysis not fused, young.

TABLE The numbers of dead animals represented in the Mound (mainly Beaker)

	maximum no. individuals (total no. bones identified)	minimum no. individuals (total incompatible bones)
Domestic Cattle	16	5
Sheep	9	3
Pigs	3	1
Horse	2	2 (?1)
Dog	1	1
Red deer	1	1
Roe deer *	~~5~~ 4	2
Aurochs	7	3

* probably not eaten

The overall predominance of domestic cattle and the excess of sheep over pig give this fauna a Bronze Age 'look', but the smallness of the sample size means that care has to be taken over this interpretation. The presence of the aurochs makes it unlikely that the fauna could be later than Bronze Age.

B E ELEMENTS , USEAGE, FRAGMENTATION AND PRESERVATION

As in the other levels there is a predominance of teeth over bones in the sample, but there are enough bones of the postcranial axial skeleton and the limbs to suggest that all bone elements were present on the site and there is no evidence for butchery elsewhere. Most of the bone is very broken and looks like normal food refuse with the notable exception of the roe deer bones. At least two of these ~~xx~~ were complete and probably come from the same individual male and all were found together; taken with the evidence of the roe deer antler in the grave itself perhaps this represents some sort of offering appropriate to the specialty of the buried archer. It should be noted however that the antler in the grave as well as in the mound (and in the Earlier Neolithic pits) was all shed and does not come from ~~x~~ hunted animals.

Of 118 bones only 44 could be identified to species. The presence of teeth without alveolar support suggests that there has been differential preservation of the more fragile bone elements. destruction

ANIMAL BONES FROM THE BARROW DITCH Probably most[ly] Beaker in date

Although the barrow ditch was dug at the same time as the construction of the barrow mound its contents seem to have been deposited later. It contained, in level (4) a cache of knapped flint of a type found in the middle or late Bronze Age. There was no bone below level (4), but the material above that [level] may well have been derived from the barrow mound, which itself contained some earlier Neolithic as well as Beaker material. However most of the bones in the ditch were in a clean, fresh, chalky condition which suggests that ~~XXXWXX~~/[they were] never in soil, so most of ~~XXXXX~~/[them are] probably of Beaker date. The presence of aurochs bones in the uppermost level tentatively suggests a date not later than the Bronze Age.

SCHEDULE OF ANIMAL BONE IN THE BARROW DITCH

Ditch 1, level (1), S.W.Quad.

Ox: L m^2, just worn; R M_1 mod. worn; lumbar vertebra, centrum.

Aurochs: R P_4 just worn (fits with M_1 in SE Quad level 1 & teeth in W. trench).

Sheep or goat: lower molar; metacarpal, shaft; L. tibia, part of shaft and distal end, distal epiphysis fused.

Pig: lower incisor, unworn; lower canine, female, unworn.

Unidentified: 12 large mammal fragments; 10 fragments, including 2 shafts of long bone (sheep or goat ?; 19 small fragments; 2 spines dorsal vertebrae (ox ?); 1 long bone shaft fragment (ox ?).

" " S.E.Quad

Aurochs: R M_1 slightly worn (fits P_4 in SW Quad); ~~XXMXXMMMMMXXMXMMMX~~ R P^2 slightly worn.

Domestic ox: L M_1 moderate worn; L calcaneum, part.

Sheep or goat: R M_3, moderate wear; upper Molar, heavy wear.

Hare: humerus, shaft and distal end.

Bird: tibio-tarsus, fragment, young.

Unidentified: 2 large mammal fragments (incl. 1 of aurochs femur?); tooth fragment; humerus shaft (sheep or goat ?); proximal phalanx, proxim end (pig?); tibia fragment (sheep, goat, pig or dog); 2 fragments.

" " S. Trench

~~XXX~~ Domestic ox: R M^3 slightly worn; R M^3 very worn R. calcaneum, tuber calcis unfused.

Unidentified: 1 fragment.

" " W. Trench

Aurochs: R M_3 just worn; R M_2 slightly worn (same animal and fits M_1 in S.E. Quad & P_4 in S.W. Quad).

Domestic ox: metatarsal, proximal end and part of shaft; ~~MX~~ R M^3 slightly worn.

Unidentified: 8 large mammal fragments; 5 smaller

Ditch 1,	level (2), S.W.Quad.	Unidentified: alveolar fragment (ox?); 1 long bone fragment; 1 skull fragment.
"	" S.E.Quad.	Unidentified: 3 large mammal fragments.
"	" N.E.Quad.	Aurochs: scapula, distal end and part of blade, female.
"	level (3), N.E,Quad.	Domestic ox: M_1 or M_2 just worn; lumbar vertebra, epiphyses unfused. Sheep or goat: M_1 or M_2 moderately worn; R & L tibiae, distal ends and parts of shaft, distal epiphyses fused, not a pair. Badger: R. mandible, very old. Unidentified: 14 long bone fragments.
"	level (4), N.E.Quad.	Domestic ox: L M^3 unerupted; L ulna fragment, not fused to radius. Sheep or goat: molar fargment. Unidentified: 28 fragments Bone pin
"	" E. Trench (flint layer)	Domestic ox: skull fragment; lumbar vertebra, epiphyses unfused; L M^3 moderate-strongly worn. sheep or goat: L scapula, fragment. Unidentified: 14 fragments, including 1 metapodial fragment of sheep or goat (?).

THE ANIMALS PRESENT AND THEIR SIZE

Cattle of two sizes are present in the Ditch fill: the larger undoubtedly come from the wild ox or aurochs (Bos primigenius) and the smaller from the domestic ox. Cattle bones of two sizes were found in the Early Bronze Age barrow at Snail Down (Clutton-Brock et al forthcoming) and the most recent known aurochs in Britain has also been dated to the Early Bronze Age (BM - Burleigh et al 1978). The aurochs measurements exceed those of Neolithic domestic cattle in Denmark and are in the range for wild cattle, both in Denmark (Degerbøl 1970) and in Northern Europe and Britain (author's measurements).

The domestic cattle bones are similar in size both to the Neolithic cattle of Denmark and to those of Late Neolithic and Early Bronze Age levels at Windmill Hill, which are, incidentally, of the same size as those from the Earlier Neolithic. Cattle in the Neolithic are known to have been larger than those in subsequent prehistoric periods (Jewell 1962); this diminution seems to have started in the Bronze Age, but not enough well-dated sites have been well enough researched to know when, where, and how uniformly this diminution took place and what ranges of variation of the cattle were involved. On the basis of the size of the domestic cattle bones, and the presence of aurochs bones, a date for the ditch fill of later than Early Bronze Age seems unlikely.

The pigs Sus scrofa, are not measureable, but the small, female, lower canine suggests they were domestic. Sheep and goat cannot be distinguished from

DITCH 1 (MOSTLY BEAKER)		HEMP KNOLL	WINDMILL HILL
WILD OX			
Lower fourth premolar	greatest length of crown	23 just worn	12.7 - 14.3, n=4
Lower first molar		e31 sl. worn	25 - 28, n=4 (M_1 & M_2)
Lower second molar		33.2 sl. worn	
Lower third molar		e46.4 just worn	36 & 37.5, n=2
Upper second premolar		18.6 sl. worn	9.3 *, n=1 st.worn
Scapula	breadth "waist"	66.4 ♀?	43-54*, n=14 & 65*, n=1 ?B.p. ♀
DOMESTIC OX			
Lower first molar	greatest length of crown	e28	25 - 28, n=4 (M_1 & M_2)
Upper third molars		31.4, unerupted 28.0 & sl. worn 30.9 mod-st worn	30*, n=1 sl. wear & 37 & 37*, n=2 ?B.p.
Upper second milk molar		23.7	-
Metatarsal	least breadth of shaft	27.1	22-34*, n=6
SHEEP OR GOAT			
Lower third molar	greatest length of crown	23.5	20 - 22*, n=6
Tibia	distal breadth	23.9, ep. fused 22.8 & ep. fused 24.0 ep. fused	23.5 - 24.6*, n=4

TABLE Measurements of Animal Bones from Ditch 1, compared with ranges of measurements from the Late Neolithic/Early Bronze Age levels at Windmill Hill (Grigson 1965). The sizes of domestic cattle and sheep are similar in two sites, but some of the cattle are so large, both at Hemp Knoll and at Windmill Hill that they must have come from the wild ox Bos primigenius. (In some cases it has been necessary to use measurements from the Earlier Neolithic levels of Windmill Hill, these are marked *; mod.= moderately, st.= strongly, other abbreviations as in Table .)

one another here and are similar to those from Windmill Hill. Single bones of the hare Lepus europaeus, of a badger Meles meles and of a bird were also present. Both red and roe deer are surprisingly absent from the Ditch fill.

EVIDENCE FOR AGE AT DEATH AND NUMBERS OF EACH SPECIES PRESENT

Domestic cattle

* (1) approx. 1 month: L m^2.
(2) 6 months-2years: M_1 or M_2 just worn.
(3) less than 3 years: calcaneum, tuber calcis unfused
* (4) less than 4 years: ~~R~~ L M^3 unerupted
** (5) 4-5 years: R M^3 slightly worn (2)
* (6) more than 5 years: L M^3 moderate to strong wear.
* (7) " " " : R M^3 very worn
(8) ? : ulna unfused to radius

Wild cattle

(1) R M_1 slight wear
(2) R P^2 slight wear
(3) R P_4 just worn
* (4) R M_3 just worn
(5) Scapula with distal epiphysis fused

} all same animal aged approx. 4-5 years

Sheep or goat

* (1) 6 months - 1½ years: M_1 or M_2 just worn
(2) more than 1 year: M_1 or M_2 mod.worn
*** (3) more than 1½ years: 3 tibiae, no pairs
(4) more than 4 years: R M_3 moderate wear.
~~XXXXXXXXXXXXXXXXX~~

Pig

* (1) lower incisor unworn
(2) lower canine ♀ unworn

} same animal less than 1 year old

* incompatible bones

TABLE The numbers of dead animals of each species represented in the barrow ditch at Hemp Knoll (probably mostly Beaker)

	maximum no. individuals (total no. bones identified)	minimum no. individuals (total no. incompatible bones)
Cattle (dom)	17	6
Cattle (wild)	5	1
~~Sheep~~ Sheep	10	4
Pig	2	1
Badger	1	1
Hare	1	1
Bird	1	1

It is usual for cattle to outnumber other domestic species on Bronze Age sites and for sheep to exceed pigs, but since the nature and date of the deposits is so uncertain little should be said about the

~~the~~ presence of the bird, badger and hare

BONE ELEMENTS, USEAGE, FRAGMENTATION AND PRESERVATION

The bone seems to represent domestic rubbish of some kind. ~~XXX~~ Teeth predominate, but there are enough postcranial bones to suggest that the animals were ~~xxxxxxxxxxxxxxxxxx~~ butchered on the site. The bone is not well enough preserved to show butchery marks, nor are there any signs of useage. Of 139 bone & tooth fragments only 37 were identified to species.

(4) ANIMAL BONES FROM THE EARLIER NEOLITHIC PITS

The fauna from the earlier Neolithic occupation below the barrow at Hemp Knoll is very important, because so few occupation sites with animal bone are known from this period. Almost all the existing information about the fauna of the earlier Neolithic comes from barrows and other sites with possible ceremonial uses, particularly the causewayed camps (Grigson forthcoming); the one really comparable occupation site is the pre-enclosure level at Windmill Hill (Jope 1965; Grigson 1965).

Bone was found in pits in the NW and SW quadrants and materials from these pits has been treated together. Pits 1 and 2 in the NW quadrant contain earlier Neolithic pottery (Hembury Ware), and, as Pit 1 contained the right half of a sheep's mandible that exacatly matched the left half found in Pit 2, it is assumed that the fill of these two pits is contemporary. Quite a large sample of bone was taken from Pit 2 for radiocarbon dating (date not yet available) and identified by Mrs. A. Locker. In the SW Quadrant Pit 1 only contained one identified bone and is assumed to be contemporary with with pits in the NW quadrant.

SCHEDULE OF ANIMAL BONES FROM THE EARLIER NEOLITHIC PITS

North West Quadrant Pit 1 level not recorded	Red deer: a shed antler with worn brow and bez tines, possibly used as a rake. Roe Deer: a shed antler with the points broken off.
black carbon layer and layer (1) (contemporary)	Domestic ox: R tibia, part of shaft and distal end, epiphysis fused, very dense and old; R I_2 complete, slightly worn; m_3; R maxilla fragment with m^3 erupted and unworn, m^4 erupting, and M^1 beginning to erupt; L m^3, worn; L m_4, slightly worn; L m^2, very worn; metapodial, metapodial III and IV partly fused, distal epiphysis unfused. Sheep or goat: R mandible with m_4 (matches mandible in pit 2); incisor; lower molar; fragment of skull; pair of very broken mandibles with M_3 not yet erupted; cervical vertebra III, both epipyses unfused; P_4 worn; M_3 slightly worn; upper molar fragment; incisor; P_2. Pig: lower incisor fragment; Unidentified: 4 large mammal fragments (including 1 rib fragment); 13 smaller mammal fragments (includig x 2 rib fragments); 8 skull fragments; 1 dorsal vertebra spine and 1 small piece metapodial. Red deer: R metacarpal, part of proximal end and part of shaft (split?); antler tine fragment.
North West Quadrant Pit 2	
level not recorded (Sample taken for radiocarbon dating)	Sample taken for radiocarbon dating (identified by Mrs. A. Locker); Ox: mandible with modern breaks, P_3 and P_4 worn, M_2 slight wear; mandible fragment with m_4; mandibular condyle; premolar; horncore fragment; otic bulla; skull fragment; atlas fragment; vertebral fragment;

North West Quadrant Pit 2 cont. Radiocarbon sample cont.

Sheep: 2 mandibular condyles; mandibular ramus fragmen premaxilla; 3 rib fragments; humerus: shaft; metacarpal, distal epiphysis unfused.
Red deer: molar.
Unidentified: small unidentified fragments present.

layer (1)

Domestic ox: R P_3, very worn; all same young animal (?): R mandible fragment, L & R (pair) $P_{2/3}$, unerupted; 4 lower molars, unerupted and broken; horncore tip; atlas, wings unfused;
R metatarsal, part of shaft and distal end (distal epiphysis fused).

Sheep or goat: All same young animal (?): L. mandible with m_2, m_3, m_4 and M_1 (matches mandible in Pit 1); incisor, unworn; R M_3, slightly worn; horncore fragment; basispenoid fragment; atlas: epiphyses fused; axis, epiphyses fused; cervical vertebra ---, anterior epiphysis fused; pelvis, sutures unfused; metacarpal, distal epiphysis (fused) and part of shaft; metacarpal, fragment of proximal end, proximal epipysis fused.
Pig lower incisor, very broken; metacarpal, proximal epiphysis unfused.

SW Quadrant Pit 2 level (1) Ox: middle phalanx, proximal epiphysis.
Unidentified: 3 fragments

ANIMAL SPECIES PRESENT AND THEIR SIZE

The fairly small size of the cattle and pig bones suggests that these are from domestic animals. The measurements of the cattle bones are very similar to those from the earlier Neolithic at Windmill Hill. Absence of a bulge on the lingual side of the lower fourth deciduous molars of sheep or goats is believed to indicate that they are from sheep; no bulge was present in the Hemp Knoll material so probably they were all ~~the animals were~~ sheep, similar in size to those at Windmill Hill. Red deer Cervus elaphus and roe deer Capreolus capreolus are also represented, and were of large size.

EARLIER NEOLITHIC		HEMP KNOLL	WINDMILL HILL
DOMESTIC OX			
Lower third premolar	greatest length of crown	17.7 v. worn	-
Lower fourth premolar		18.2 unerupted	18.0 - 22.5, n=11
Lower fourth milk molar		37.2 sl. worn	34.1 - 38.5, n=3 unworn or sl. worn
Tibia	distal breadth	c58 v. old	e56 - 64, n=18
SHEEP			
Lower second premolar	greatest length of crown	8.3	-
Lower second molar		16.8	13 - 15.7, n=5
Lower third molars		19.9 & 19.4	20 - 22, n=6
Lower third milk molar		18.3	-
Metacarpals	proximal breadth	e20 ep. fused	20.1 - 222.8, n=1
	distal breadth	22.6 ep. fused	-
RED DEER			
Antler	circumference of pedicel above burr	162 shed	115-228, n=15 shed
ROE DEER			
Antler	circumference of burr	110 shed	73-148, n=11

TABLE Measurements of animal bones from the 8 earlier Neolithic pits at Hemp Knoll compared with those from the earlier Neolithic levels at Windmill Hill (Grigson 1965). The sizes of cattle and of sheep are similar in the two sites. (All measurements in millimetres; V = very, sl. = slightly, e = estimated, c = circum, ep. = epiphsis, n = number of specimens.)

EVIDENCE FOR AGE AT DEATH AND THE NUMBERS OF EACH SPECIES PRESENT

Cattle

(2) less than $1\frac{1}{4}$ years: metapodial with metapodials III and IV unfused.

(3) " " $1\frac{1}{2}$ years: proximal phalanx with proximal epiphysis unfused.

(4) " " $2\frac{1}{2}$ years: m_3 erupted.

(5) " " $3\frac{1}{2}$ years: unerupted P_4.

* (6) " " $3\frac{1}{2}$ years: m_4 erupted.

* (7) approx. $3\frac{1}{2}$ years: I_2 with slight wear; mandible with P_3 and P_4 with strong wear and M_2 with slight wear

(8) more than $1\frac{1}{2}$ years: premolar (type not stated).

(9) " " $2\frac{1}{4}$ years: metatarsal with fused distal epiphysis.

(10) " " $2\frac{1}{2}$ years: P_3, its great degree of wear suggests an animal much older than $2\frac{1}{2}$.

* (11) " " 2 years: tibia with distal epiphysis fused and also a very heavy and old texture, probably at least ten years old.

* (1) approx. 6 months: maxilla with m_3 erupted and unworn, m_4 erupting and M_1 beginning to erupt.

It is clear from these figures that animals of all ages from about six months to $3\frac{1}{2}$ years to at least ten years are present. The sample is too small for more detailed conclusions.

Sheep

* (1) approx. 6 months: left mandible with m_2, m_3, m_4, and M_1 present

(2) less than 2 years: metacarpal with distal epiphysis unfused.

* (3) " " 4 years: pair of mandibles with M_3 not yet erupted, but present.

(4) $1\frac{1}{2}$-$3\frac{1}{4}$ years: incisor, erupted and unworn.

* (5) 3 - 4 years: M_3 slightly worn.

(6) more than $3\frac{1}{2}$ years; P_4 worn.

(7) " " $1\frac{1}{2}$ years: metacarpal distal epiphysis fused.

Of the seven bones that can be aged only one is definitely from a young lamb, though two others could be that young. Only one individual is definitely more than 3 years old.

Pigs

* (1) Permanent incisor. The presence of even an unidentified permanent incisor represents an animal of at least 6 months old.

* (2) The metacarpal with an unfused proximal epiphsis is from a foetal pig.

* incompatible bones

TABLE The numbers of dead animals of each species represented in the Earlier Neolithic pits at Hemp Knoll

	maximum no. individuals (total no. bones identified)	minimum no. individuals (total no. incompatible bo
Domestic cattle	31	4
Sheep	31	3
Pigs	3	2
Red deer	2	1

As usual on Eralier Neolithic sites in southern England cattle are the predominate domestic animals, but it is unusual for sheep to be equal, or nearly equal, to them in number before the early Bronze Age. However this is rather a small sample.

BONE ELEMENTS , USEAGE, FRAGMENTATION AND PRESERVATION

The very fragmentary nature of this bone suggests that it represents the remains of domestic rubbish, largely meals, but it is possible that two of the collections of bones represent ~~the remains of~~ one individual sheep and one individual calf which were perhaps deliberately buried in the pits. Skull bones and teeth predominate, but there are enough bones of the remainder of the axial and appendicular skeletons to suggest that the animals were killed on the site. There is no evidence of cuts or other butchery marks.

~~[illegible]~~ Of 137 bones (plus a few extra unidentified bones used in dating) 70 could be identified.

It is possible that there has been some differential destruction of bone in situ as the pit contennts were humic (pH not known).

The only bones which show signs of deliberate use are the red deer antler (with worn brow and bez tines, which looks as though it was used as a rake) and a red deer metacarpal, which seems to have been deliberately split longitudinally, perhaps as a preliminary to the manufacture of a bone tool.

SEASONALITY

Shed ~~[illegible]~~ antler of both red deer and roe deer was present in the Neolithic pits and there was no unshed antler; this could be atken to indicate occupation in April (when red deer shed their antler) and October (when roe deer shed their antler), but it must be remembered that antler can be stored, so more positive evidence for both use and non-use of the site at particular times of the year is needed as evidence for seasonal use. The presence of some young domestic animals may indicate spring or summer useage, provided that parturtition took place only in the spring in the Neolithic.

SITE CATCHMENT

The excess of sheep over pigs suggests the presence of open country around Hemp Knoll, with some access to woodland for pannage.

(5) DITCH 2 *Date unknown*

This ditch is undated though its construction probably antedates the construction of the mmmmd Beaker barrow. The presence of domestic animals at least rules out any possibility of Mesolithic date and the rexlatively high proportion of pig bones could be taken to suggest a late Neolithic date (Grigson forthcoming), but with such a tiny sample of bones this may not be significant.

SCHEDULE OF BONE FINDS FROM DITCH 2

level (2)
ox: rib fragment
sheep or goat: L humerus, distal end and part of shaft, epipyssis fused.
pig: rib fragment.

level (4)
ox: lower molar fragment: worn.
Sheep or goat: R. mandible fragment; radius, part of shaft.
pig: I_1 unworn; L humerus, distal end and part of shaft, epiphysis almost fused.
unidentified: 3 large mammal fragments.
dog: L humerus, part of shaft and distal end, epiphysis fused.

level (5)
domestic ox: R tibia, part of shaft.

level (6)
unidentified: 2 fragments

XMX ANIMALS PRESENT

Cattle, pigs, sheep or goats and dogs are represented in the fill of DitchX 2, the ungulates by three bones each and the dog by one large humerus (maximum distal breadth 31.9mm); five bone fragments were unidentified.

BONE ELEMENTS AND FRAGMENXTATION

The presence of teeth, ribs and limb bones of ungulates, in a very broken state, suggest that they were slaughtered on the site and probably represnt the remains of animals that were eaten.

(6) DITCH 4 LEVEL (1) Probably Romano-British

SCHEDULE OF BONES FOUND

Horse: L M_2.
Domestic ox: M_2 or M_3.
Sheep or goat: radius, part of shaft; tibia, part of shaft.

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add to previous page