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A Preliminary description of British cattle from the late 12th to the Early 16th century.
A PRELIMINARY DESCRIPTION OF BRITISH CATTLE FROM THE LATE TWELFTH TO THE EARLY SIXTEENTH CENTURY.

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(This is a revised version of a paper presented at the Third International Archaeozoological Conference held at Szczecin, Poland 23-26 April, 1978).

INTRODUCTION

As a contribution to the proceedings of the symposium on MAN AND CATTLE organised by the Royal Anthropological Institute of Great Britain in May 1960, Professor Peter Jewell (Jewell, 1963) delivered a paper that has since been widely quoted. This paper showed the changes in size that occurred in domestic cattle in Britain from the Neolithic through to the medieval period. At the time of the symposium, Professor Jewell was not able to comment fully on the cattle of the medieval and later periods owing to the lack of available skeletal material from late medieval and post-medieval archaeological sites. Now, twenty years later, sufficient faunal remains have been recovered by excavation to enable the advances made in livestock husbandry at the end of the middle ages to be followed more closely. In this paper, I will present the evidence for these improvements and discuss their significance. The information brought together comprises data obtained from my own studies on the large assemblages of horn cores of cattle recently found on medieval and post-medieval sites in south eastern England, and from skeletal remains excavated in the City of London by the Department of Urban Archaeology, Museum of London, on which my research work is centred. Several colleagues have also very kindly made available to me measurements on unpublished material from elsewhere in Britain.

WASTE FROM HORN WORKING INDUSTRIES

Much valuable knowledge concerning the conformation of cattle from the
various historic periods may be acquired from studying assemblages of horn cores that represent the discarded waste from horn-working industries (Fig. 1). In the preliminary stages of horn-working, the horner removed the outer keratinous horn sheath from the bony core after it had been softened by immersion in boiling water. The unwanted core stripped of its outer sheath was then thrown away either amongst the general urban refuse or altogether in one collection of debris. Archaeologists working on urban sites often come across these deposits (Armitage and Clutton-Brock, 1976; Armitage, 1980; in-press). Horn cores found in this kind of context are extremely valuable to the archaeozoologist for two reasons. Firstly, the cores in these deposits were usually dumped over a short period and they therefore form a closely related group, unlike specimens from other dumps of refuse frequently encountered on archaeological sites where deposition or accumulation of the bone is known to have occurred over a prolonged period. Secondly, dumps of waste from horn-working invariably consist of very large numbers of cores, many of which are sufficiently intact to allow measurement and enable full statistical analysis.

Fortunately for the archaeozoologist, the problem of horn imported from overseas is not likely to be encountered on medieval and Tudor sites in Britain since cattle horns were readily abundant throughout Britain, and horners could easily obtain all their supplies of raw material from local slaughteryards, butchers and tanners (Rosedale, 1912; Fisher, 1936). Importation of foreign horn did not take place until the end of the 17th century, and even then this trade was concerned almost entirely with exotic horn. That is to say, with horn from such animals as the wild North American bison Bison bison and the domestic Indian buffalo (Water buffalo) Bubalus bubalis, whose horn cores are very different to those of domestic cattle and can be easily distinguished from them.

It should also be pointed out that the horn cores of cattle found on virtually all medieval and early Tudor excavations are almost certainly derived from local cattle; those from London, for instance, are mostly from animals born and raised in Surrey, Middlesex, Essex and Hertfordshire (Fisher, 1935;
FIG 1: CATTLE HORN CORES
LENGTH OF POSTERIOR-DORSAL (OUTER) CURVE

NUMBER OF SPECIMENS
★ REPRESENTS WASTE FROM A HORN WORKING INDUSTRY

ROMANO-BRITISH
EUROPEAN MEDIEVAL
BRITISH MEDIEVAL
HIGH MEDIEVAL
LATE MEDIEVAL AND TUDOR
EARLY MODERN
MODERN
Everitt, 1967). Although there are documents showing that as early as the 14th century some cattle were being sent 'on the hoof' from Wales to London, such movements of stock over long distances were rare and on a small scale until the 17th century, when the era of the great cattle droves began (Skeel, 1926; Russell & Goodman, 1936; McGrath, 1948; Trow-Smith, 1957, 1959; Haldane, 1973; Armitage, 1978).

THE CONFORMATION OF MEDIEVAL CATTLE

Figure 1 shows the observed range in size of horn cores of cattle from different archaeological sites in Britain. From this diagram and the measurements given in Table I, it is evident that there is a marked difference in the range in size of horn core between cattle of the high middle ages (12th and 13th centuries) and those of the later medieval and Tudor periods (14th to 16th centuries); with the cattle in the latter periods exhibiting very wide variation in the size of the horn, including some individuals whose horns can only be described as massive.

Cattle in the high middle ages

The archaeological evidence so far suggests that the stock of British cattle in the 12th and 13th centuries was predominantly of the short horned type. Examples of the horn cores from these cattle are shown in Figure 2, and are from Angel Court, City of London. The small size of cattle during this period may be ascertained from estimates of their stature (withers height) based on measurements taken of complete, adult metacarpal bones, after the method of Fock (1966). Values calculated for cattle from the City of London are given in Table II, and these show that the smallest animal was less than 1 metre high at the shoulder and the largest beast was only 1.21 metres.

According to Bökényi (1974) the small, short horned cattle in the high middle ages formed a uniform population that was distributed throughout Europe, from the Urals to England. Furthermore, he believes that the small size of these
beasts indicated the existence of very primitive conditions of livestock husbandry, and a lack of understanding of certain fundamental elements of animal breeding. One unfortunate practice of this period was the castration of the largest and strongest of the bull calves, carried out in the belief that these individuals would develop into the best draught oxen, but at the same time having the unforeseen consequence of unintentionally selecting for smaller sized cattle (Payne, 1972). It should be stated, however, that such a lack of understanding of the practices required for successful livestock breeding may not have been universal. In this connection, Fraser (1972) maintained that some form of elementary selection procedure must have been applied in certain of the farming communities of medieval England, 'at least as far as the bull was concerned'. Even assuming the aspiring improver of livestock of this period possessed the necessary knowledge, there would, however, have been very little incentive or indeed opportunity for him to upgrade his cattle, for, under the open field system of farming then prevailing, good and indifferent stock were allowed to mingle on the common pasture. Added to this, there was the shortage of stock feed, particularly during the winter months, which meant that smaller individuals with smaller food requirements had a better chance of survival and may therefore have been preferred. Any large, improved beast with its high nutrition requirements would have been a burden on the resources of the farming community. It may also be mentioned that low levels of nutrition are, in themselves, responsible for creating small sized cattle, as has been shown experimentally. An early experiment conducted by Frederiksen in 1929 (referred to by Hammond, 1940 reprint, 1971, 188-191) demonstrated that adequate supplies of good quality stock feed are all important to growth and development in cattle, and that restrictions in food intake during the early stages of growth severely inhibit the development of body conformation in the young animal, leading to dwarfing in the adult.

One may conclude from the above discussion that no single factor can be identified as being responsible for the dwarf cattle that were common throughout the high medieval period in Europe, but that there are many plausible explanations to account for this phenomenon.
In spite of this general picture of the preponderance of inferior scrub cattle, there were apparently a few isolated localities in Europe, as for example at Wädenswil and Hallwil Castle in Switzerland (Zimmermann, 1920) and Torcello, Italy (Riedel, 1979) where much larger, improved cattle flourished. The more favourable conditions found in these areas encouraged higher standards of livestock keeping and breeding, resulting in an increase in the size of the local cattle. No equivalent localities producing improved cattle have so far been identified for 12th and 13th century Britain.

Long-horned cattle of the late medieval and early Tudor period

Short horned cattle reminiscent of those of the 12th and 13th centuries persisted in Britain throughout the late middle ages and into the 16th century. By the late 14th and early 15th century, however, long-horned cattle were also to be found. The three horn cores from this long-horned stock that are shown in Fig.3 are from the fill of rubbish in the stone-lined dock basin, Baynard's Castle, London, and are dated to c. 1499 - 1500 (Armitage, 1977). Similar cores have been found in a late 14th century pit at Kingston upon Thames, Surrey; in the 14th - 16th century level, Tudor Street, City of London; and in a late 15th to early 16th century rubbish pit at West Ham in Essex.

According to the earlier authorities, among them Hughes (1896), the modern Longhorn in Britain is the descendant of the cattle imported to this country from Holstein and the Low Countries in later medieval times. In spite of this claim of an ancestral link between Dutch cattle and the modern British Longhorn, the introduction of Dutch cattle to England during the close of the medieval period remains unsubstantiated and, according to Trow-Smith (1957), the earliest documents attesting to such imports are from the late 17th century. Contemporary eyewitness accounts show the late 17th/early 18th century Dutch cattle could not possibly have contributed to the foundation of the Longhorn breed in Britain. In the words of one 17th century writer on agriculture, Markham (1657), the imported Dutch cows were pied in colour and had horns that were 'little and crooked' whilst a later author, Mortimer (1707) portrayed them
as being 'long legged' and 'short horned'. The connection between medieval Dutch stock and the origins of the British Longhorn is further ruled out by the archaeological record. There is, as yet, no evidence for the existence of long-horned cattle in Holland in the later middle ages (Clason, 1967; 1977; Prummel, pers. comm.). The only finds of late medieval long-horned cattle that have been reported in Europe are from Hungary (Bokonyi, 1974) and Upper Austria (Knecht, 1966) and neither of these two countries are very likely to have supplied livestock to Britain. In any case, it may be pointed out that during the late 14th and 15th centuries, when importations of live cattle to the shores of Britain were supposedly taking place, there was stagnation of international commerce brought about by a period of severe economic depression (Hilton, 1958; Holmes, 1970).

If the long-horned cattle of late medieval Britain do not represent imported stock, how then may their sudden appearance in the late 14th century be explained. From the evidence so far, I would suggest that the increase in the length of horn seen in the late medieval cattle of south eastern England arose as a consequence of an increase in the overall size and build of the animal, that is, there would seem to have been a direct proportional change in the length of horn following a change in absolute body size. Data supporting this interpretation comes from Baynard's Castle, London, where the calculated mean height at the withers for the 13th century cattle is 1.08 m, and that for the 16th century cattle 1.23 m, with one animal in the later period reaching 1.51 m. (Table II). There is, therefore, clearly an increase in size of cattle between these two centuries. But the essential feature for this site is that the horn cores found in association with each of the groups of metacarpal bones indicate that, according to the system of classification proposed by Armitage & Clutton-Brock (1976) the 13th century cattle were short-horned, whilst those of the 16th century were long-horned. Similar material that I have examined from other sites in London and elsewhere confirms the observation that, in the high and later medieval periods small cattle were generally short-horned and large cattle, long-horned.

Although the relationship between body size and length of horn seems at first
to be axiomatic and therefore unworthy of comment, it may be said that this relationship does not always hold true. In early 19th century cattle, for instance, the body size of the Shorthorn exceeds that of the Longhorn, as demonstrated by the following measurements of two live oxen made by Garrard between 1790 and 1800 (Garrard, 1800):

**Holderness Shorthorn ox:**
- Length of horn: 1 foot 6 inches [0.45 m]
- Height at the shoulder: 5 feet 6 inches [1.67 m]

**Longhorn ox:**
- Length of horn: 2 feet 8 inches [0.81 m]
- Height at the shoulder: 4 feet 6 inches [1.42 m]

Furthermore, the mechanism determining horn size in medieval and later cattle may not be as straightforward as I have suggested here. It is, for instance, of interest that the reduction in size of horn in 12th and 13th century cattle appears to be far greater than would have been predicated from the decrease in body size. Research into this phenomenon so far indicates that the diminution in the relative horn size in medieval cattle following dwarfting conforms to the rules of heterogonic growth that were discovered by Huxley (1932). Work on this aspect is continuing.

**AGRARIAN CHANGE IN 14TH CENTURY BRITAIN**

As has already been demonstrated, the increase in stature and build seen in late-medieval cattle can not be explained by the importation of foreign stock into Britain but, instead, probably represents the result of selective breeding within the existing population. This observation leads on to the question of why at the close of the middle ages did an improvement in cattle occur.

Britain in the late 14th century seems at first an unlikely setting for experimentation in the breeding of livestock. From the point of view of progress made in the fields of science and technology, the period from the 14th to the end of the 15th century was one of stagnation, and is in marked contrast to the achievements of the preceding 12th and 13th centuries, which, according to White
Gimpel (1977), experienced a 'technological boom'. The 14th century was also the time of a severe economic depression and, in addition, witnessed about a third of the population of Britain killed-off by bubonic plague (Langer, 1964; Ziegler, 1975). The destruction wrought upon the population by the plague, together with the deleterious effects of the heightening inflation, brought in their wake the abandonment of rural settlements leading to the phenomenon of the deserted medieval village as well as providing fuel for the spontaneous rebellion by discontented rural labourers. But out of the turmoil created by all these events there sprang several radical reforms and innovations that were destined to change for the better the organisation and productivity of the agrarian economy. The two most significant changes being the replacement of the manorial system by tenant farming, and the widespread conversion of arable land to pasture (van Bath, 1966; Hodgett, 1966; Postan, 1975). From the point of view of livestock husbandry, the following changes that occurred in the 14th century can be identified as the ones that probably exerted the most influence:

(1) Enclosure of the common pasture, which allowed for the first time an opportunity to carry out controlled mating of selected stock.

(2) An increase in the size of certain herds on the larger estates, which gave greater scope for the improvement of stock. There is greater variability expressed in a large population compared to a small one, and this permits superior individuals to appear more frequently in each generation; providing more choice for the stockman when selecting breeding animals (see Darwin, 1866; Bowman, 1974).
(3) The introduction of a rudimentary system of crop rotation that incorporated the cultivation of leguminous fodder plants. In addition, new improved techniques for the making and storage of hay were being adopted. Together, these innovations meant that better quality feed was available for stock over the whole year, and no longer did beasts emerge from the 'lean winter months' in a severely undernourished condition.

All of these factors promoted livestock husbandry in Britain in the later middle ages, culminating in the emergence of large sized, long-horned cattle in the south-eastern counties. The archaeological record, however, also shows that these same counties raised dwarf, short-horned cattle whose presence clearly indicates that, on some farms at least, the older practices of husbandry were not readily replaced. On the evidence collected so far therefore, it appears that the application of new improved techniques of livestock keeping and breeding were restricted to one particular region of Britain, and then probably only to a few of the larger, more progressive estates, and did not extend immediately to all farming communities.

DISCUSSION

From my studies on the remains of medieval and later cattle from archaeological sites in the City of London and elsewhere, I have established that large sized, long-horned cattle do not appear in Britain until the late 14th century. Before this time, the cattle are almost exclusively of the small, short-horned variety. After considering all the evidence that I have been able to find, I am now of the
opinion that the late medieval long-horned cattle do not represent imported stock, rather they probably emerged as a result of selective breeding from the local cattle population.

The question as to whether or not the long-horned cattle of the 14th, 15th and 16th centuries are the progenitors of the modern Longhorn breed remains to be answered. It is of interest that the only horn cores found of these late medieval cattle so far come from south-eastern England, that is outside those regions of Yorkshire, Lancashire and Westmoreland traditionally held to be the original home of the modern Longhorn (Garrard, 1800; Youatt, 1846; Martin, 1847). Research into the relationships between the late medieval/early Tudor long-horned cattle, the longhorn of the 17th and early 18th century, and the modern Longhorn is continuing, and I hope to publish the results of this study at a later date in the Ark.
APPENDIX: EXPLANATION OF TERMS USED

(1) *long-horned* denotes the large sized, long-horned cattle of the late medieval and early Tudor periods. The horn cores of these cattle are not only long but are also massive, unlike the core of the modern Longhorn whose basal circumference is well within the normal range established for the other modern breeds of cattle.

(2) *longhorn* refers to the unimproved form of the modern Longhorn breed; the term being used to identify the small, mainly black cattle that were common to Britain in the 17th and early 18th centuries. Considerable variation is thought to have existed between the stocks from different regions of the country. Some authorities assert that the longhorns of North Wales and Scotland were mainly black, whilst those from central and mid-Wales were either red or brown.

(3) *Longhorn* is the title of a recognised and distinct breed of cattle, and refers to the improved stock of longhorns established in Britain in the late 18th and early 19th centuries. These cattle were extremely variable in colour being either black, red, pied, or brindled. But whatever the colour of the coat, almost all of them exhibited a white stripe along the back, referred to as a 'finch back'.
Fig. 1: Cattle horn cores. Length of the posterior-dorsal (outer) curve.

The observed range in size of horn cores from each site is shown by the solid vertical bar. The values at either end are the lowest and highest values of the length of the outer curve. Number of cores measured is given in parentheses above the bar.

Apart from the data relating to Perth, York and Exeter which include measurements of juveniles, all the dimensions shown refer to sub-adult and adult only.

Sources of information:
Melbourne St., Southampton ------- Jennifer Bourdillon
Bedford Castle ------- Ann Grant
Perth, Scotland ------- G.W. Hodgson
Petergate, York ------- M.L. Ryder (see Ryder, 1970)
Exeter, Devon ------- M. Maltby
Lewes, Sussex ------- D. Freke

All others, P.L. Armitage

Fig. 2: Horn cores of short-horned cattle. First half of 13th century.
Angel Court, City of London. BM(NH) 76.5051.

Photo: P.R. Crabb, BM(NH) Scale in centimetres

Fig. 3: Horn cores of long-horned cattle. Late 15th/early 16th century.
Baynard's Castle, City of London. BM(NH) 75.8278, 75.8299, 75.8303.

Photo: P.R. Crabb, BM(NH) Scale in centimetres
Table I: Cattle from southern England. Horn core, basal circumference.

(All measurements are given in mm)

<table>
<thead>
<tr>
<th>Site</th>
<th>Date (cent.)</th>
<th>No.</th>
<th>M</th>
<th>Range</th>
<th>SD</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of London (3 sites)</td>
<td>late 12th &amp; first half 13th</td>
<td>37</td>
<td>128.8</td>
<td>89.0 - 179.0</td>
<td>25.2</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>early/mid 13th</td>
<td>21</td>
<td>133.9</td>
<td>83.0 - 187.0</td>
<td>31.4</td>
<td>6.8</td>
</tr>
<tr>
<td>Kingston upon Thames, Surrey</td>
<td>late 14th</td>
<td>72</td>
<td>200.3</td>
<td>119.0 - 273.0</td>
<td>30.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Tudor Street, City of London</td>
<td>14th - 16th</td>
<td>27</td>
<td>124.2</td>
<td>81.0 - 255.0</td>
<td>37.6</td>
<td>7.2</td>
</tr>
<tr>
<td>West Ham, Essex</td>
<td>late 15th/early 16th</td>
<td>110</td>
<td>190.9</td>
<td>99.0 - 260.0</td>
<td>29.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Cutler Street, City of London</td>
<td>late 17th/early 18th</td>
<td>166</td>
<td>217.7</td>
<td>122.0 - 292.0</td>
<td>30.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Hertford Castle, Hertford</td>
<td>late 17th/early 18th</td>
<td>39</td>
<td>224.7</td>
<td>168.0 - 284.0</td>
<td>27.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Greyfriars, Oxford</td>
<td>first half 19th</td>
<td>225</td>
<td>182.6</td>
<td>143.0 - 288.0</td>
<td>16.8</td>
<td>1.1</td>
</tr>
</tbody>
</table>

KEY:  
- **No.**: Number of specimens (adult & sub-adult cores)  
- **M**: Mean (estimated by average value of the observations on the variate)  
- **Range**: Observed size range (lowest and highest values of variate)  
- **SD**: Standard deviation  
- **SE**: Standard error of the mean
Table II: Size of cattle from late 10th - 13th century, London. Estimated height at the withers (m).

<table>
<thead>
<tr>
<th>No. bones examined</th>
<th>Height at the withers (m)</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>27</td>
<td>1.02</td>
</tr>
</tbody>
</table>

1. Calculated after the method of Fock (1966):
   Length of metacarpal bone $\times 6.13$
Table III: Comparison of the size of cattle from 13th and 16th century levels, Baynard's Castle, City of London. Estimated height at the withers (m)\(^1\).

<table>
<thead>
<tr>
<th>Context No.</th>
<th>Date</th>
<th>No.</th>
<th>Height at the withers (m)</th>
<th>Mean</th>
<th>Range</th>
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<tbody>
<tr>
<td>5000</td>
<td>13th century</td>
<td>4</td>
<td>1.08</td>
<td>1.04</td>
<td>1.14</td>
</tr>
<tr>
<td>1</td>
<td>c. 1520</td>
<td>74</td>
<td>1.20</td>
<td>1.09</td>
<td>1.32</td>
</tr>
<tr>
<td>23</td>
<td>c. 1520</td>
<td>118</td>
<td>1.23</td>
<td>1.09</td>
<td>1.51</td>
</tr>
</tbody>
</table>

1. Calculated after the method of Fock (1966):-

Length of metacarpal bone \( \times 6.13 \)
P.L. Armitage

REFERENCES


Hughes, T., McKenny (1896). On the more important breeds of cattle which have been recognised in the British Isles in successive periods. Archaeologia, LV, 125-158.


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