Animal Bones from South Witham
EXCAVATED IN 1966.

(660506)

The material from this site can be regarded as all of 13th century date and has been treated as a single entity. The total number of identified specimens was 1400; of these 230 were bird bones and 125, the shells of oyster and whelk. The domestic species of which bones were found, with the minimum number of individuals of each shown in brackets, were cattle (11), sheep (23), pig (10), horse (2), dog (2) and cat (1). The wild mammals present were black rat, rabbit, fox and a mustelid; a pole cat or a ferret. Also found were a few vertebrae of a fish of the size of a cod.

An analysis of the age at death of cattle, sheep and pig has been made but with a collection of this size, caution is necessary in the interpretation. The absolute ageing of earlier animal populations based on the usual criteria of epiphyseal fusion and dental eruption is best avoided because a quite spurious impression of precision is created; a division into age groups is better. With the development and application of more exact techniques this situation may change. (7). Because the sequence of fusion and eruption has probably not changed the method of ageing used has been to classify all long bone epiphyses into two groups, early fusing and late fusing. Unfused specimens in the early group then indicate juveniles and fused specimens in the late group, fully mature and old animals. Each of these two categories is then expressed as a percentage of the total in the group.

Cattle

Age - Four of twenty nine epiphyses (14%) in the early fusing group were unfused and in the late fusing group 78% (11/15) were fully fused showing that fully mature animals were much in the majority. The only complete mandible was from a young animal, only the first molar being erupted. There were eleven lower third molars, - two were moderately worn, eight well worn and one very heavily worn, the posterior pillar being reduced to only 10 mm. in height. All of these must have been from fully mature beasts and the last mentioned from an old animal, possibly as much as fifteen or more years old.

Size - The measurements (Table 1) show that these were typical Mediaeval cattle, small animals with an approximate shoulder height of 42"-50" (106-126 cms.).

Table 1. Measurements of Cattle Bones

	Total length	Proximal width	Midshaft diameter	Distal width	m.s.d. %	Shoulder Ht. cms.	Shoulder Ht. ins.
Humerus	-	-	-	81	-	-	-
Radius	272	74	39	56	-	-	-
	-	54-71 (6)	-	50-67 (6)	-	-	-
Metacarpals	177	46	24	49	13.5	106	42
	187	51	29	54	15.5	112	44
	206	57	33	61	16.0*	126	50
	-	50-57 (5)	-	59-62 (3)	-	-	-
Tibia	-	-	-	48-58 (9)	-	-	-

Metatarsal	-	38-47 (11)	-	47-59 (5)	-	-	-
	203	38	21	47	10.3	108	42
	204	40	23	48	11.3	108	42
	204	40	24	48	11.8	108	42
	206	-	22	-	10.7	110	43
	210	41	24	50	11.4	112	44
	212	39	22	47	10.4	113	44
1st Phalanx	-	22-30 (14)	-	-	-	-	-
Calcaneum	116-141(4)	-	-	-	-	-	-
Astragalus	56-66(16)	lateral length					

m.s.d. % = Midshaft diameter as % of total length. This index can be a useful sex determinant, taken in conjunction with total length. The animal marked * was probably a steer.

All measurements are in millimetres and those of extremities are taken across articular surfaces.

Metacarpals were multiplied by a factor of 6 and metatarsals of 5.35 to estimate shoulder height. (3)

Sheep

Age - The overall age structure ~~is~~ WAS similar to that of the cattle but with an even greater preponderance of older animals. Owing to the great number of distal extremities of humerus and tibia, both in the early fusing group, this ~~is~~ WAS much the larger and contained only 5% (3/60) of unfused epiphyses. The late fusing group ~~is~~ WAS very small, only ten specimens, all of which are fused. There ~~is~~ WAS one juvenile mandible and thirty three others all with the lower third molar fully erupted; 49% show light wear on all three pillars, 27% moderate wear and the remaining 24% are heavily worn which supports the evidence of the long bones.

Size - The measurements are shown in Table 2. and indicate small slender animals with a shoulder height of about 24" (61 cms), a size that is found virtually unaltered from the Neolithic period onwards.

Table 2. Measurements of Sheep Bones

	Total length	Proximal width	Midshaft diameter	Distal width	m.s.d. %	Height cms.	Height ins.
Humerus	-	-	-	24-28 (16)			
Radius	130	25	15	22	-	-	-
	149	-	16	22	-	-	-
	-	22-28(12)	-	21-25 (8)	-	-	-
Metacarpal	126	22	14	26	11.1	61	24
	-	19-26 (11)	-	-	-	-	-
Tibia	-	-	-	19-25 (27)	-	-	-
Metatarsal	123	19	10.5	21	8.5	57	22

Metacarpals are multiplied by 4.86 and metatarsals by 4.68 to estimate shoulder height. (9).

Pig

Age - The age structure of this species ~~is~~ WAS the exact opposite of that of cattle and sheep. In the early fusing group 60% of the epiphyses were unfused and in the late group there were no fused epiphyses at all. Apart from breeding stock and unlike cattle and sheep, a pig, with a few bizarre exceptions, is of no use until it is dead so this finding is to be expected.

Size - Few specimens were measurable but this species, like the sheep, remained unaltered for a very long time. It was long legged and lean, very different from its present day shape. Seven distal extremities of the humerus ranged from 27-32mm. and a tibia with no proximal epiphysis had an estimated length of 202mm., midshaft diameter 21 mm. and distal width 23 mm. Pitt-Rivers' test animal was 28" (71 cms.) in height and had a tibia of 204 mm. (6).

Horse

Forty eight specimens were present, mostly teeth. A complete radius of 337 mm. indicates an approximate shoulder height of 14 hands (146 cms.). Two distal humeri had widths of 64 and 65 mm. Most of the remains of this species came from the kitchen and chapel area.

Dog and Cat between them were represented by four fragmentary bones.

Small wild mammals

The rabbit and fox, both burrow dwellers, may have been modern intruders. The black rat, (Rattus rattus) which first arrived in this country not long before the date of this site, provided four specimens. A complete humerus of a mustelid could not be identified with certainty. It might be from a wild pole cat, (Mustela putorius) which is quite often found close to human habitation (2) and the present restricted range of which is due to persecution, or a ferret (M.p.furo), perhaps recent, but not necessarily as the first reference to the ferret in England is from 1223 (5).

Shellfish

There were 105 oyster shells and twenty whelks. All except fourteen of this total came from the upper and lower levels of the Great Hall and from the kitchen area.

Birds

The wild species, with no more than one individual of each present, were mute swan (Cygnus olor), barnacle goose (Branta leucopsis), a duck, probably pintail (Anas acuta), partridge (Perdix perdix), redwing (Turdus iliacus), mistlethrush (T. viscivorus), a corvid, probably rook (Corvus frugilegus) and a jackdaw (C.monedula).

The domestic species were goose, duck and domestic fowl. The goose bones were similar to those of greylag but more robust. The minimum number of individuals was eleven and this species must have provided the greatest part by weight of the poultry meat eaten.

The fowls, some fifteen birds, were, as is to be expected, small by present day standards. The overall length measurements of the humerus fell into two groups, probably male and female, the larger with an average of 71.4 mm. and the smaller of 62.5 mm. Five cock tarsal bones with spurs averaged 77.9 mm.

Pathology

The metatarsus of a cock showed an exostosis involving more than half the length of the bone. In the lower part this had formed a nearly complete tube round the flexor tendon.

Discussion

The high proportion of bones of fully mature sheep and cattle suggests that the animals present here were those slaughtered at the end of their working life time. The importance of cattle as draught animals and sheep as wool producers (8) at this time was too great to allow of their premature slaughter. Although it is firmly and perhaps ineradicably entrenched in popular mythology there is no contemporary evidence for the so-called autumn killing (8) and the age structure at sites such as this one, a commonplace in the writer's experience, casts further doubt on its occurrence. The provision of extra feed in the winter was regular practice in the Mediaeval period (8) and because the stock of the time were not expected, as now, to produce prodigious quantities of milk nor to grow at a great pace, less food for each animal would have been required.

Then, as now, old animals, the barren and those unsuitable for one reason or another would be fattened and killed each year but to have done substantially more than this would have jeopardised the vital breeding and rearing stock. It must also be remembered that disease, from time to time, would have caused heavy mortality, especially among sheep. It still does but the difference is that today the losses are largely preventible.

From the comparative bone dimensions it has been estimated that the carcase weight ratio of cattle:sheep:pig was 10:1:1.5. On this basis the relative meat contribution of these species derived from the minimum numbers of each present, was beef, 74%, mutton, 16% and pork, 10%. Such figures of course, can be only an approximation.

The presence of horse bones on Mediaeval sites presents a problem of interpretation (4). Were the animals killed and eaten like cattle? The finding of their broken bones in the kitchen area would suggest that perhaps they were but, if that is so, what were others doing in the chapel area? There are grounds for the belief that the eating of horse-flesh was discouraged if not forbidden by the church (1. 4.) and there must, presumably, be some historical basis for the fact that in this country, even after two world wars, the palatable meat of this species is fed only to dogs.

Acknowledgements

I am indebted to D. Bramwell for the report on the bird bones.

References

1. Clason, A. T., 1967. Animal and Man in Holland's Past p.60. Diss. Groningen.
2. Corbet, G. B., 1966. The Terrestrial Mammals of Western Europe. p.145. G. T. Foulis. London.

3. Fock, J., 1966. Metrische Untersuchungen an Metapodien einiger europäischer Rinderrassen. Diss. Munich.

4. Harcourt, R. A., In Keen, L. J., Excavations at Tattershall College (In prep.)

5. Owen, C., 1968. The Domestication of the Ferret - Symposium on Domestication of Animals and Plants. ~~Weidenfeld & Nicholson~~ GERALD DUCKWORTH & Co. LTD. (~~In prep~~.)

6. Pitt Rivers, A. H., 1887. Excavations on Cranborne Chase Vol. II p.209 et seq.

7. Saxon, A., and Higham, C. F. W., 1968. Identification and Interpretation of Growth Rings in the secondary Dental cementum of Ovis aries. Nature. London 219. 634.

8. Trow-Smith, R., 1957. A History of British Livestock Husbandry to 1700. Routledge & Kegan Paul. London.

9. Tsalkin, V. I. 1961. cited by Ryder, M. L., 1969. Animal Bones in Archaeology. p.49. Blackwell Scientific Publications. Oxford & Edinburgh.

R. Harcourt.
12.6.69.

1556

South Witham, Lincs. - dendrochronology.

Ruth A. Morgan Dec. 1975

One timber from a twelfth century mill structure at South Witham was submitted for dendrochronological analysis; the beam (SN 1568 629A) was of oak (Quercus sp.) and formed a roughly split and hewn trunk which was rectangular in cross-section. The pith remained but all the outer sapwood had been lost or trimmed off. Seventy four annual growth rings proved to be measurable along the 11cm. radius, the rings averaging 1-2mm. in width, yet fluctuating from year to year. The plotted curve of the growth pattern thus appeared suitable for cross-dating.

Several contemporary individual or mean curves are available from various parts of England and Western Europe which have already been dated by dendrochronological methods. One mean curve of 163 years from excavated timber in York has been tentatively dated to A.D. 1196, and another from waterfront excavations on the Thames in London is almost identical to the West German reference curve (Trier area) by which it is dated to A.D. 1021-1179 (originally determined by J.M. Fletcher). These and other as yet unpublished curves were compared to the curve for the South Witham timber both visually and by means of a computer program which objectively measures the level of similarity between two curves.

Reasonable matches occurred with South Witham, York and London which placed the final measurable ring of the South Witham curve in A.D. 1137; computer correlation values were 60.3% with York and 65.1% with London. For three reasons, the final estimated date of A.D. 1160 - 1170 can only be tentatively proposed at present:

1. Dating can be achieved with a higher level of certainty

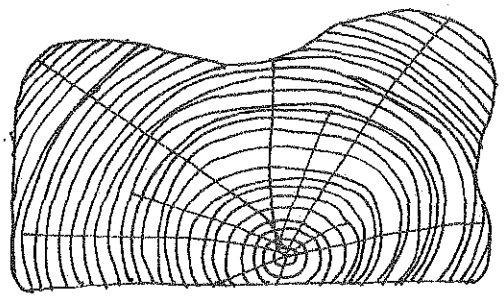
when using a mean curve based on several timbers from different trees rather than on one timber.

2. Comparative material in England is as yet dated by means of the German master curves until such time as a reference curve extending back from the present day can be established using English material from various regions. In the north, matching of curves is proving particularly difficult.

3. The actual felling date of the timber can be ascertained quite accurately only if some sapwood remains on the outer edge of the timber; sapwood retains a uniform width of about 25 growth rings and allows an estimate to within $\pm$ 5 years of the felling date. In the absence of sapwood, an unknown quantity of heartwood has also been lost or removed, as in this case. However, assuming the sapwood boundary to be very close to the final measurable ring, the South Witham timber would have been felled in about A.D. 1160-1170; the actual date could be later but is unlikely to be earlier than this.

South Witham - annual ring width values for timber SN 1568/629. 0.1mm.

	1	2	3	4	5	6	7	8	9	10
0	7.0	12.0	12.0	13.0	8.0	6.0	5.0	7.0	9.0	15.0
10	12.0	15.0	18.0	19.0	17.0	19.0	18.0	14.0	19.0	13.0
20	12.0	13.0	12.0	9.0	16.0	20.0	13.0	10.0	11.0	12.0
30	18.0	9.0	14.0	15.0	21.0	19.0	15.0	9.0	9.0	13.0
40	12.0	11.0	10.0	18.0	15.0	17.0	15.0	20.0	16.0	14.0
50	13.0	16.0	14.0	18.0	16.0	14.0	13.0	8.0	7.0	10.0
60	12.0	14.0	13.0	15.0	13.0	10.0	11.0	12.0	12.0	12.0
70	13.0	14.0	9.0	12.0						



dimensions: 17 x 9cm.

radius 11cm.