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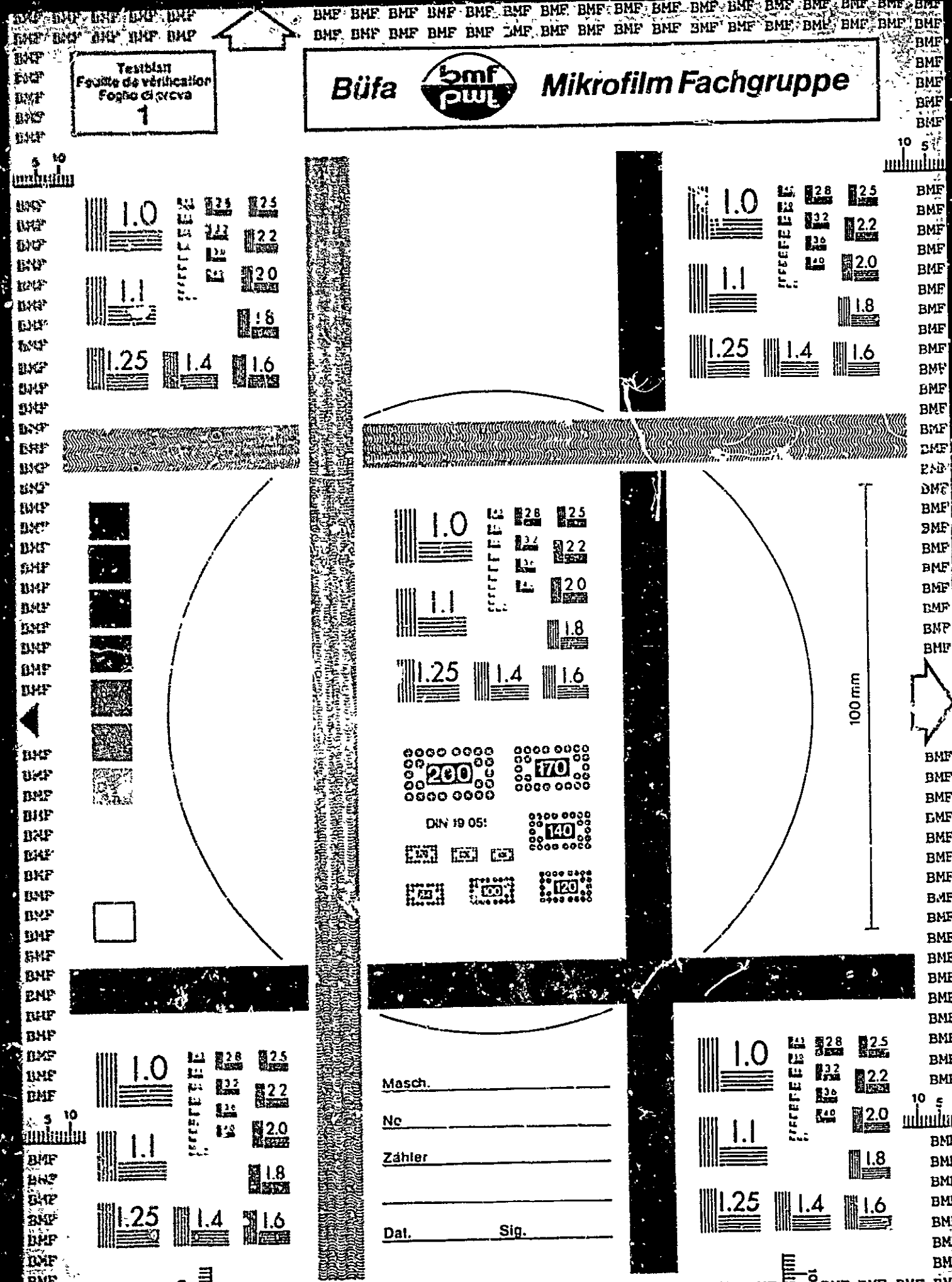

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LEVEL III REPORT ON THE MEDIEVAL ANIMAL BONES AND MARINE SHELL FROM CHURCH STREET (SITE A) by BOB WILSON WITH ALISON LOCKER.

Continued from Fiche V

Photocopies of the microfiche can be obtained from the Oxford Archaeological Unit, 46 Hythe Bridge Street, Oxford, OX1 2EP.

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MEDIEVAL BONES AND SHELLS FROM CHURCH STREET AND OTHER SITES IN ST. EBBE'S, OXFORD by BOB WILSON WITH ALISON LOCKER

Continued from Fiche V

Pathology notes Notes on post-medieval pathological bones from Church Street are included for completeness here.

Antler There is one abnormal antler of roe deer about 10cm in length which lacks the normal pedicel and coronet. The distal extremity appears truncated by abcission some 3cm above a poorly developed brow-tine bud of about 2cm in size. The surface of the distal antler retains a roughened texture suggestive of immature growth but pearling on the proximal surface is that of mature antler. The proximal base is constricted and narrowed into a V shape in cross section (at which point it was broken or chopped from the cranium) and indicates further abnormal development.

I have not yet found a text book parallel. The abnormalities appear attributable to hormonal imbalance, possibly due to a poorly differentiated sexuality (Plate 56, 13th-century A F2509/4).

Mandible tooth absence or loss. This was recorded where alveolus or position of tooth is completely or partly sealed by bone growth. In calculating the incidence of such pathology, counts of normal mandibles

Pl.56 Abnormal antler from A F2509 L4 compared with two normal archaeological antlers.

include those where the tooth is present or was probably lost from the alveolus after death. Post-medieval data is also noted here.

p1 cattle 1/15 mandibles (all periods)

P1 pig 2/10 One P1 still retained in alveolus (13th-century A F501)

P2 sheep 5/53 Saxon, 18/157 medieval and, 5/37 post-medieval: Total of 28/245 (16/28 show scar indicative of mechanical loss either of p1 or P2)

P2 cattle 2/14 (1/2)

p3 sheep 1/98 Saxo-medieval

P3 sheep 1/208 Saxo-medieval

P4 sheep 1/198 Saxo-medieval and, 1/41 post-medieval

Rotation of Teeth

P2 sheep 1/208 Saxo-medieval and, 1/37 post-medieval

P3 sheep 1/208

Periosteosis and tooth loss

Incidence in sheep 4/247 Saxo-medieval and -/64 post-medieval. In cattle -/26 Saxo-medieval. Affected region runs from P3 to M1. No severe distortion of any mandible was recorded. Actual tooth loss is 2/247, involving one tooth from separate mandibles, a P4 and M1, both 11th-century, but the remaining M1 of the former mandible was broken before death and shows other signs of decay (A F84).

Premortem tooth breakage in sheep Of the M1 above and of another from 13th-century A F142.

Abscess and tooth loss in sheep One third incisor appears lost as the result of an abcess in the surrounding mandible (13th-century A F113; M.W.S. 32).

Overcrowding of teeth in sheep The alveolus of a third incisor (13) occurs above those of the first and third incisors (13th-century A F97); M.W.S.32). Four instances occur where p3 or part of it is lodged on top of P4 (M.W.S. 29-32 11th- and 12th-centuries). Twice P4 is noticeably jammed against or occluded by M1 (11th- and 15th-centuries; M.W.S. 30 & 31). Once, M1 and M2 appears badly overcrowded (13th-century; M.W.S. 39). However, other less severe cases of adjacent mandible teeth wearing against each other are common.

Irregular cusp formation of teeth in sheep Two examples for M3 (12th- and 13th-centuries).

Fluted outgrowth of molar roots was noted once in one mandible from a

very old sheep (M.W.S. 51; 14th-century A F118).[1]

General comments on oral pathology Incidences of tooth loss are less than recorded at the Hamel and Harding's Field but appear about equal to or less than the incidence among the same species at Barton Court Farm and Mount Farm, Oxon, between the Iron Age to Saxon periods.[2] One trend at Church Street is that the incidences of tooth loss among sheep appear slightly greater among mandibles of the 14th- to 19th-century groups compared to those of the 10th- to 13th-centuries. This trend coincides with the greater ages at which sheep were slaughtered during the later period.

The incidence of periosteosis appears greater among the groups of Iron Age to Saxon period mandibles of sheep and cattle at Mount Farm. It is also greater at the Hamel, particularly in the 14th- to 16th-century sheep mandibles, and possibly at Harding's Field.

Pathology of post-cranial elements

Vertebra

Horse — Thoracic spine with spongy bone outgrowth at the spine base on the left side (13th-century A F145).

Pig — Lumbar neural spine with probable healed fracture (15th-century A F1006).

Neural spine of immature thoracic or lumbar vertebra with dorsal healed fracture (12th-century A F2503). Neural spine of a ?thoracic vertebra is twisted - possibly a healed fracture. Bone outgrowth also occurs at the base of the spine (12th-century A F1515).

Two thoracic vertebrae fused together by bone growth on dorsal left side (12th-century A F2501).

Healed fractures and fused vertebrae occur in spine of post-medieval pig (A F90 see St. Ebbe's, Part II).

Rib

Cattle — Four healed fractures (11th-century A F1518, 12th-century A F1515, and two in 13th-century A F2503).

1. Cf. J. Baker & D. Brothwell, Animal disease in archaeology (1980), Fig. 9.

2. R. Wilson, in The Hamel, Oxoniensia, xlv (1980), Fiche F05-07; Harding's Field, Chalgrove, held by O.A.U. Fiche section; in Barton Court Farm, Abingdon (CBA report 50, 1986), Fiche section; in Mount Farm, Berinsfield, Oxon, held by O.A.U., Fiche section.

	Pig	Post-medieval skeleton also includes extra skeletal bone deposition around the ribs (metastatic ossification,[1] St. Ebbe's, Part II)
Pelvis		
	Cattle	Bone outgrowths around acetabulum - possibly of a castrated animal (16th-century A F1528).
Humerus		
	Sheep	Distal ends with lateral outgrowths of bone from slight up to 6mm in depth: three of 11th-century date, one each of 12th-, 14th-, 16th- and two (including one from Greyfriars site) of 17th-century dates.
Radius		
	Sheep	Proximal ends with lateral outgrowths of bone: three of 11th-century (from different features to those of distal humeri listed above) and one of 17th-century.
Tibia		
	Sheep	A 12th-century distal tibia has lateral outgrowths comparable to the abnormalities noted above for the humerus and radius. In a 15th-century case bone outgrowth occurs around the distal tibia and is associated with striations of the articulation surface.
	Pig	Outgrowth on the distal shaft: lateral (13th-century) and medial sides (11th-century) and similar to that found on the post-medieval skeleton (St. Ebbe's, Part II).
Ulna		
	Pig	Healed fracture of shaft showing a shortening of the overall bone length (12th-century).
Astragalus		
	Cattle	Healed fracture and shortening of bone length (13th-century A F1540).

1. J. Baker & D. Brothwell, Animal diseases in archaeology (1980), 169.

Metacarpal

Cattle — Lateral enlargement and eburnation of distal articulation surface (14th-century). Two other slight cases were noted but at most the medieval incidence is 2/26 distal ends and the post-medieval is 1/22.

Pig — Eleventh-century metacarpal IV with some enlargment of shaft surface.

Metatarsal

Cattle — Proximal articulation surface showing partial fusion with cuboid (16th-century A F2531).

Large distal epiphysis, probably of a castrate ox or of a bull, showing medial side enlargement and slight disturbance of articulation surface. Possibly this metatarsal was articulated within a proximally enlarged first phalanx listed below (14th-century A F2502).

Distal epiphysis similar to above (also 14th-century).

Slight eburnation shows on another distal end (12th-century). The overall incidence of these three distal ends is among 44 medieval and 14 post-medieval distal metatarsals.

Sheep — One distal end turned obliquely downward from horizontal plane due to differential compression and twisting of bone immediately above articulation. Is comparable to that observed in fallow deer metapodials[1] but although considerable reorganisation of the bone has occurred outgrowths of bone are scarcely present.

Raised medial ridge lengthways on shaft (12th-century A F1515) and small lump of bone on distal shaft (15th-century A F1030).

Pig — Proximal articulation surface of metatarsal III eroded or developed into outgrowths of bone (12th-century A F503).

Metatarsal III shaft enlarged possibly by redeposition of bone reabsorbed from the inside of the shaft (12th-century A F1530).

1. R.E. Chaplin, Study of animal bones from archaeological sites (1971), Fig. 17.

Healed fracture of metatarsal V shaft (12th-century A 1530 - possibly related to item above).

First phalanx

Cattle Bone outgrowth on dorsal distal surface (12th-century A F2503).
Enlarged and eburnated proximal articulation surface. Possibly articulated, with abnormal metatarsal above. (14th-century A F2502).

Sheep Slight enlargement laterally of distal end. Similar to pathology of lateral distal humerus (17th-century A F1529).

Second phalanx

Cattle Slight outgrowth on dorsal distal surface (12th-century A F1526).
Outgrowth on lateral and dorso-proximal end (17th-century A F17).

Third phalanx

Cattle Gross disruption of articular surface and partial fusion to second phalanx. Bone outgrowth occurs on dorsal and ventral proximal surfaces (12th-century A F2503).

General Comment The pathology of the post-cranial skeleton appears largely brought about by various mechanical damage, chiefly from blows or knocks or long term wear which diversely caused fractures, disruption of joint surfaces, and, frequently, bone outgrowths around joints and on shaft surfaces.

Lateral side injuries particularly to the elbow and other joints of sheep were common. Pigs appear more prone to damage of the spine and lower limbs. Cattle, perhaps, were vulnerable mainly to long term mechanical wear and tear and to occasional fractures.

Most of the abnormalities are minor ones although lameness is evident for at least one sheep (metatarsal) and some cattle (astragalus and third phalanx). The list of pathological bones does not appear a long or severe one for over 31,000 mammal bones examined from the medieval and post-medieval sites of St. Ebbe's.

Butchery of sheep The bone collection appeared to be of rather doubtful

phasing to undertake elaborate and time consuming studies of animal butchery. A pilot study was undertaken of the securely stratified Saxon sheep bones from A F84 and using a more elaborate set of drawings than available for Ashville, Abingdon,[1] on which to record cuts, chops and breakages. This work gave useful results but was not continued with, which was just as well since many of the features were rephased after the completion of general recording - information from features of different date would have been superimposed on the same record sheets in order to determine cutting or breakage of bones at a single period.

The records for 11th-century A F84 show:-

1. Persistant breakages of the horns near their bases and which was associated with recognisable chopping marks, mainly from the medio-anterior or lateral-anterior direction.
2. Saggital splitting of the cranium to take out the brains, chopping appears made from above and to a lesser extent from behind the head. Splitting of the cranial bones tended to break away from the plane of chopping.
3. Common breakages of the relatively fragile mandible ramus are associated with transverse cut marks indicating the removal of cheek meats as well, perhaps, as the deliberate breaking of mandibles. A line of cut marks occurred just above the teeth of one maxilla.
4. A few vertebrae present showed occasional saggital and lateral breakage or cleavage. One axis indicated that chopping was from the posterior.
5. A few transverse cuts were found on the ventral neck of the scapula.
6. No pattern was recognisable for the marks on the pelvis.
7. The shaft of the humerus was extensively broken up. At least a few of the blows were transversely directed and one was made obliquely. The femur may have been broken up similarly.
8. The shafts of the lower limb bones indicate more localised butchery but the pattern is uncertain except that chopping was directed obliquely and, at least for the tibia, was directed toward the shaft from distal directions.
9. All the large limb bones bear small transverse cuts on the shafts. There are only a few similar cuts near the shafts but some of these do

1. Cf. for cattle R. Wilson, Ashville, Abingdon (CBA Res. Report 28, 1978), Figs. 74-78.

mark the edge of the articulation surface of the distal humerus, and one occurs entirely on that of a distal radius.

Interpretation of many breakages is uncertain. Damage on the distal metapodials however, and on one distal calcaneum, is attributable to gnawing by dogs. Oblique chopping through the shafts of the radius and distal tibia may be a technique of disjointing the legs but equally may be the preparation of bones for marrow extraction either for the meal table or for industrial purposes.

The cut marks on the upper limb bones are attributable to removal of meat. Those on the metapodials are probably from skinning of the carcass. One midshaft metacarpal cut was truncated later by breakage possibly for marrow.

Butchery of small mammals This deserved special attention because evidence of such butchery is still unusual and interesting, eg. the skinning marks on fox skeletons in A F1540 (M V C10), and possibly on the post-medieval polecats/ferrets in A F17.[1] Butchery marks on other small animal bones were confined to a few transverse cuts on the distal shaft of a femur of hare (12th-century A F2503) and to bones of cat.

A cranium of an immature cat bears cuts on the edges of the orbit (12th-century A F1527), another has left side cuts over the nasal area, in front of the orbit, over the frontal, and also on the right side parietal and temporal area (medieval A L1035). Cuts mark the anterior mandibles of a kitten (12th-century A F1537) and of an older cat (13th-century A F2578). All these cuts must be marks from the removal of the skins.

One distal radius bears a transverse cut (11th-century A F133) which may also be a skinning mark. Meat removal is shown by a cut on a proximal femur and possibly on another from the same deposit (c.14th-century A F59, see (M V C11).

The relationship of age and sex in the kill off pattern with interpretations of husbandry and economy: general expectations

This and subsequent sections of the report are intended to demonstrate and interpret:-

a) Long term trends of animal slaughtering in Oxfordshire - a necessary perspective in which to consider b):

b) Differences in kill-off patterns between contemporary late period sites.

1. R. Wilson, in 'St. Ebbe's: Part II', Oxoniensia, xlix (1984), Fiche M VI A4.

In particular it is worthwhile to examine this evidence and to trace the pattern of marketing animals from rural to urban sites. Although medieval marketing is documentable in part, the recognition and confirmation of this from bone evidence is important to test our methods, especially where comparable bone data invites the analysis of cultural debris which has no historical record.

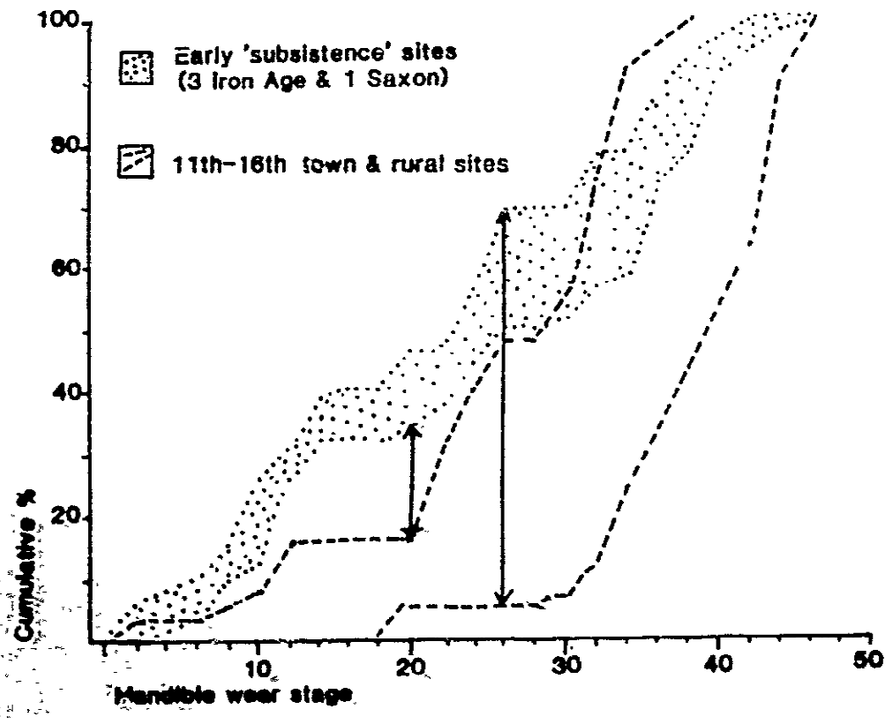
Obviously where few or small differences are found among slaughtering patterns from different sites, the economy and husbandry of species will appear little differentiated in space and time, for example during the Iron Age. Genuine differences between sites of the same period indicate social and economic differentiation which is probably based on some form of marketing exchange at least during the medieval and Romano-British periods. A useful hypothesis is that the consumption of a higher proportion of young animals will occur on urban sites while older animals will be retained at farm sites for breeding, and 'secondary' uses and production. The effects of secondary human requirements of animals may, of course, dominate, distort or even hide the patterns of meat production and marketing. Nevertheless there is sufficient regional data to investigate such phenomena.

Comparable levels of subsistence in cross-cultural comparisons The bone data which is compared is assumed to be from economies which are relatively close to the same subsistence level of agriculture. Here 'subsistence' is used without necessarily excluding marketing processes and refers to limited agricultural and technological resources available at each cultural period, limited prosperity, and a meagre existence for most of the human population.

This situation perhaps ought to be separated from cultural periods of great and rapid economic growth and where new agricultural or industrial resources were exploited with consequent diversification of the animal husbandry and economy and a general increase in human prosperity.

Consequently, cultural comparisons appear best made between the slaughtering patterns of Iron Age and medieval sites. Similarity of subsistence level is suggested for example by the small size of cattle at both periods and which is indicative of limited agricultural resources even though the cultural economics may differ in other respects, for example in the extent of the arable agriculture. The evidence of similarity of subsistence level between these two cultures appears to contrast with that of the Roman and post-medieval periods when the cattle were of larger size.

Fig.221 Comparisons of cumulative percentages of Mandible Wear Stages of sheep to show evidence of the increased slaughtering of older individuals, and probably of increased wool production a) from the Iron Age onwards and b) from the 11th-century to the post-medieval period.



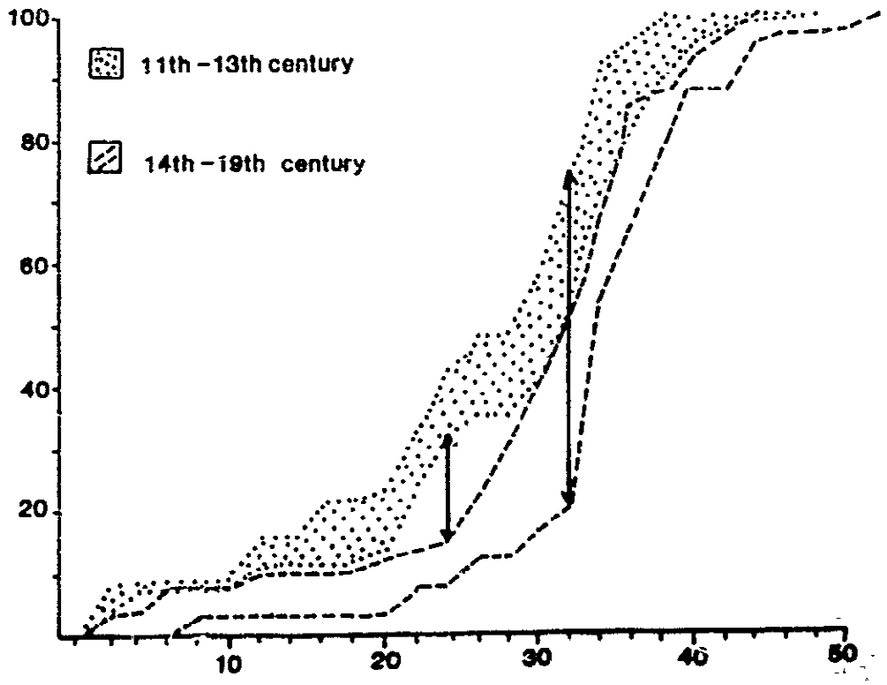
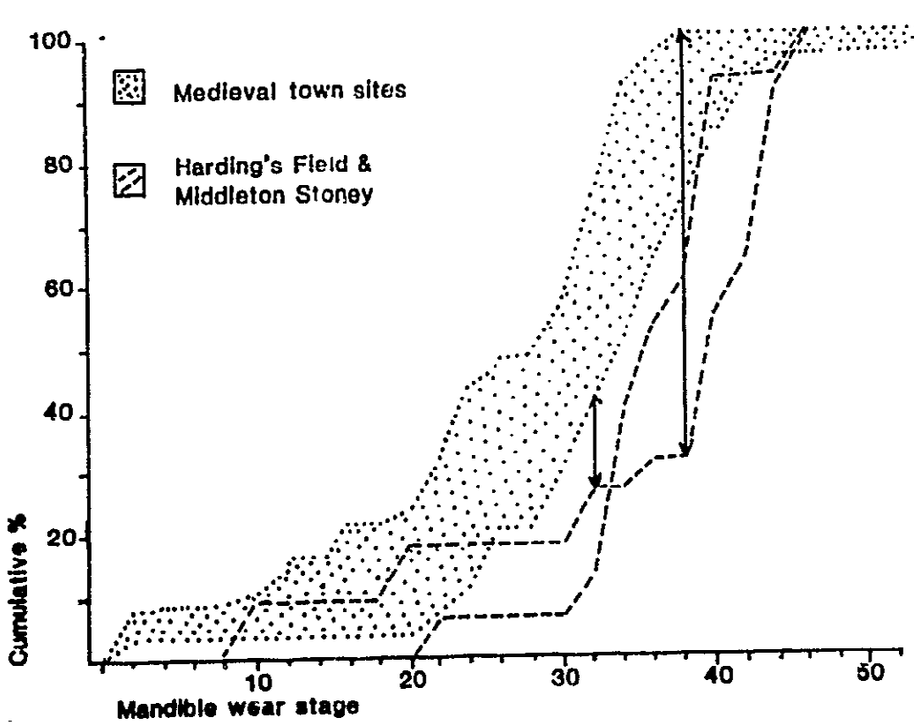
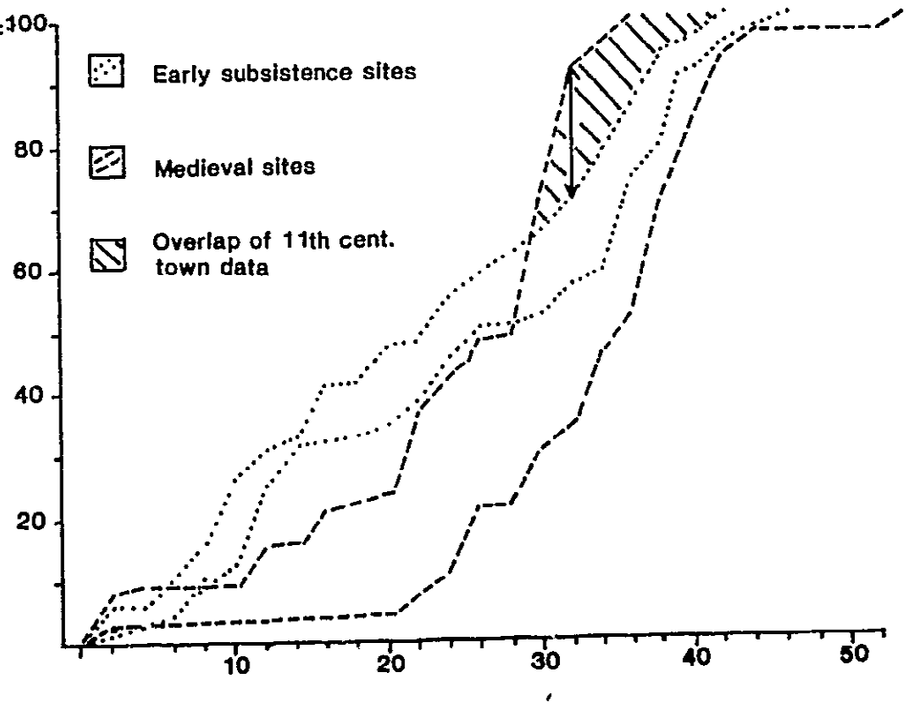


Fig.222 Comparisons of cumulative percentages of Mandible Wear Stages of sheep to show evidence of the 11th- to 16th-century marketing of younger sheep from rural to town sites in Oxfordshire.





General comparison of age data distributions Cumulative percentage distributions of the Mandible Wear Stages of cattle, sheep and pigs at sites of different periods are plotted out in Figures 18 to 22. Most of the graphs are intended as comparisons of age evidence to demonstrate particular aspects of the economy of a species.

Least variability between the slaughtering patterns is found for pig and most variability for sheep. The explanation for pig is clearly that husbandry at all periods aimed to provide meat and other carcass products. The greater variability of mortality patterns of sheep and cattle must be due to varied emphases on 'secondary' products and uses of these species before slaughtering. This conclusion can be combined with the previous general expectations about subsistence and marketing to explain the economy and husbandry of the species at the medieval period.

Economy and husbandry of sheep. The two major trends of sheep mortality patterns are:-

a) The markedly increased proportion of older sheep in the slaughtering pattern from Iron Age to post-medieval periods and from late Saxon to the post-medieval period (Fig.221).

b) The high proportion of older sheep in the slaughtering pattern from two rural sites compared to those at urban sites (Fig.222). Since secondary production from sheep is implicated (above), either dairying or wool production must be the main economic explanatory factors since both require the presence of mature and maturing individuals to produce optimal wool and milk yields. However only a few males are necessary for sheep dairying and most are liable to be killed relatively young if emphasis is given to dairying as is possible at the Iron Age sites. In contrast, wool production can and often does involve castrated or intact males as well as females. Their abundant presence in the slaughtering pattern is confirmed by the evidence of the sexes at Church Street and the Hamel. Presence of male sheep is less evident at Iron Age sites (M V E3).

A considerable increase in wool production appears to explain the long term increase in the slaughtering ages of sheep. The increased wool production is probably associated with the sizeable rural and urban human population of the medieval and post-medieval periods. By implication there is an increasing market for wool from the late Saxon to post-medieval

periods. Admittedly this brief argument is over simplified and qualifications to interpretation can be made at all stages of it but will not be discussed here.

The second trend of slaughtering patterns illustrating the differences between medieval urban and rural farm sites indicates that the marketing of animals to town sites included a higher proportion of younger sheep than those retained on the rural sites. The evidence of the sexes suggests that those younger sheep were mainly castrates.

In addition, compared even to Iron Age sites with high mortality rates, all of the late Saxon sheep sample were killed off before all of the Iron Age. This confirms that the late Saxon and, probably, the medieval urban pattern is related less to the breeding of stock and less to the flock maintenance of rural sites.

The difference between the Iron Age and late Saxon patterns would not have shown if greater Saxon emphasis had been placed on wool production and the keeping of older sheep. Thus the sheep marketed then reflect a somewhat greater interest in dairying (ewes) or perhaps meat production (wethers or rams). The latter might suggest some late Saxon prosperity relative to the later periods since meat is the least necessary product of mixed (cereal and animal husbandry) and subsistence economies.

To some extent false premises and arguments may have been presented because priorities on dairying or wool production appear to have opposite effects on the mortality pattern. A compromise between the desirability of producing both kinds of products may yield a slaughtering pattern which is similar to that of meat production. Thus indirectly there may have been a surplus of younger sheep which were marketed at age stages appropriate to optimal meat production, though this was probably influenced also by fodder availability, outbreaks of disease and other environmental factors.

Overall the effect appears indicative of some late Saxon prosperity at both producer and consumer sites and less for the medieval. The chief pattern is of course the marketing of the majority of animals which were slaughtered after their wool growing or dairying functions. The proportion of these increased during the later periods. It must be remembered that urban site slaughtering patterns diminish the past importance of wool just as the patterns from rural site exaggerate it.

Economy and husbandry of cattle Three trends are evident in the mortality patterns of cattle: two are similar to those of sheep, but less markedly, the third is the most dramatic trend:-

a) an increased proportion of older cattle in the slaughtering patterns from the Iron Age to the medieval period (Fig.223).

b) an increased proportion of older cattle is represented at the rural sites of the medieval manor at Harding's Field and the Romano-British farmstead or villa at Barton Court Farm, Abingdon. This also occurs at the Hamel, Oxford. All three site distributions contrast with the higher proportions of younger cattle killed near the central Oxford sites of Church Street, New Inn Court, and All Saints (Fig.224a).

c) also, however, there is a vastly greater proportion of juvenile cattle in 14th- to 19th-century mandible distributions compared to the relatively normal ones of the 11th- to 13th-centuries (Fig.224b) at both Church Street and the Hamel.

The third pattern is already known to be due to a differentiation of the slaughtering, butchery and selling of meat and the deposition of mandibles of calves and older cattle in different places (M V E11). The first and second patterns can be explained in a similar way to those of sheep. The choice of explanatory economic factors for the implied 'secondary' production is, however, between dairying and the use of draught oxen.

Overall, dairying is most evident at Iron Age sites as indicated by the relative abundance of cow bones. Cows are well represented among the Church Street bones but less evident at Harding's Field. Thus medieval dairying was obviously very important but draught oxen also appear better represented than on local Iron Age sites and particularly at Harding's Field where the majority of cattle were mature or old animals and a predominance of draught oxen was indicated.[1]

The difference of slaughtering ages observed between the rural sites and the centre of Oxford again indicates the marketing of younger as well as some old animals. The somewhat different distribution of Mandible Wear Stages at the peripheral site of the Hamel is of uncertain significance, though a few 16th-century calf mandibles are present. The Hamel's 11th- to 13th-century

1. R. Wilson, in Ashville, Abingdon (CBA Res. Report 28, 1978), 115-116 & 136; in Hardings Field, Chalgrove, held by O.A.U.

Fig.223 Comparisons of cumulative percentages of Mandible Wear Stages of cattle to show evidence of the increased slaughtering of older individuals from the Iron Age to the late medieval period.

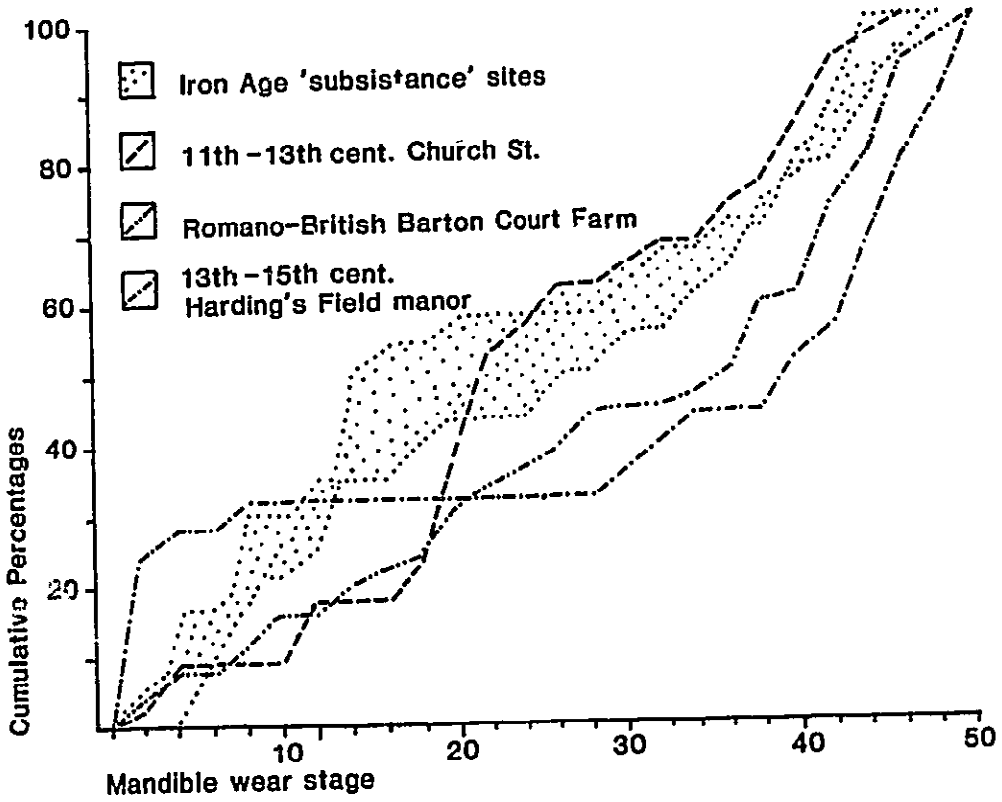
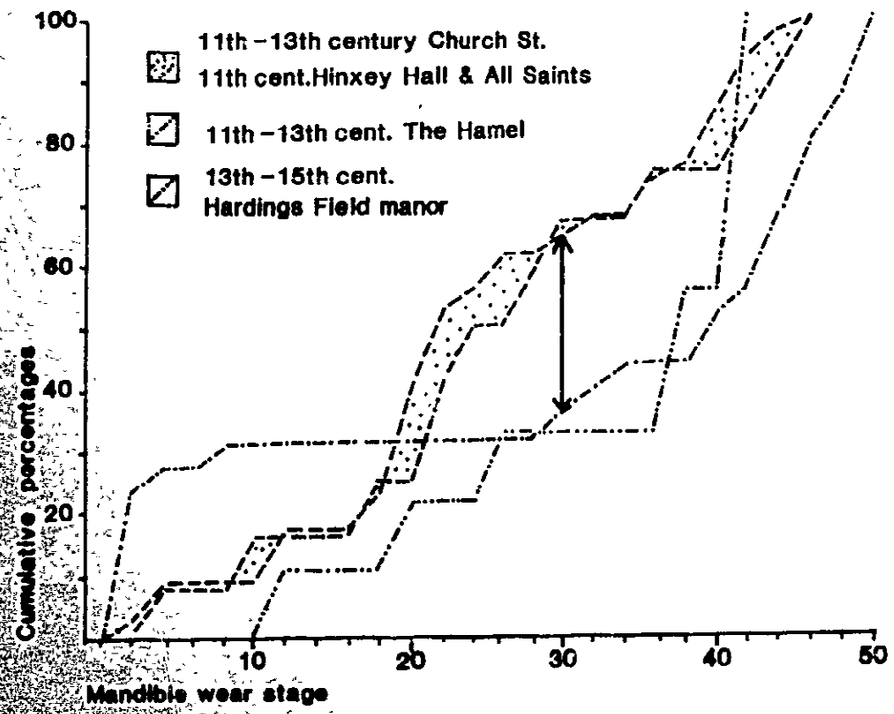


Fig.224 Comparisons of the cumulative percentages of Mandible Wear Stages of cattle to indicate a) possible 11th- to 13th-century marketing trends and b) the pattern of 14th- to 19th-century butchery.



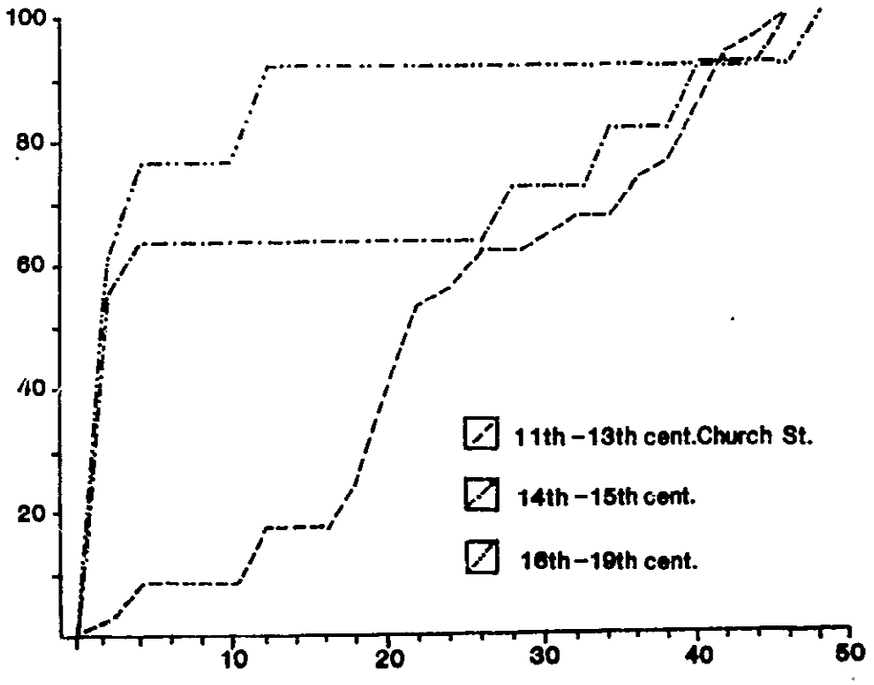
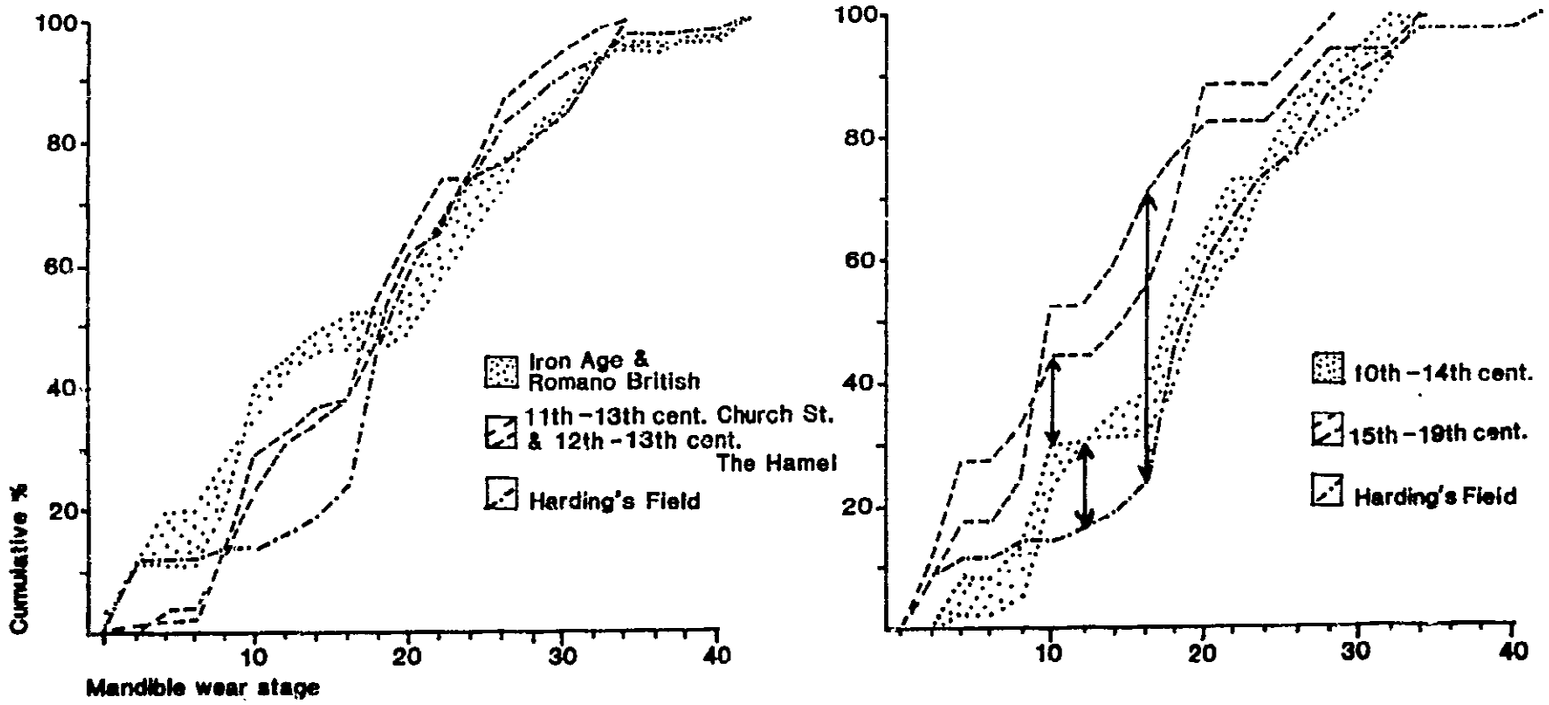


Fig.225 Comparisons of the cumulative percentage of Mandible Wear Stages of pig.



sample number is small but the mandible distribution appears similar to that at St. Peters, Northampton where there were tanneries and there may have been a similar business at the Hamel.[1]

The rural pattern at Romano-British Barton Court Farm is different in that steers, bulls or oxen appear abundant as well as cows.[2] Since the slaughtering pattern does not include as many old animals as at Harding's Field, the Romano-British farmstead or villa pattern suggests both meat production and consumption and much more than the pattern of the medieval manor. Roman rural organisation thus appears different to the medieval.

The bringing of young or immature steers, bulls, and sterile cows to late Saxon and medieval Oxford amounted to about 62% of the cattle killed. Of these 10-20% were juveniles, the remainder were between about 1 to 3 years of age. This represents a considerable proportion of stock which were not pastured further or were unproductive for other reasons, for example infertility. Of course, these cattle may have originated from many farms or households selling an occasional animal rather than producing many for meat.

Economy and husbandry of pig Any of the small variability deserved in the slaughtering pattern (Fig. 225) should be due to marketing or other exchange at the preferred times for eating pigs. As youngest pigs are less abundant at Harding's Field some marketing is indicated. Possibly the earlier medieval groups indicate both production and consumption while the 14th- to 19th-century remains indicate relatively more consumption.

Conclusions about marketing The still limited evidence conforms to expectations about the marketing of younger animals to towns like Oxford, and if confirmed is an important step for regional site interpretation. Use of the term marketing probably applies to many animals brought into the town for sale and slaughtering but cannot be used to apply to all the bone evidence. Animals were also raised on the tenements or outside the walls by town dwellers who reared animals for their own household consumption as well as, presumably, for sale (printed section of St Ebbe's report.

1. R. Wilson, unpublished data for the Hamel, Oxford; M. Harman in St Peters Street, Northampton (1979), 328-32.

2. R. Wilson, in Barton Court Farm, Abingdon (CBA Res. Report 50, 1986) Fiche section.

Appendix 1: Report on the animal bones from late Saxon pit A F84 by B.J. Marples

Pit A/84 contained a total of 39.5kg (87 lbs.) of bone. There were relatively few complete bones and a considerable proportion, 25% by weight, consisted of small shattered fragments only a few centimetres long. No attempt was made to separate these by species. There was also 17% by weight made up of portions of ribs and the transverse processes of vertebrae. Of the identifiable bones and portions of bones the majority was those of Sheep (1073), but there were considerable numbers of those of Ox (523) and of Pig (203). A few other mammals were represented by small numbers of bones. There were also 267 bones of birds and nineteen of fish. In addition to the bones there were 303 Oyster shells, 139 being upper valves and 165 lower ones.

Many of the bones, especially ribs and scapulae and pelvis of Ox, showed signs of having been chopped by the butcher. A great many vertebrae were cut, sometimes down the middle as is done at the present time, but more often laterally, so that the transverse processes were sliced off. The cutting or breaking of the skeleton into small pieces suggests that cooking was by stewing in a pot rather than by roasting over an open fire. This is supported by the fact that only nine charred bones were found in the whole collection. Evidence from the pottery may also bear on this topic. Thirty two bones showed signs of having been chewed, presumably by dogs.

Measurements were made of all the bones which were sufficiently complete, and the full data are deposited in the records. The averages of the measurements of those which appeared to be adult are given in the archive.

Ox. Of the 523 Ox bones, by far the greatest number (375) consisted of vertebrae, fragments of vertebrae and parts of ribs. The next most numerous category represented the distal parts of legs, especially hind legs. Very few fragments of the proximal parts of legs were present. It may be that, as at present, the meat from these regions was removed by the butcher as steaks, and the householder did not take the large bones home. Scapulae and pelves were not uncommon, with forty-two fragments. There were ten skull fragments, fourteen parts of jaws and only three horn cores. Some examples were found of what appeared to be matching sets of bones. These were two distal ends of tibiae with astragalus and calcaneum, two pairs of astragalus and calcaneum

and a pair of cervical vertebrae. From the point of view of cooking this suggests stewed vertebrae and ribs, and cow heel. It was notable that no oxtail seemed to be present.

Sheep. The bulk of the collection consisted of bones of Sheep. Sheep and Goats are not readily distinguishable osteologically, and though a look was kept out for bones of Goat, only one, a radius, was seen which might belong to this species, and it is best to exclude it. Of the Sheep bones a fifth belonged to immature individuals, and a few to very small lambs. At least five individuals of these were represented. About 10% of the bones showed signs of having been cut, but only seven were charred.

Inspection of the figures for the different parts of the skeleton does not suggest any special preference for particular joints. Evidently whole legs had been present as phalanges and metapodials, often complete, are present. There are sixteen calcanea but only six astragali. Previous workers have suggested that in ancient times the astragalus tended to be removed for some special purpose, perhaps for playing a game. Different parts of the vertebral column are more or less equally represented, and about half of the vertebrae show signs of cutting. The breed of sheep was a horned one, and eighteen horn cores and the cut bases of twenty-nine horns are present. There are many skull fragments, and in addition five posterior halves of skulls and sixteen right or left halves. Jaws are very well represented, with whole or parts of ninety-six. Most seem to belong to individuals of one to two years of age. The dentition is as follows:

Very young	3
With 3 molars	5
With 4 molars	1
With 4½ molars	1
With 5 molars	14
6th molar just erupting	15
6th molar partly worn	11
With 6 molars	22

Pig Bones of Pig are much less common, only 193 (203?) being present, twenty-nine of which are immature. The most numerous are foot bones, pig's trotter evidently being eaten, and fragments of skull and jaw.

Other Mammals Roe Deer are represented by twenty-seven bones belonging to at least two individuals. Among them is the cranial part of a skull and an

antler broken away from the skull. Of Red Deer there is only a skull fragment with about 10 cm of the antler with the brow tine. There are two bones of Hare, twenty-seven bones of Cat representing probably two individuals, and the skull of a young Dog

Birds There are 267 bones, or fragments of bones, of birds, the majority of which belong to small Fowls, several of which were immature. The measurements are given in the archive. Goose and Duck are represented by twenty-three and thirteen bones respectively, and there are two of Pigeon. Of wild birds the most interesting is the tarsus of a Crane. It lacks the proximal end but has its ossified tendons in position and so must have been thrown into the pit in a fresh state. There are two bones of Waterhen and a few of at least two other species not so far identified.

Fish Remains of fish are few but they are well preserved and it seems unlikely that many have been lost by decay in the ground. There are seven vertebrae and part of a skull apparently belonging to a large Cod, some vertebrae of two different, much smaller, fish and a few other bones. Further identification may be possible.

Appendix 2: Note on the results obtained for pit A F84

Overall results obtained by the separate and independent examinations of the bones from Pit A F84 are given in Table 37. It is doubtful that the extra ribs counted by Professor Harples explain the large number of bones identified by him and, anyway, the bird and fish bones and unidentifiable fragments are at present missing totally from the collection (M V B9).

Surprisingly, the percentage presence of species do not differ much except that of oyster shells. There is a discrepancy in the identification of fallow and red deer, but elsewhere Harples says he was short of comparative material, and I noted uncertainty in my records when making an identification of this antler. The additional information on the species present among the bird and fish is welcome, and is incorporated into the printed report synthesis, although an accurate adjustment of the 10th- to 11th-century figures in Tables 19and 20is not possible.

Table 37 Comparison of fragment frequency results obtained for A F84

	Frequency of species bones		% and % Index of n	
	Marples	Wilson	Marples	Wilson
			n	n
			1830	456
	f[a]	f	%	%
Cattle	523	68	29	15
Sheep/goat	1073	294	59	64
Pig	203?	84	11	18
Dog	1[b]	-[b]	0.1	-
Cat	-	-	+	+
Fallow/red deer	1	1	0.1	0.2
Roe	27	7	0.4	1.5
Hare	2	2	0.1	0.4
Domestic fowl	c218	nc	1.2	nc
Domestic goose	23	nc	1.2	nc
Duck	13	nc	0.7	nc
Pigeon	2	nc	0.1	nc
Crane	1	nc	0.1	nc
Waterhen	2	nc	0.1	nc
Oyster	303	322	17	71
Fish	19	nc	1.0	nc

a Includes rib fragments

b Excludes two cat skeletons

nc Not able to be counted or calculated: some bones are lost

The Bird Bones. From Church Street, Oxford (A.M. Lab Report 4363)

By Alison Locker[1]

Introduction. A total of 1602 bird bones was sorted from other bones dating from the 10th to the 15th centuries. Some of the contexts featured were subject to contamination, and these were kept separate from the secure contexts. Table 38 summarizes the species identified in each of these groups. The following species were identified; domestic fowl (Gallus sp.), goose (Anser sp.), domestic duck/mallard Anas sp./Anas platyrhynchos, white stork (Ciconia ciconia), mute swan (Cygnus olor), teal (Anas crecca), Crane (Grus grus), cf redshank/golden plover (Tringa totanus/Pluvialis apricaria), woodcock (Scolopax rusticola), pigeon (Columba sp.), raven (Corvus corax), crow (Corvus corone), and jackdaw (Corvus monedula). Undatable deposits contained a single bone of buzzard (Buteo buteo) from context F77 L122. The bones were measured using the method of Jones et al.[2]

Domestic fowl are the most common species throughout all phases, all part of the skeleton are represented. Domestic fowl would have been important both for their flesh and eggs. The latter is indicated from the examination of 84 femora, 31 of which contained medullary bone showing that 37% were 'in lay' at the time of slaughter.[3] The tarsometatarsi were

1. I would like to thank Jennie Coy (Faunal Remains Project, University of Southampton) and Graham Cowles (British Museum, Natural History) for their help with the identification of the crane bones, and also Roger Jones (Ancient Monuments Laboratory) for his help and use of reference material, and Barbara West (Dept. of Urban Archaeology/British Museum Natural History) for discussion of the sexing of domestic fowl tarsometatarsi.

2. R.T. Jones, S.M. Wall, A.M. Locker, J. Coy and M. Maltby (1981), Ancient Monuments Laboratory DoE computer based osteometry data capture user manual (I), A.M. Laboratory Report No. 3342.

3. J. Driver 1982, Medullary bone as an indicator of sex in bird remains from archaeological sites, In Sexing and Ageing Animal Bones from Archaeological Sites, Eds. B. Wilson, C. Grigson and S. Payne, (BAR British Series 109, 1980), 251-254.

Table 38 Records of medieval bird bones at Church Street

Century period	10th	11th	11th +	12th	12th +	12th ++	13th	13th +	14th	14th +	15th	15th +
Contamination (+)												
Domestic fowl	3	152	6	168	44	29	247	4	4	60	1	145
Goose	1	22	2	40	6	-	113	2	5	38	1	43
Domestic duck/mallard	-	12	-	10	2	-	15	-	-	6	-	7
White stork	-	-	-	-	-	-	-	-	-	1	-	-
Mute swan	-	-	-	-	-	-	1	-	-	2	-	-
Teal	-	1	-	-	-	-	1	-	-	-	-	-
Crane	-	1	-	1	-	-	-	-	-	-	-	-
Redshank/plover	-	-	-	-	-	-	2	-	-	-	-	-
Woodcock	-	2	-	1	-	-	3	-	-	1	-	1
Pigeon	-	23	-	4	-	1	1	-	-	1	-	-
Crow	-	6	-	-	1	-	5	-	-	-	-	-
Jackdaw	-	-	-	2	-	-	1	-	-	-	-	-
Raven	-	-	-	-	-	-	-	-	-	6	-	-
Unidentifiable	1	43	3	46	8	8	113	-	6	35	1	81
Total	5	262	11	272	61	38	502	6	15	150	3	277

divided into possible sex groupings according to the presence or absence of a spur scar or fused spur core. Of 84 bones 29 showed no evidence of a spur scar and are thought to be female, 6 had a spur scar, and 12 had a fused spur scar (the latter two groups are thought to be male) The length ranges are 55.5 - 76.2, 69.2 - 83.0 and 78.5 - 93.8mm respectively. According to West,[1] in the latter two groups the large fused specimens with spurs are likely to be capons and the smaller fused specimens with spur scars male. Taking into account the sex groupings of the tarsometatarsi and the total length measurements of other long bones,[2] there does seem to be a slight increase in the size of fowl from the 10th to the 15th centuries. Certainly the largest males (capons?) are found in the 15th-century deposits.

Five contexts contained partial skeletons, including one immature fowl, two males, and two females.

Evidence of butchery on domestic fowl bones was infrequent, only twenty bones had definitely been butchered, of which nine were tibiotarsi with knifecuts at the distal end, and three were chopped distally. These marks may have been made while removing the lower leg and feet.

Numbers of porous, immature bones were found in all phases, the highest proportion of which were present in the uncontaminated deposits of the 11th, 12th and 13th centuries, these were 11%, 14% and 22% respectively.

Goose was the second most frequently occurring species, these birds were probably all domestic. Geese were kept for their feathers which were used for a variety of purposes, during the 16th-century they were plucked during the summer at six week intervals.[3] Goose grease collected from the cooking bird also had a large number of uses both in cooking and as an ointment. Butchery marks were seen on a few bones (11), including the tibiotarsus, as in fowl, and as knifecuts on the proximal end of the ulna, both of which were probably made while preparing the bird for the table.

1. B. West, Chicken Legs Revisited, Circaea (1985), (in press).

2. In archive.

3. J. Urquhart, Animals on the Farm (Macdonald, 1983), 155.

All parts of the skeleton were found including a small number of skulls. Low numbers of immature goose bones were found in most phases, these never formed more than 20% of the total, and in some instances the number of goose bones, both adult and immature was so low that no reliance could be placed on their relative proportions.

Ducks were also regularly eaten, though they were only found in low quantities. Teal was identified from two bones, and is the smallest species of duck in Britain, the remaining duck bones were of a domestic/mallard type. Only a single femur showed any evidence of butchery, with two knifecuts on the proximal end, and only one immature bone was identified.

Pigeons were common throughout the medieval period, dovecotes were often built on the manors. The partial skeleton of a single individual was found in 11th-century deposits.

The remaining species are wild, and would mainly have been caught by wildfowling. White storks are at present found in some areas of Western Europe where they breed, but they are rare visitors to Britain, however they may have been found here more frequently in the later medieval period. Stork was certainly eaten in Britain during that period since it first appears on the price list of the Company of Poulters in London in 1507, costing two shillings which was cheaper than crane, bustard and swan.[1] Swan was only represented by two bones in 13th and 14th-century deposits, and certainly commanded the highest prices set by the Company of Poulters between 1274 and 1634,[2] which suggests it may also have been expensive over the rest of the country. The crane, which is now only an occasional migrant here, used to breed in the Fens. They were traditionally larded, roasted and eaten with ginger.[3] Redshank, plovers and woodcock were netted by wildfowlers, woodcock were said to be at their best from October to Lent.[4] In the 19th century hawks were used to take woodcock and made very

1. C.A. Wilson, Food and Drink in Britain (Constable, 1973).
2. Ibid., 118.
3. Ibid., 121.
4. Ibid., 121.

good sport,[1] this may also have been practised in earlier times. These birds would have provided a welcome source of fresh meat during the winter months. The corvids were also eaten, Hartley[2] gives a recipe for 'young rook pie' using just the breasts and upper thighs. No butchery marks were found on the wild species, except for some knifecuts on the proximal end of a woodcock humerus.

A few examples of pathology were found, ten examples from domestic fowl and three from goose. Exostoses were noted on a domestic fowl scapula, the distal end of a tarsometatarsus and also on a goose ulna. Healed fractures were seen on a domestic fowl tibiotarsus where the break had set at right angles to its normal position. A healed fracture was also observed on a goose ulna, with gross formation of new bone, and a large central lesion which may have facilitated drainage of infectio Other examples include a domestic fowl tarsometatarsus in which the distal end was swollen and distorted, and a goose coracoid which had an ossified tendon. A domestic fowl tibiotarsus had a swollen shaft suggestive of osteopetrosis as described by Baker and Brothwell,[3] although this example was not so severe as those described. Osteopetrosis has an infectious viral aetiology, which starts in the tibiotarsus and can affect the whole skeleton. Baker and Brothwell suggest that modern husbandry methods favour this condition, but also cite some archaeological examples.

Conclusions. The bird bones from Church Street span five centuries, in which domestic fowl, goose and duck are the three most important species, the diet also being supplemented by wild birds. The domestic fowl were largely females, kept for their eggs, as suggested by the tarsometatarsi and the medullary bone in the femora. No change in the relative importance of any of the species was seen to take place, except for a possible increase in the relative importance of goose to domestic fowl in the 13th and 14th centuries.

1. F.H. Salvin and W. Brodrick, Falconry in the British Isles. (A Windward Reprint from 1855, 1980), 55.

2. D. Hartley, Food in England (Macdonald and Jane's Third Impression, 1979), 205.

3. J. Baker and D. Brothwell, Animal Diseases in Archaeology. (Academic Press, 1980), 61.

The Fish Bones from Church Street, Oxford.

by Alison Locker[1]

A total of 292 fish bones was recovered from deposits dating from the 11th century to the 19th century, some of these deposits were subject to contamination, and a summary of the total number of bones identified for each species can be seen in Table 39 and Table 40. The majority of the fish bones were recovered by hand during the excavation, samples from three deposits were sieved at a later date from which some very small vertebral centra were extracted, as well as cyprinid pharyngeal bones.

The following species were identified, spurdog (Squalus acanthias), eel (Anguilla anguilla), conger eel (Conger conger), herring (Clupea harengus), Salmonidae, pike (Esox lucius), bream (Abramis brama), chub (Leuciscus cephalus), roach (Rutilus rutilus), cod (Gadus morhua), haddock (Melanogrammus aeglefinus), whiting (Merlangius merlangus), ling (Molva molva), Gadoid, hake (Merluccius merluccius)), Triglidae, Labridae, plaice (Pleuronectes platessa), and flounder (Platichthys flesus). Some bones were not specifically identifiable, hence the use of Salmonidae when salmon or trout was present, Gadoid where bones could not be more specifically identified than belonging to the cod family, Triglidae and Labridae refer to an unspecified gurnard and wrasse respectively.

Although the number of fish bones is low, especially when the time span is considered, it appears that marine fish are dominant in all periods, especially the cod group which includes cod, ling, whiting and haddock as well as the gadoid group, these form 46% of the fish bone from the whole site. Cod alone forms 19% of all fish bone which is a significant contribution considering the large size of this fish.

Marine fish may have been brought to Oxford from the ports of Bristol, Southampton or London, except in the case of ling which because of its natural distribution is more likely to have been caught by a more northerly based fishery (ling are not found in the southern parts of the North Sea at present), and brought down the coast. Cod, ling, haddock and hake would all have been caught on lines, and whiting in nets, the latter species being common in shallow inshore water.[2] Although spurdog, whiting and hake were only found in post-medieval deposits the number of bones is so low

1. I would like to thank Mr A. Wheeler (British Museum, Natural History) for his help and use of reference material.

2. A. Wheeler, Key to the Fishes of Northern Europe (Warne, 1978), 153.

Table 39 Records of medieval fish bones at Church Street

Century period	11th	12th	12th +	13th	13th +	14th	14th +	15th	15th +	Total
Contamination (+)										
Spurdog	-	-	-	-	-	-	-	-	5	5
Conger eel	-	1	-	2	-	1	3	-	3	10
Herring	-	-	-	6	-	-	-	-	2	8
Salmonid	-	-	-	1	-	-	-	-	-	1
Roach	-	-	1	1[a]	-	-	-	-	-	2
Cod	-	2	5	21	1	1	2	1	8	41
Haddock	-	1	-	2	-	-	-	-	-	3
Whiting	-	-	-	-	-	-	-	-	1[a]	1
Ling	-	-	-	1	-	4	2	-	2	9
Gadoid	-	6	5	6[a]	-	2	4	-	9	32
Gurnard	-	-	-	3	-	1	-	-	1	5
Labridae	-	-	-	1	-	-	-	-	-	1
Plaice	-	-	-	-	1	-	-	-	-	1
Flounder	-	-	-	1	-	-	-	-	-	1
Flatfish	-	-	-	-	-	-	-	-	2	2
Unidentifiable	1	-	1	27[a]	-	-	5	1	6[a]	40
Total	1	10	12	72	2	9	16	1	39	161

a includes sieved bones: roach 1, herring 1, whiting 1, gadoid 1 and 2 unidentifiable

Table 40 Records of post-medieval fish at Church Street and Greyfriars

	Church Street			Greyfriars
Century Period	16th	18th	19th	19th
Conger eel	-	-	-	1
Eel	4[a]	-	-	-
Salmonid	1	-	-	-
Pike	-	1	-	-
Bream	-	9	-	-
Cod	13	-	2	-
Whiting	5	-	-	-
Ling	2	-	-	-
Gadoid	28	-	-	-
Hake	2	-	-	-
Plaice	3	-	-	-
Flat fish	1	-	-	-
Unidentifiable	59[a]	-	-	-
Total	118	10	2	1

a includes sieved bones: 3 eel and 40 unidentifiable

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that it is assumed that the type of fish consumed does not change from the medieval to the post-medieval period.

Conger eel, apart from one vertebral centrum was only represented by head bones. These fish inhabit rocky shorelines and can be caught on lines or in traps. Spurdog, common in coastal and offshore waters, is probably under represented since like all elasmobranchs its skeleton is composed of cartilage and does not often survive in archaeological deposits. It is often identified by a characteristic spine found in front of the dorsal fins which does survive. Herring and eel, because of the small size and the fragility of their bones can easily be missed if sieving is not carried out, so these two species may also be under represented at Church Street. Both were important food fishes during the medieval period.

The herring fishery was a seasonal activity using surface nets, for which Yarmouth was the main port on the east coast. On the west coast Irish herring were distributed from Bristol.[1] The herrings were marketed pickled or smoked (after the 13th century), in barrels, and were an important low priced food that could be kept over the winter.

Eels were commonly caught in 'eel-bucks', which were basket like traps, found stretched across rivers, and were often associated with water mills. These caught the fish as they descended the river to the sea. The reverse arrangement was called a 'salmon-buck' and caught the salmon ascending the river to spawn.[2]

Other marine fish including the gurnards (possibly the tub gurnard, Trigla lucerna), ?wrasse, place and flounder are all good to eat but appear to have been of secondary importance to the main cod fish group. They are all generally found in shallow water, and would have been caught by a variety of methods including shoreline traps and nets.

Freshwater fish seem to have been of little importance if the small number of bones found is a true reflection of their status as a food source. Both pike a ' bream are good to eat, although some of the other cyprinid remains were from such small specimens that it is difficult to

1. C.A. Wilson, Food and Drink in Britain (Constable, 1973), 32.
2. A. Wheeler, The Tidal Thames (Routledge & Kegan Paul, 1979), 61.

regard them as a fisherman's catch. In contrast freshwater fish were well represented in 13th- and 15th-century deposits at Stert Street, Abingdon,[1] where ten species were identified, including a variety of cyprinids. Eel bones were also very numerous from one sieved deposit. Wheeler suggests that some of the very small freshwater fish found at Ster' Street could have been caught in finely woven traps possibly as a by-catch of the eel fishery which was very important on the Thames.

Until the advent of fast cheap transport and refrigeration most marine fish that had to be transported any distance for marketing were preserved by drying, smoking and pickling. This ensured an all year round supply of fish whose sometimes unappetising appearance could be disguised by a great number of recipes.

A few butchery marks were noted (twelve), all on cod bones. These were mainly on the skull, particularly the cleithrum, which is probably associated with the removal of the head before drying or salting. The presence of other skull bones suggests that not all cod were sold with the heads removed.

Too few skull bones were measurable for any estimation of the lengths of the fish to be made.

Two pathological vertebral centra were found. These were identified as cod, the two centra articulated, and the adjoining articular surfaces had deteriorated. It seems likely that in time the two centra would have coalesced, as was seen with two ling centra from Baker Lane, King's Lynn.[2]

In summary the fish bones from Church Street are dominated by marine fish, especially the cod family. The bias towards the larger species is emphasised because little sieving was carried out. Despite the inland situation of the site little importance seems to have been placed on the freshwater species.

1. A. Wheeler, Fish Remains, In Excavations at Stert Street, Abingdon, Oxon, Oxoniensia, xliv (1979), 21-23.

2. A. Wheeler, Fish Bones, In H. Clarke and A. Carter, Excavations in King's Lynn 1963-1970 (Soc. for Medieval Archaeol. Monograph 7, 1977), 403-408.

THE FISH BONES FROM THE HAMEL, OXFORD [1]

by Alison Locker[2]

A total of 206 fish bones was recovered from deposits dating from the 12th to 18th centuries. Approximately 54% of the bone was composed of unidentifiable fragments and fin rays from two contexts of 13th to 15th century and 14th to 16th century date. The following species were identified; eel (Anguilla anguilla), conger eel (Conger conger), herring (Clupea harengus), pike (Esox lucius), cod (Gadus morhua), haddock (Melanogrammus aeglefinus), ling (Molva molva), Triglidae, mackerel (Scomber scombrus), plaice (Pleuronectes platessa) and flounder (Platichthys flesus). Information on the biology of these fish can be found in Wheeler[3]. Table 41 summarises the species found in each phase.

Most of the marine species, i.e. cod, haddock, ling and gadoids (the latter refers to bones that were not specifically identifiable, but belong to the cod group), would have been the product of a traditional line fishery. Ling would have been caught in a more northerly fishing ground, since ling are not found in the southern parts of the North Sea.

The herring fishery was very important during the medieval period, the main port at which they were landed was Yarmouth, they were marketed pickled and smoked, in barrels. This trade later declined in the 15th century in competition with the Dutch.[4] Gurnards, (Triglidae), plaice and flounders are usually found in shallow waters, flatfish were often caught in shoreline traps as they returned to deeper water after feeding on the shoreline at high tide, these were called 'kiddles'.[5] Gurnards, despite

1. I would like to thank Mr A. Wheeler (British Museum, Natural History) for his help and use of reference material.

2. Most other site information has been published previously: N. Palmer, 'A beaker burial and medieval tenements in the Hamel, Oxford', Oxoniensia, xlv (1980), 124-225.

3. A. Wheeler, Key to the Fishes of Northern Europe (Warne, 1978).

4. C. Wilson, Food and Drink in Britain (Constable, 1973), 47.

5. A. Wheeler, The Tidal Thames (Routledge and Kegan Paul, 1979).

Table41 Records of fish bones at The Hamel, Oxford

Bone group	2	4	5	7	8	9	10	11	12	
Century period	12th	13th	13th	13-15th	14-16th	15-16th	16th	16-19th	18th	
Eel	-	-	-	-	-	1	-	-	-	1
Conger eel	-	-	1	-	3	1	1	2	-	8
Herring	-	2	-	19	6	1	-	-	-	28
Pike	1	-	-	-	-	-	-	-	-	1
Cod	-	-	1	3	1	1	3	-	-	9
Haddock	-	-	-	1	-	-	-	-	-	1
Ling	-	1	-	-	-	-	1	-	-	2
Gadoid	-	3	-	3	5	-	4	-	-	15
Gurnard	-	-	-	-	-	-	1	-	-	1
Mackerel	-	-	-	-	-	-	-	-	1	1
Plaice	-	-	-	1	-	-	-	-	-	1
Flounder	-	-	-	3	2	-	-	-	-	5
Unidentifiable	-	-	-	52	72	2	-	6	1	133
Total	1	6	2	82	89	6	10	8	2	206

their armoured appearance, are good to eat, but together with plaice and flounder appear to have been of limited importance as food at this site. Mackerel form large shoals near the surface of the water, and would have fished seasonally using nets, or possibly lines. An oily fish, like herring, mackerel would have to have been marketed smoked or pickled, as fresh fish quickly became rancid.

At the end of the 17th century mackerel were the only fish that were permitted to be sold in Billingsgate Market on a Sunday, this exception was made because of their extreme perishability.[1]

Conger eels are found off rocky shorelines and would have been caught in traps or on lines. All the bones found at the Hamel were from the head, as was the case at Church Street. This may represent the discarded part of the eel, or possibly the remains of a pie, Hartley[2] states that the Cornish miners roasted the middle cut, while the ends were made into pies. A dentary from 16th-century deposits showed a possible chopmark, which could have been made while removing a large hook.[3]

The only evidence of freshwater fishing is from a single pike bone dated to the 12th century, and a single eel bone from the post-medieval period. The former could have been caught locally by rod and line, the eel was a very important food fish in the medieval and post-medieval periods, even though it is so poorly represented here, the paucity of this species may be a reflection of the lack of sieving, rather than the unimportance of this fish.

In summary the fish bones from the Hamel are fairly similar to those from Church Street, with the emphasis on marine fish that were probably all brought to Oxford in a dried, salted or pickled condition, Oxford being too far inland for these fish to be sold fresh before the development of refrigeration or cheap fast transport.

1. C. Wilson, Food and Drink in Britain (Constable, 1973), 52.
2. D. Hartley, Food in England (Macdonald, Third Impression, 1979), 247.
3. Colley, pers. comm.

APPENDIX 3. A note on the biased record of fish bones from archaeological sites in Oxford and elsewhere in the Thames Valley.

by Bob Wilson

The purpose of this note is to show that the useful records of fish species present at archaeological sites in Oxford must be treated cautiously in order to avoid the misinterpretation of site evidence. Table 42 summarises the normal archaeological record of fish in Oxford and compares it to other local sites where a significant amount of fish bones were retrieved by soil sieving (1-3mm mesh sieves). The table and the counts of fish bones in the reports show that small species e.g. herring, eel and members of the carp family, are commonly recovered by sieving but tend to be absent from among normally excavated bones.

This bias of differential recovery gives undue prominence to the presence of large marine fish in the normal excavation record and suggests that fresh water or migratory fish like the eel were of little importance as food. Soil sieving indicates this is not true.

Table 42 Archaeological records of late Saxon to post medieval fish in and around Oxford

	Normal excavation method						Sieving
Century period	9-10	11-12	13-14	15-16	17-18	19-20	12-16
Sites with records of fish	2	5	6	6	2	2	4
Marine species							
Spurdog	-	-	-	1	-	-	1
Roker ray	-	-	-	-	-	-	4
Conger	-	1	3	1	-	1	4
Herring	-	-	2	2	1	-	3-4
Sprat	-	-	-	-	-	-	1
Cod	2	4	4	2	-	1	3
Haddock	-	1	2	-	-	-	3
Whiting	-	-	-	-	-	-	2
Ling	-	-	2	2	-	-	-
Hake	-	-	-	1	-	-	1
Gurnard[c]	-	-	3	3	-	-	2
Wrasse	-	-	1	-	-	-	-
Bass	-	-	-	-	-	-	1
Scad	-	-	-	-	-	-	1
Mackerel	-	-	-	-	1	-	3
Plaice	-	-	2	1	-	-	2
Flounder	-	-	2	-	-	-	1
Migratory species							
Sturgeon	-	-	-	-	-	-	1
Eel	-	-	-	2	3	-	4
Allis shad	-	-	-	-	-	-	1
Salmon/trout	-	-	1	-	2	-	3
Freshwater species							
Pike	-	3	-	-	-	1	1
Bleak	-	-	-	-	-	-	1
Tench	-	-	-	-	-	-	1
Bream	-	-	-	-	-	1	-
Barbel	-	-	-	-	-	-	1
Gudgeon	-	-	-	-	-	-	1
Dace	-	-	-	-	-	-	1
Chub	-	-	-	-	-	-	3
Minnow	-	-	-	-	-	-	1
Roach	-	-	1	1	1	-	2
Stickleback	-	-	-	-	-	-	1
Perch	-	-	-	-	-	-	2
Ruffe	-	-	-	-	-	-	1

a All Saints (unpub.), Church Street (this vol.), the Hasel (Fiche, this vol), St Aldates (3 sites: Oxoniensia xlii & xlix) and New Inn Court: (Oxoniensia xlviii)

b Blackfriars, Oxford (Oxoniensia i), Harding's Field, Chalgrove (unpub.), Middleton Stoney (Rowley & Rahtz, 1984) and Stert Street, Abingdon (Oxoniensia xliv)

c Includes Red gurnard, and possibly Tub and Grey gurnards

LEVEL III REPORT ON BONES FROM SELFRIDGES, OXFORD, 1972.

Small quantities of bones were salvaged from the site at Selfridges in 1972 but only two contexts, F1 and F5 provided sufficient material to be worth recording. Both contexts are Late Saxon and appear to be composed of unexceptional domestic rubbish presumably from adjacent houses (Tables 43-44).

Table 43 Fragment frequency of Late Saxon bones from Selfridges, Oxford

Feature number	1	5	Total	%
Cattle	24	20	44	42
Sheep	22	15	37	35
Pig	11	8	19	18
Horse	-	5	5	5
Total	57	48	105	
Unidentified	94	15	109	
Burnt bone	5	-	5	
Domestic fowl	5	-	5	5

Table 44 Percentages of head, foot and body debris of sheep and cattle

	Sheep	Cattle
Sample size	37	44
	%	%
head	22	34
foot	16	18
body	62	48

EXAMINATION OF THE CONTENTS OF ST. EBBE'S PITS FOR THE EGGS OF PARASITES

by M. J. MARPLES

This report was written in the late 1960s and does not take account of recent research.

Material from some pit contents was examined for the presence of the ova of human parasites. Specimens were prepared by flotation with zinc sulphate solution and examined microscopically.

Site B, Greyfriars

B VII F4 L12, early 18th-cent. context.
Vegetable remains. Occasional ova of Z type.

B VII F5, mid 19th-cent. context.
Vegetable remains. Small numbers of a small oval mematode egg (Y), approximately 10 x 18 units. Not a recognisable human parasite. Occasional larger egg (Z), similar in size to, and closely resembling that of Trichuris trichiura but without the end plugs. Possibly a parasite of domestic animals.

B VII F5 bottom
Occasional eggs of Ascaris lumbricoides, probably of human origin. Moderate numbers of ova of Y type.

B VII F5
Scanty vegetable remains. No ova seen.

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M V1 D8-G11 Blank

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M VI D8-G11 Blank

M 71 D3-C11 Blank

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