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The Animal Bones from Stonar.

Summary

The bones examined, a total of just over 7000 identified specimens, were in three distinct groups dating from the mid- twelfth to the early fourteenth century. The material, it is thought represented predominantly the remains of butchered food animals brought in to feed the townspeople. Cattle, sheep and pig predominate; sheep being the most numerous but beef comprising the greatest part of the total meat. Other species represented are horse, dog cat, red and fallow deer, xxxxxx, rabbit, dolphin, fish and many species of bird.

Methods.

To be added to "Methods"

The ages at which various teeth erupt and the rate at which they wear once erupted are so dependent on nutrition and the nature of the herbage that, as with the epiphyses, no attempt to establish absolute ages has been made. Instead each sufficiently complete mandible was graded according to the stage of eruption reached by the latest erupted tooth present; thus in Group I were placed those with only the first molar, in Group II those with the second molar erupting, in Group III those with the second molar in wear and so on.
All measurements are in millimetres unless stated otherwise.

unfused epiphyses in early fusing bones must come from young or juvenile animals and fused epiphyses from late fusing bones, from adult or aged animals. The ages at .....(continue as on attached slip)

Description of the Material

Hardly any but short lengths of bone were present and because of this the information it was possible to glean was not as great as might have reasonably been expected from a collection of this size.

Cattle

The dimensions of all measurable bones are shown in Table I and from this it is seen that they do not vary between one period and another to an extent greater than can be explained by chance and natural variation.

The measurements fall within or close to the same range as those of cattle

bones from other mediaeval sites such as Writtle, Somerby and South Witham(Harcourt 1969 & unpublished)
Those from Stonar show, in some instances, less variation but this is probably explained by the small size of the sample. The complete meta - carpal indicates an animal with a shoulder height of about 122cm. (49ins)(Fock 1966).

Table I. Measurements of Cattle Bones.

	Period I	II	III
Humerus dw.	———	———	61-71(4)
Radius pw	60-68(2)	62	72
1st Phal.pw.	21-31(9)	20-31(8)	———
Astragalus tl.	60-61(2)	55-58(2)	54-65(7)
Calcaneum tl.	104	———	117-124(5)
Metacarpal dw.	———	47-56(4)	49-62(12)
tl.	———	———	199
Tibia dw.	———	47-49(2)	42-57(7)
Metatarsal dw.	———	———	44-60(14)

pw.= proximal width dw.=distal width. tl=total length.
Figures in brackets are the number of specimens measured.
The extremities of long bones are measured across articular surfaces.

In Period I the sample size was too small but in Period II 31% of the animals as represented by the bones were juveniles with unfused early fusing epiphyses and 53% were fully mature adults. For Period III the figures were respectively 41% and 53%. It is almost certainly a mistake to assume that all bones on archaeological sites are necessarily those of animals deliberately killed for consumption but on a mediaeval town site such as Stonar this assumption is probably justified and for this reason it must be remembered that the material is not representative of the stock keeping practices of the time but only of the animals slaughtered. The age at death pattern referred to therefore shows that the meat available comprised that from younger animals surplus to breeding requirements supplemented by the carcases of older beasts which had reached the end of their working life.

There were not enough sufficiently complete mandibles to allow of their use for ageing.

SHEEP

There is no discernible difference in the sizes of the sheep in one period as compared with those in ~~an~~ another, all being small slender animals standing about two feet high at the shoulder. (Table II).

Table II. Measurements of Sheep Bones.

Period	I	II	III
Humerus dw	25-29 (25)	25-30(10)	23-33(53)
Radius pw.	24-28(17)	25-29(13)	—
tl.	142	—	131
Metacarpal tl.	120-128(4)	117-122(3)	110-129(9)
Metatarsal tl.	120-122(2)	—	117-139(6)
Shoulder height.	56-62 cm	57-59	53-65
	22-24 in	22-23	21-26

The metacarpal total length is multiplied by 4.86 and that of the metatarsal by 4.68 to give the approximate shoulder height. (Tsalkin 1961)

Table III. Ages of Sheep as shown by epiphyses. ~~and mandibles~~

Period	I	II	III
Early fusing UF	13%	9%	14%
Late fusing F	60%	66%	63%

Table IV. Ages of Sheep as shown by mandibles-PeriodIII only

Group	I	II	III	IV	V	VI	VII	VIII
	7.5%	1.5%	7.5%	1.5%	6%	24%	30%	22%

Group I: M_1 only; II: M_2 erupting; ~~Mxxxxxxxx~~ III : M_2 in wear
IV: M_3, 1st cusp in wear. V: 2nd cusp in wear. VI: 3rd cusp in wear.
VII: 3rd cusp well worn. VIII: 3rd cusp heavily worn.

M_1 = lower 1st molar; M_2, ~~2x~~ 2nd, M_3, 3rd. UF=unfused. F= fused.

PIG

As is so often the case with this species the bones were few and fragmentary. The measurable specimens are shownxx in Table V together with the age structure although it was only in Period III that there were enough for the latter to be ~~recorded~~ derived.

Table V. Measurements of Pig Bones and Age Structure.

Period	I	II	III
Astagalus. tl.	39-45(3)	38-41(3)	40-44(4)
Humerus dw.	32	----	27-34(7)
Radius pw.	---	---	27-29(3)
M_3 tl.	---	---	29-33(3)
Early fusing UF.	--	---	81%
Late fusing F	--	---	12%

OTHER SPECIES.

Each was represented by only a few specimens from one or at most two periods. The only horse bone was a split water worn phalanx from Period I, dog was found only in the Period III levels and the bones present included an ulna which had been sharpened at one end. Rabbit, the remains of two nearly complete animals was found in the Period III levels. Two adult and two immature cats were present in Period II. Among the bones were two complete humeri, measuring 83 and 85mm respectively. Two kittens and not less than three adults were found in Period III. Deer remains came from all periods but xxxxxxxxxx a total of only six specimens; from Period I a cast antler of red deer(Cervus elaphus), sawn off close to the base, from Period II a tooth of the same species and from Period III a complete metacarpal of fallow deer(Dama dama). There were also some antler fragments, one of which showed saw marks, from the same species.
The only marine mammal represented was either a white- beaked or awhite-sided dolphin, (Lagenorhynchus sp.) of which one vertebra was found.

FISH

REmains of fish were numerous. Vertebrae xxxx comprised by far the greater part and most of them were of approximately similar size, resembling those of cod.

BIRDS→ ~~PATHOLOGICAL AND ANATOMICAL ANOMALIES~~.

~~An ulna of a sheep showed lesions of osteoarthrosis, a condition often but~~

To be inserted after Fish

BIRDS - Wild species

The list of birds is long and varied, comprising some twentyfive wild species together with domestic poultry, geese and ducks. A total not less than of one hundred and forty individual birds is represented, ninety of which are from Period III.

The species present, grouped according to habitat are gannet(Sula bassana) brent goose(Branta bdrnicla) shelduck(Tadorna tadorna), scoter(Melanitta sp) goosander ? (Mergus merganser)mallard(Anas platyrhynchax) teal(Anas crecca),great black backed gull(Larus marinus), herring or lesser black-backed gull(Larus sp.) common gull(Larus canus) kittiwake(Rissa tridactyla), roseate tern(Sterna dougallii), razorbill (Alca torda), guillemot(Uria aalge), golden plover (Pluvialis apricaria),whimbrel (Numenius phaeopus),dunlin or snipe(Scolopacidae), wood pigeon(Columba palumbus), stock dove(Columba oenas),jackdaw(Corvus monedula), partridge (Perdix perdix),?blackbird(Turdus merula), and ?skylark(Alauda arvensis). Although some of these species, for instance the gulls, might seem inedible by modern standards it is hard to imagine for what other purpose than the pot they might have been taken. It is possible that some may have been fed to falcons, but against such a suggestion is the fact that no remains of birds of prey were found.

Domestic fowl (Gallus sp.)

These were represented as shown in Table VII by one hundred and twenty six long bones the measurements of which seem to indicate a fair degree of variability. It is however essential to curb the temptation to see "breeds" where, in fact, none may have existed. We are so accustomed in modern times to numerous closely controlled breeds of livestock, the individual members of which show very little variation, that it is easy to forget that this is a very recent phenomenon. Furthermore the breeds of today differ by much more than mere size. Distinguishing features are provided by colour, pattern and nature of external covering, fur or feathers. Hardly any evidence for these is available in the archaeological record. As has been pointed out by Kurtén(1968) the variation within a population is often underestimated and, according to the same worker, the bones of adult animals of one species in the wild may show a coefficient of variation ranging from 4-9. The values for the ulna and tibio-tarsus

Table VII. Measurements of long bones of Domestic Poultry.

	N	OR	M	SD	CV
Humerus	27	64-85	71.7	5.5	7.7
Ulna	18	64-94	78,1	10.3	13.2
Cmc	24	36-49	40.5	3.8	9.5
Femur	29	70-95	79.8	6.5	8.1
Tibio-tarsus	14	90-141.5	111.7	12.6	11.3
Tmt	14	65-98.5	76,9	8.9	11.6

Cmc= Carpo-metacarpus. Tmt= Tarso-metatarsus. N= number of specimens
OR= Observed range. M= arithmetic mean. SD= standard deviation
CV= coefficient of variation
The number of bones from Periods I and II is too small to allow of any between period comparison- the specimens from Period III comprise 75% of the total- so all have been amalgamated.

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are slightly outside this range but in a domestic population the effects of natural selection are bound to be slightly modified and perhaps allow the survivial of individuals at the extremes of variability that would normally perish. Certainly Figs.II and III show no more than the bimodal distribution of a species which displays sexual dimorphism.

PATHOLOGICAL AND ANATOMICAL ABNORMALITIES

An ulna of a sheep showed lesions of osteoarthrosis, a condition often but incorrectly referred to as osteoarthritis. It is a degenerative change usually associated with advancing age in which pits and grooves are worn in the articular surface of the bone. One lower third molar had a much reduced third cusp, a feature often seen in cattle teeth but less often in those of sheep.

EVIDENCE OF BUTCHERY METHODS

It is a commonplace that ~~any~~ a collection of bones from ~~whatever~~ any period in the archaeological record contains a high proportion of broken fragments but it is the writer's experience that,-relatively, more complete bones are found prior to the Saxon period. Thereafter, ~~xixx~~ because of improvements in metal technology, heavier knives and cleavers became available which made butchery, in the modern sense of chopping carcases into small pieces, a practical proposition. Prior to this there must have been far more defleshing as opposed to true butchery.

Among the material from Stonar, both sheep and cattle, there were very numerous vertebrae split lengthways, also some vertebrae and rib heads which were split across indicating that carcases were split longtitudinally and then into pieces transversely. Evidence of jointing of limb bones was provided by scapulae cut across at an angle near the neck, by humeri chopped across through or immediately above the condyles and by many astragali which had been cut through on the slant.

SPECIES MEAT CONTRIBUTION

It is the writer's firm belief that attempts to estimate the actual weight of meat represented by the bones on a particular site is to erect an imposing structure on flimsy foundations and give a totally spurious impression of precision. The preferred method is to attempt to arrive at a ratio. ~~This has been done by taking a sheep as unity and then expressing other species in terms of this animal.~~ This has been done by taking the weight of a sheep as unity and then expressing that of other species, based on comparative bone sizes, in terms of this animal. The ratio used ~~is~~ was : ~~Cattle:Pig:Sheep= 10:1.5:1~~ Cattle: Pig:Sheep= 10:1.5:1. The ratio for each species is multiplied by the minimum number of individuals to give the number of "Meat units" contributed by that species (mu). This value is then expressed as a percentage of the total meat units provided by all species combined(MU). Then % Meat contribution = $\frac{mu}{MU} \cdot 100$. (Table VI)

Table VI. Species Meat Contribution and Minimum Number of Individuals.

	Period I			Period II			Period III		
	MNI	%	MC	MNI	%	MC	MNI	%	MC
Cattle	3	12	55	5	23	71	12	15	60
Sheep	20	77	37	11	50	16	43	55	22
Pigs	3	11	8	6	27	13	23	30	18

MNI= Minimum number of individuals. % = MNI of one species as % of all.
MC = % Meat Contribution

~~Although there are variations in the relative numbers of species in different periods they are so small that they are probably due to chance.~~ When, for each period, pork is taken as unity and the other types of meat expressed as a ratio of it the results, as shown in Table VII and Fig. I, seem to show that the consumption of beef showed a steady decline and that of mutton an initial drop followed by a levelling off during the time of occupation of the site. A note of caution must, however, be sounded. It has been stated(Clason 1972) that the simple determination of minimum number of individuals may lead to overrepresentation of species found in small numbers and vice versa although it is difficult to see quite how this hypothesis could be put to the tested. If, however, it is true then the number of pigs shown may be greater than in fact was the case. As two species of deer were represented it is possible that venison contributed to the total meat supply but the amount, on the evidence of the Cervid specimens found, was too small to be taken into consideration. ~~A possible alternative interpretation is that only heads and hides were brought in.~~

STOCK KEEPING PRACTICES

For cattle it has already been shown that for Periods II and III over half the animals represented in the collection were fully mature or aged. With sheep the preponderance of older animals is even more marked, as shown in Tables III and IV. For all periods, of the bones with epiphyses, more than 60% were in the late fusing fused group and of the mandibles at least 82% had the third cusp of the third lower molar, a late erupting tooth, erupted and in wear. 22% were in Group VIII in which the third cusp is heavily worn.

From this it is clear that while some animals may have been killed young for meat, older animals were a commonplace and that bringing them through many winters was well within the capabilities of the stockmen of

the time.

The main purpose for which sheep were kept in the mediaeval period was for wool(Trow- Smith 1957) to which end they would be kept alive as long as their teeth lasted. Cows would have been required for milk, and for the production of calves, cows and bullocks were needed for draught. For the latter purpose no animal of less than three to four years of age is suitable. For all of these reasons therefore and for others connected with the slow maturing and low breeding rate of mediaeval cattle(Trow-Smith 1957.) the so- called autumn killing for which in addition there is next to no literary evidence, can never have been practiced.

Acknowledgements

The bird remains were identified by D.Bramwell who also kindly suppied the long bone measurements from which TableVII was derived.

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See opp.

R.Harcourt. M.Sc.B.V.M.S.M.R.C.V.S.

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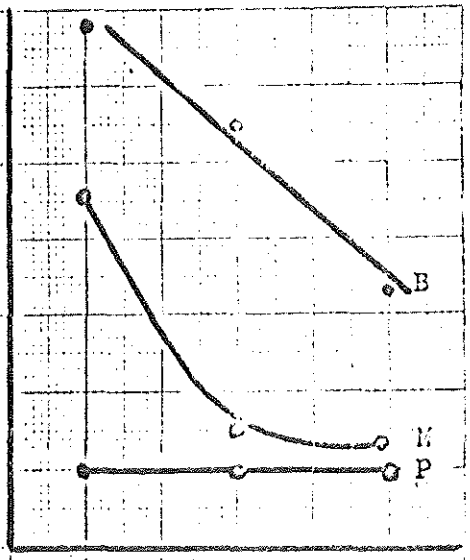
Fig.I Relative amounts of beef(B), mutton(M) and pork(P) eaten in the three periods of occupation. Pork is expressed as unity and beef and mutton as a ratio as indicated by the figures on the vertical axis, which have no quantitative value. They are derived from column MC in Table VI.



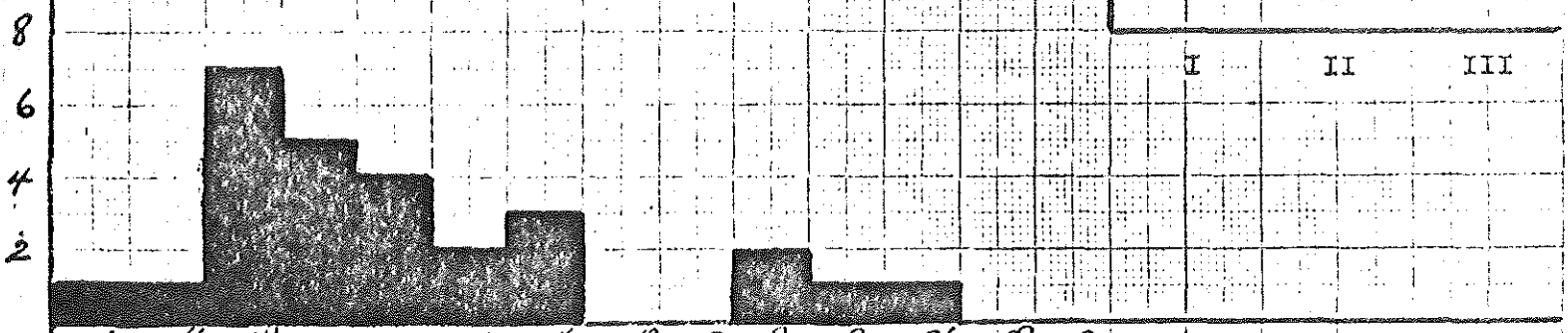


Fig.II Measurements of the humerus of the domestic fowl.

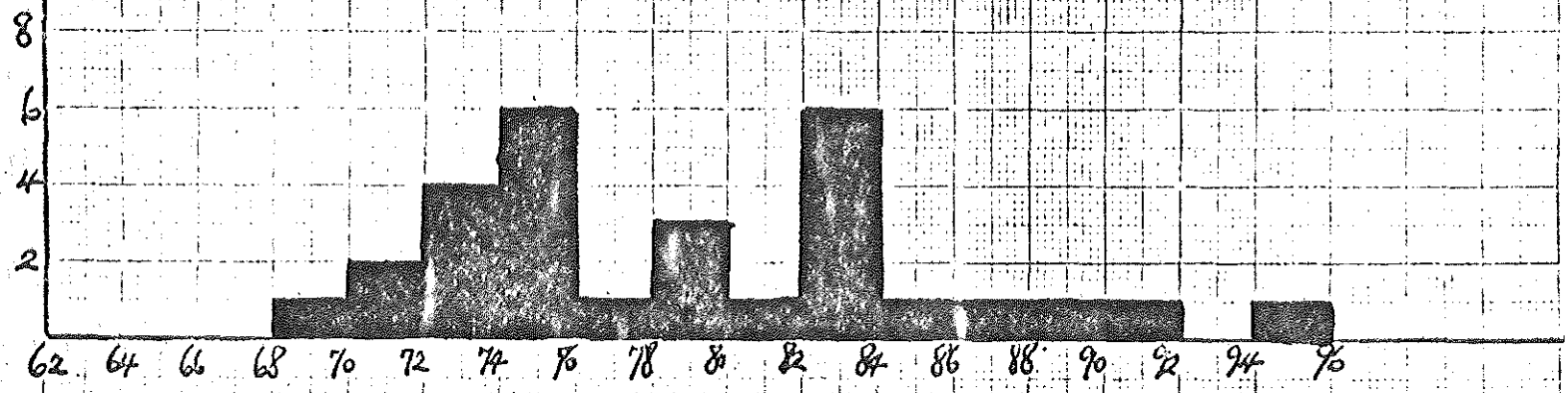


Fig.III Measurements of the femur of the domestic fowl.

The vertical axis in each figure shows the number of specimens and the horizontal, the dimensions of the bone in millimetres, but grouped in two millimetre"steps", so that the left hand column in Fig.III shows one bone of 69mm or 70mm.