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A SYSTEM FOR AGEING AND SEXING THE HORN CORES OF SEVENTEENTH AND EARLY EIGHTEENTH CENTURY UNIMPROVED BRITISH LONGHORN CATTLE

Philip L. Armitage[a]

INTRODUCTION

Throughout the 17th and early 18th centuries, an abundant stock of cattle found in nearly every district of Britain was the unimproved longhorn (see Appendix for explanation of terminology). These cattle were highly esteemed by both grazier and butcher alike. The cows gave milk that was rich in butterfat and non-fatty solids (lactose, proteins and minerals) and therefore eminently suitable for use in the manufacture of cheese and butter, whilst the bullocks when fattened on either grass or turnips produced a reasonably good quality carcass (Trow-Smith,1959:84-89; Kerridge,1968:316). In addition, the hides of these animals were far thicker than those of other kinds of cattle and were much valued by tanners who were often willing to pay the butcher more for a pound of hide than he received for a pound of meat (Garrard,1800). Unlike the later improved breed of Longhorn of the late 18th and early 19th centuries for which there are many detailed and fine engravings and paintings of pedigree animals (see, for example, those in Bewick,1800:33-35; Bingley,1809:408-409; Youatt,1846:12; Martin,1847:58 & 59) as well as a series of measurements taken of live animals (Garrard,1800), information on the 17th and early 18th century unimproved longhorn is sparse. There are, as far as I am aware, no contemporary pictures of the unimproved longhorn. The rather stylized depictions of a bull, cow and ox that appear in the well known book The History of Four-Footed Beasts by Topsell (1658) are all copied from an earlier work by the Swiss naturalist, Conrad Gesner (Gesner,1551) and are therefore of foreign cattle. Gesner's engraving of an ox is again plagiarized to illustrate the revised and enlarged edition of Mascall's book The Countreyman's Jewel or, the Government of Cattel (Mascall,1680). Furthermore, all references made to the 17th and early

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18th century unimproved longhorn by the contemporary writers on agriculture mentio only the colour of their coat, mostly black but with some red and brown beasts; their exceedingly long horns; and their concentration in the north western and midland counties (Markham,1657:69; Armitage,1978:219). No information regarding size of body or shape of horn is given.

It is important to realise that none of the numerous engravings and paintings showing late 18th century pedigree Longhorn cattle is of any help when attempting to investigate the appearance of the 17th and early 18th century unimproved longhorn. This is because the later animals represent stock that had been highly modified by a succession of pioneer livestock breeders, starting with Sir Thomas Gresley in the first half of the 18th century, and culminating with the improvements carried out by Robert Bakewell (1726 - 1795) and his contemporary, Robert Fowler of Rollright, Oxfordshire.

In about 1720, Sir Thomas Gresley of Drakelow House, Burton-on-Trent, Derbyshi endeavered to upgrade the local longhorn stock. Sir Thomas suceeded in his goal and managed to establish a herd of good quality animals that were uniform in colour and conformation. This early breeding experiment was continued by Mr Webster of Canley, near Coventry, Warwickshire, who became one of the foremost breeders of longhorn cattle in about the mid 18th century. Professor Low (Low 18 : 372) record that the Canley herd was based on cows derived from the stock owned by Sir Thomas Gresley crossed with bulls imported from Lancashire and Westermoreland. The Canley herd was later, in about 1760, eclipsed by an even more famous herd, that of Robert Bakewell of Dishley Grange, Leicester. Bakewell purchased two heifers from Mr Webster and a bull from Westmoreland. From these animals he produced a herd of superior beef cattle by following a policy of close inbreeding coupled with rigorous selection according to predetermined criteria based on market requirements and culling of all unwanted individuals. Bakewell's breeding programm was successfully emulated by Robert Fowler of Little Rollright, Oxfordshire whose herd of Longhorns was derived from animals purchased both from Webster and Bakewell (Housman,1915:70 - 76; Trow-Smith,1959:56; Kerridge,1968:320; Cox,1978). The improved Longhorn of Bakewell and Fowler's time was less coarse in the bone (See Appendix for terminology) and had a greater propensity to fatten at an earlier age compared with its unimprove predecessor (Garrard,1800: Bingley,1809:410; Wilson,1909:110). Other alterations

had also occured, most noticeably in the head, where the frontal eminence had become convex, producing a dome-shaped forehead with the horns directed backward at their base (Grigson,1976:126, frontal profile type 1). The length of horn had al increased and sometimes took on a bow-shaped configuration, sweeping first downwards and then curving sharply inwards towards the nose (Fig.1). In certain animals, this form of horn became so exagerated that the horns 'often met before the muzzle in such amanner that the points were obliged to be sawed off in order that the animal might at liberty to feed' (Martin,1847:57). Because of the very considerable modification that were made to the longhorn in the latter half of the 18th century, the depictions of the improved Longhorn breed can not therefore be used as a model for the reconstruction of the earlier unimproved animal. There is only one source available for this purpose and is the skeletal remains of 17th and early 18th century cattle found in the archaeological record.

Fig. 1: Improved Longhorn ox of the late 18th century with bow-shaped horns. Drawing based on the scale models and engravings by Garrard (1800).

HORN CORES OF UNIMPROVED LONGHORN CATTLE FROM ARCHAEOLOGICAL SITES IN SOUTH EASTERN ENGLAND

Excavations recently carried out in the City of London and the London Boroughs of Southwark and Enfield have revealed deposits containing the horn cores of 17th and early 18th century unimproved longhorn cattle (Table I). All of the cores from these three sites are identified as the waste from slaughteryards, tanners and horn-workers. At Southwark, this material had been unwanted and straightway thrown into a pond-like area used as a refuse dump (Maitland Muller, 1980, pers.comm.) but at Enfield the horn cores had been usefully employed in the construction of agricultural land drains, with the cores placed end to end in a line along the bottom of buried trenches cut into the impervious clay sub-soil (Armitage, Ivens & Coxshall, 1980, in press). At Cutlers Gardens, the cores had again been used for construction purposes. Here they had been laid horizontally in courses, separated by layers of clay, against the sides of pits and provided reinforcement to these structures, preventing the collapse inwards of the sides of the pits which are believed to have functioned as soakaways (settling tanks) for some as yet undetermined industrial process (O'Connor Thompson & Armitage, 1980, in prep.).

From these three collections of horn cores much information has been obtained concerning the size and appearance of the unimproved longhorn and at what age they were slaughtered for their meat. Part of the initial investigation into this material has been concerned with establishing a method whereby the age and sex of each core may be determined. The results of this research have proved so rewarding that I present them here in order that they can be used by other archaeozoologists who may be called on to describe the animal remains from post-medieval sites.

Table I. Details of selected groups of horn cores from 17th/early 18th century sites in south eastern England.

Site name and location	Excavator and date of excavation	Description of context in which cores were found and number of cores recovered	Date of context
Cutlers Gardens, City of London (CUT 78)[1]	D.U.A., Museum of London 1978 & 1979	Trial hole 2 & contexts 234, 984, 1315, 1451, 1456, 1527 Horn cores used as lining to industrial(?) pits 537 cores: ~~approximately~~ ⅓ longhorn; rest short & medium horn (provisional analysis only)	late 17th/early 18th century
New Guys House, Southwark (NGH 65)[2]	Maitland Muller, Cuming Museum 1965	Trench 2 layer 5B Horn cores from silt layer in a pond-like area ? cores: 1 longhorn; 6 mediumhorn	early 18th century
Upsdell Avenue, Enfield (UA 79)[3]	Enfield Archaeological Society 1979 & 1980	Trench nos. 1 - 6 Horn cores used to line old agricultural land drains 20 cores: 8 longhorn; 12 mediumhorn	17th/early 18th century

1. O'Connor Thompson & Armitage (1980, in prep.)
2. Maitland Muller (1980, pers. comm.)
3. Armitage, Ivens & Coxshall (1980, in press)

PROPOSED SYSTEM FOR THE CLASSIFICATION AND DESCRIPTION OF HORN CORES OF 17th AND 18th CENTURY UNIMPROVED LONGHORN CATTLE

I. IDENTIFICATION

The following criteria may be applied in the identification of the cores of unimproved longhorn cattle:-

(1) Length of outer curve:

Any specimen whose length along the posterior-dorsal (outer) curve exceeds 360 mm is assigned to what is here referred to as the 'unimproved longhorn group'.

(2) Index of proportion:

All modern Longhorn cows and oxen, together with some bulls, have horns that are disproportionately long relative to the size of their basal circumference (Grigson, 1975:120). This trait applies also to the unimproved longhorn of the 17th and early 18th century and may be detected in cores recovered from archaeological sites using the index:

length of outer curve / basal circumference X 100

This 'index of proportion' provides the means of quantifying the shape of a core; values over 100 show that the specimen is proportionately long (Skinner & Kaiser, 1947:143). On the basis of the data relating to the horn cores from Cutlers Gardens, I propose that a value greater than 180 denotes an unimproved longhorn.

It should be mentioned that in archaeological material not all unimproved longhorn males will be identified by means of this index and in such specimens recognition must rely entirely on the criterion of length. The following examples will serve to illustrate this particular point. Two cores, one from Cutlers Gardens (Plate I, top specimen) and the other from Southwark (Plate III) are recognised as male from their elongated conical shape and angle of attachment to the frontal bone (see section 3, bull 1). Measurements taken of these specimens reveal that they are much shorter and more robust than those of either cow or ox, and have an index of proportion calculated at 154 and 153 respectively (Table III). These values fall well within the range that I have established for the combined short and medium horn cattle from the same sites. Nevertheless, both cores have lengths of outer curve greater than 360 mm which place them firmly in the unimproved longhorn group.

(3) Shape of frontal bone and direction of curve of the horn core:

Although there is some slight evidence of incipient bowing of the horn in a few of the 17th and early 18th century horn cores that I have examined, for example in the bull from Upsdell Avenue, Enfield (Plate IV & Fig.4, bull 2) the fully developed bow-shaped horn that is characterstic of many improved Longhorn animals does not appear among the earlier unimproved longhorn cattle. Instead, the horn stands outwards from the head and the frontal bone appears flat when viewed from the back of the skull (Grigson, 1976:126, frontal profile type 2). In the improved Longhorn the frontal eminence is typically bulbous producing a dome-shaped forehead.

(4) Parietal lap and horn core neck:

The archaeological evidence examined so far suggests that both the 'parietal lap' and 'horn core neck' (see below for explanation of terms) are uncommon in 17th and early 18th century unimproved longhorn cattle. Only in four of the cores identified as ox from Cutlers Gardens were these two features recorded. In all of these specimens, the horn core is massive and curves downwards.

The so-called 'parietal lap' is a conspicuous triangular shaped area in the upper region of the frontal eminence and is formed by the extension of part of the parietal bone into the facial region. In skulls of modern Longhorn cattle this feature is usually found in conjunction with a characteristic 'neck' of bone between the frontal bone and the base of the horn core (Epstein, 1971: 235-237). According to Duerst (1926) both of these features are the result of mechanical stress imposed on the skull by the growing horn core. In particular it is the weight and direction of movement (angle of rotation) of the growing core that determines the shape of the frontal bone and the final form of the intercornual ridge in the fully grown adult. When the horn is massive and curv downwards, the bone at the point of attachment of the core to the skull becomes elongated forming a distinct 'neck' whilst the parietal bone extends forewards into the facial region to give rise to the 'parietal lap'. This condition is clearly seen in the two skulls of modern Longhorn cattle with bow-shaped horns in the collections of the BM(NH) (reg.nos. 0.23 & 1953.3.16.1) but is noticeabl absent from the one Longhorn cow with outward directed horns (BM(NH) reg.no. 1953.3.31) where the base of the core is set close to the frontal bone and the line of fusion between the frontal and parietal bones is along the edge o the intercornual crest. With the exception of the four oxen mentioned above, all the specimens from Cutlers Gardens, Southwark and Enfield are like the modern Longhorn cow BM(NH) 1953.7.31 in that they do not have either a 'parietal lap' or 'horn core neck'.

Table II: 17th/early 18th century longhorn cattle. Metrical data from selected examples of horn cores recovered from archaeological sites in the City of London, Southwark and Enfield.

Site name and location	Measurements & indices							Sex	
	1	2	3	4	5	6	7		
Cutlers Gardens, City of London (CUT 78. Trial hole no. 2 & Context 234)	409	265	81.1	93.9	104.0	86	154	Bull	
	517	219	71.1	67.8	125.1	105	236	Cow	Plate I
	589	264	82.4	85.8	148.1	96	223	Ox	
	473	233	60.8	85.0	105.7	72	203	Ox —	Plate II
New Guys House, Southwark (NGH 65. Trench 2 layer 5B)	490	320	94.0	115.1	-	82	153	Bull —	Plate III
Upsdell Avenue, Enfield (UA 78. Trench 1)	475	229	60.6	80.0	-	76	207	Bull —	Plate IV

Measurements & indices: 1. length of outer curve (mm); 2. basal circumference (mm); 3. minimum diameter across the base (mm); 4. maximum diameter across the base (mm); 5. half width between the bases of the horn cores (mm); 6. index of minimum diameter across the base/maximum diameter across the base X 100; 7. index of length of outer curve/basal circumference X 100.

II. AGEING HORN CORES

From the very start of the work it became apparent that the existing system for the subdivision of horn cores according to the three age classes juvenile, sub-adult and adult, widely used by archaeozoologists (Ekman,1971:17; Armitage & Clutton-Brock,1976) was inadequate. I felt that there was a need to increase the number of classes to five in order to accommodate those specimens showing intermediary stages of development. Only in this way could the material be catelogued precisely.

This idea of employing five age classes in the classification of horn-cores of sub-fossil and fossil bovids is by no means new and appears as early as 1927 in a paper by Koch (Koch,1927). The descriptions given by Koch of the age classes are, however, in my opinion, unhelpful when attempting to identify specimens. For instance, he says of a young animal aged between three and four years that the tip of the core is still youthful and the base is in the process of change. Furthermore, there is disparity between the age range assigned by Koch to each of his phases and the series of aged Chillingham cattle skulls held by the BM(N.H.) that have been studied by Grigson (1973). It was for these reasons that I decided to devise my own descriptions of the changes that occur in cattle horn cores with age, based largly on a visual appraisal of the assemblage of unimproved longhorn cores recovered from Cutlers Gardens. These descriptions are presented in Table III and drawings of each age class are shown in Figure 3.

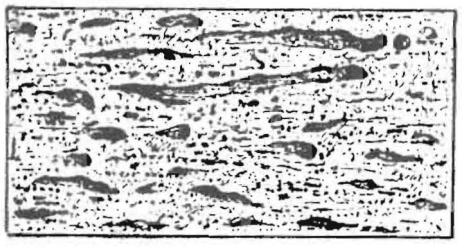
In order to be able to recognise each age class it is first necessary to distinguish the six forms of bone texture found in cattle horn cores (Fig. 2). When these are readily identified, the appropriate age class may then be ascertained from the distribution and pattern of these different bone textures over the surface of the core (Table III & Fig.3).

Fig. 2: 17th and early 18th century unimproved longhorn cattle. Horn core, categories of surface texture and appearance of bone.

1

Soft 'spongy' bone, light in weight. Many large channels formed by nutrient foramina. Surface pitted by numerous minute pores. Stage of actively growing bone.

2

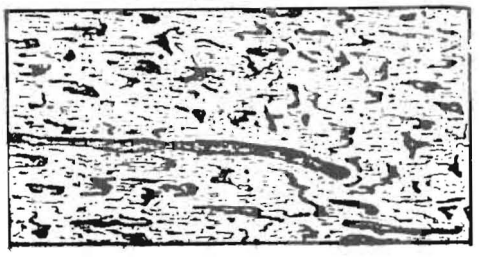


Soft porous bone. Channels leading into nutrient foramina are less conspicuous than in category 1. Numerous minute pores present. Stage of actively growing bone.

3

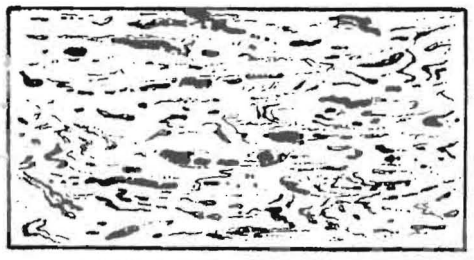
Porous bone. Nutrient foramina appear mostly as large spherical or elliptical pits which are arranged closer together than in category 2. Numerous minute pores present. Stage of growing bone.

4



Bone becoming more compact but many minute pores still present. Appearance of nutrient foramina as in category 3 but more scattered. Surface feels rough to the touch. Stage of growing bone.

5



Compact bone with scattered nutrient foramina. Only a very few minute pores present. Stage in which growth of bone is virtually completed.

6

Smooth, compact bone. Very few nutrient foramina and minute pores are present. Stage of senescent bone.

N.B. There are only copies of the original diagram (not for publication)

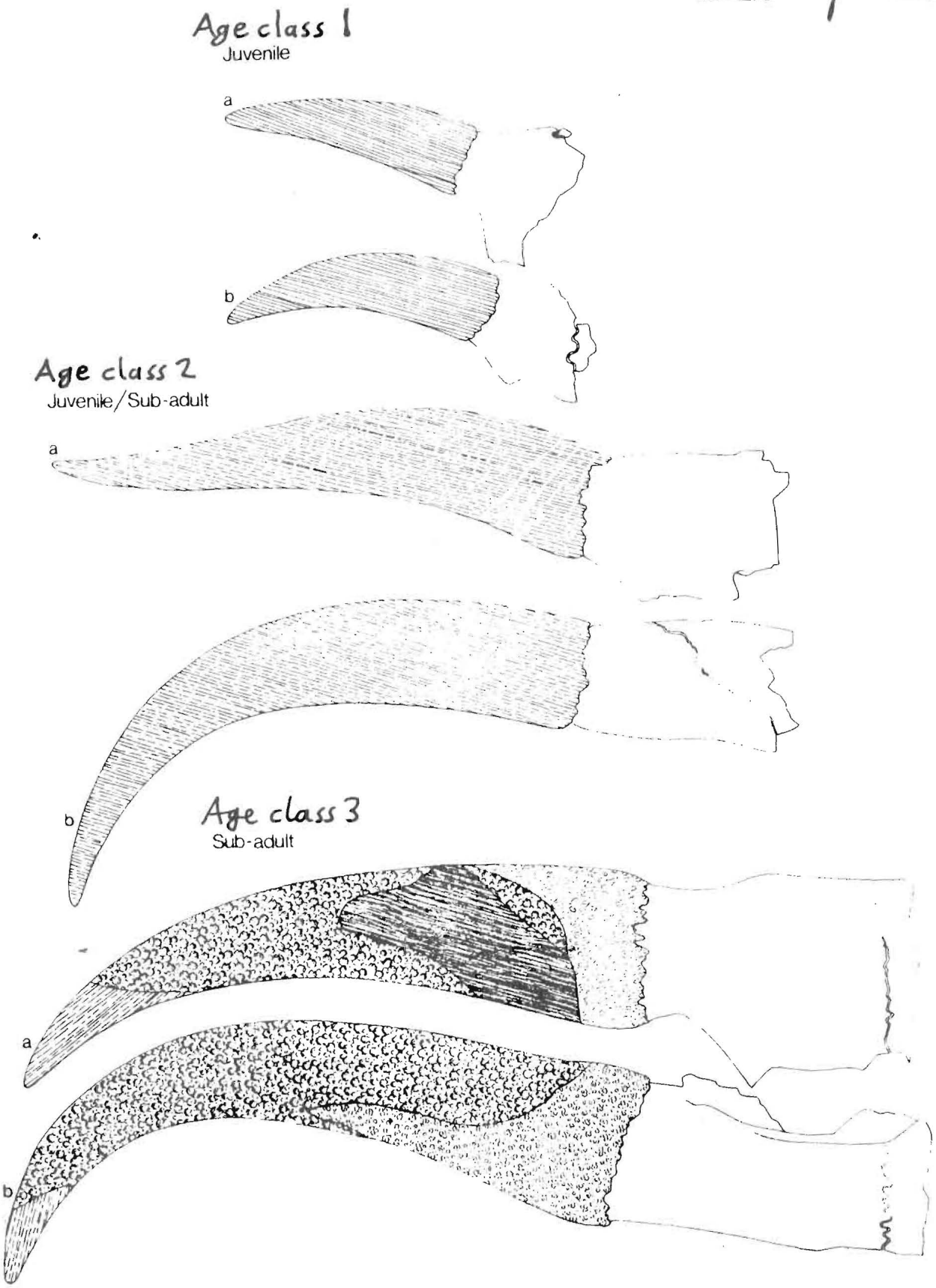


Fig. 3: Late 17th and early 18th century unimproved longhorn cattle from Cutlers Gardens, City of London. Schematic diagrams of horn cores to show the five age classes that have been identified.

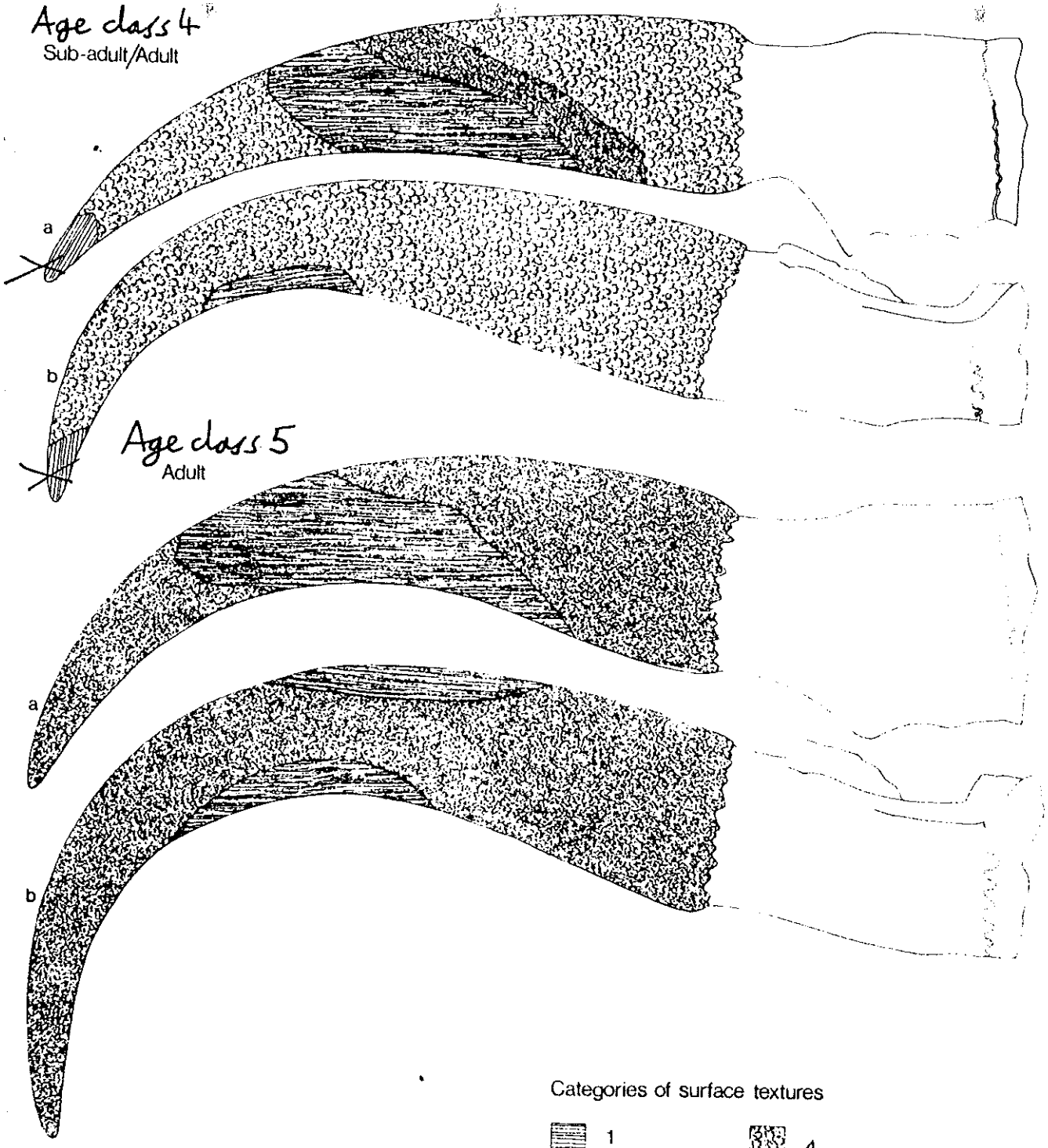

Age class 4
Sub-adult/Adult
a
b
Age class 5
Adult
a
b
a Frontal view
b Nuchal view
Categories of surface textures
1
2
3
4
5
6

Table III: Description of age classes illustrated in Figure 3

Age class	Designation of growth stage & suggested age range (note 1)	Appearance of core	Frontal-parietal suture (note
1	Juvenile 1 - 2 years	Whole of core is composed of soft 'spongy' bone (Fig.2,1). Core is starting to curve.	Unfused.
2	Juvenile/sub-adult 2 - 3 years	Whole of surface comprised of soft porous bone (Fig.2,2).	Starting to fuse along the line of the nuchal eminence.
3	Sub-adult about 3+ years	Length of core may approach that of the adult. Porous, actively growing bone around the base (Fig.2,3) and forming the tip (Fig.2, 2). In some cores, a zone of compact bone (Fig.2,6) has, by this stage, formed on the inside (anterior)face. Growth in this area has ceased but the posterior side continues to grow (Fig.2,4) causing the core to curve forewards in relation to the frontal plane (Note 2). Longitucinal grooves may be present, the result of differential rates of growth between the sheath and the core (see Grigson,1976:130).	Either wholly or partially fuse along the line of the nuchal eminence. Unfused at back of the skull i.e. along the upper edge of the temporal fossa immediately below the base of t horncore.
4	Sub-adult/adult 3 - 5 years	Bony substance of core is in a transitional phase between age classes 3 and 5. Tip is still porous (Fig.2,2) and actively growing in length (Note 3). Basal region has become more compact (Fig.2,4).	Fused along line of nuchal eminence but unfused at back
5	Adult over 5 years	Entire surface of core, including the tip region, has become compact (Fig.2,5 & 6). In old animals, the surface may become	In some specimens, may be completely fused along whole length, in others it may be

	rough and a knobbly 'wreath of bony pearls' (perlae) develop around the base as, for example, in the bull from Southwark (Plate III) (see Grigson, 1973:176).	only partially fused at back of the skull.

NOTES:

1. The age range given for each class is tentative, and is based on the series of skulls of Chillingham cattle held by the BM(NH). It should be mentioned that castration of bull calves was usually carried out between 10 and 20 days after birth and this would have greatly affected the normal growth pattern and delayed the onset of skeletal maturation. Any ox assigned to one of the above classes may therefore be somewhat older than the upper limit of the proposed age range.

2. According to Grigson (1973:194) the earlier curving of the horn in cattle is governed by the sheath, whilst in the later stages, as here, it is the core that determines the magnitude of the curvature.

   It is interesting that cores sectioned in this region reveal that the wall of the compact bone on the inside of the curve is thin whilst that of the porous bone on the outside is far thicker.

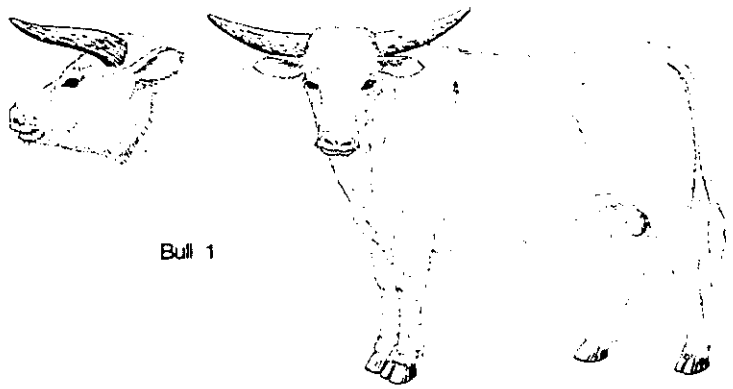
3. The tip is not only porous but still retains many large channels created by the nutrient foramina showing that growth in this region is continuing well beyond the sub-adult phase. This is in contrast to the skull of a Chillingham bull aged 3 - 5 years held by the BM(NH) (reg.no. 1953.4.22.5) whose horn core tips have apparently ceased growth at a much earlier stage. This extension of the growth period in the cores of longhorn cattle possibly explains the mechanism responsible for producing the characteristic long horns of this stock.

4. These observations are intended to give a general guide only to the usual sequence of fusion. Time of fusion is, however, very variable between individuals and in castrated animals may be considerably delayed. For this reason, the degree and extent of union between the frontal and parietal bone plates is an unreliable method of establishing age.

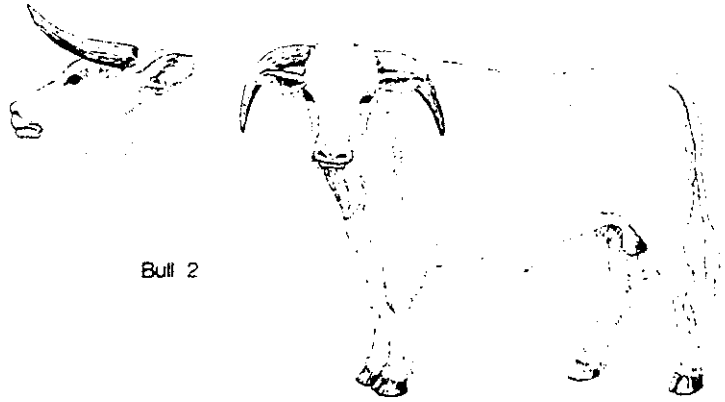
III. DETERMINATION OF SEX FROM THE HORN CORE

One of the major problems that I encountered in attempting to establish the sex of the cores from Cutlers Gardens, Southwark and Enfield was the lack of contemporary depictions of 17th and early 18th century unimproved longhorn cattle. As has been mentioned before, there are numerous engravings and portraits of late 18th and early 19th century improved Longhorn cattle, as well as a series of plaster models of pedigree animals belonging to this breed made by George Garrard between 1790 and 1810 (Clutton-Brock,1976). None of these however is of any use when it comes to identifying bulls, cows and oxen of the 17th and early 18th century from the shape of their horns. This is because the conformation of the later Longhorn was much altered during the improvements carried out to this stock in the latter half of the 18th century, which resulted in an animal that bore little resemblance to its unimproved predecessor (see Martin,1847:57; Trow-Smith,1959:56).

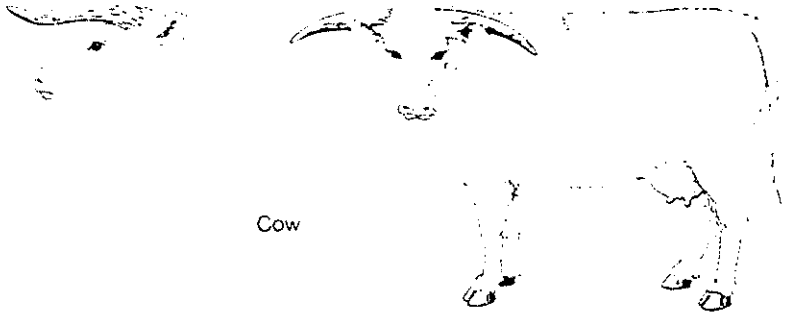
The deficiency in information relating to the 17th and early 18th century unimproved longhorn was to a certain extent overcome by consulting the few 19th century authors whose works include descriptions and illustrations of animals referred to as the older form of longhorn cattle. For example, the drawing of a Craven bull of circa 1833 reproduced in the book on cattle breeds by Youatt (1800: 188) said to have 'many of the characters of the old breed', helped with the identification of the horn core recovered from Upsdell Avenue,Enfield (Plate IV). Photographs of modern Longhorn cattle with outward directed horns thought to be reminiscent of those ~~found in~~ of the older form of longhorn (Trow-Smith,1957:142,Fig. 7b; Parker,1973; Anon,1976:217) were also examined in the hope that they could provide clues to the various types of horn to be found in 17th and early 18th century unimproved longhorn bulls, cows and oxen. The information collected from these sources and from the archaeological material are incorporated in Figure 4 where idealized outlines are presented of the different forms of horn found in unimproved longhorn cattle prior to 1750. Descriptions of the horn cores from these animals are given in Table IV. It is important to note that the descriptions given in this table (Table IV) apply only to cores from sub-adult, sub-adult/adult and adult animals. Juvenile cores are excluded as it is not possible to determine their potential size and shape when adult.



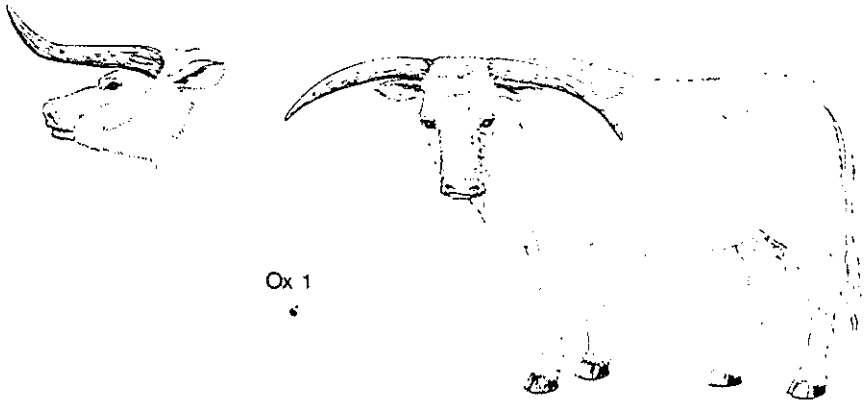
Bull 1



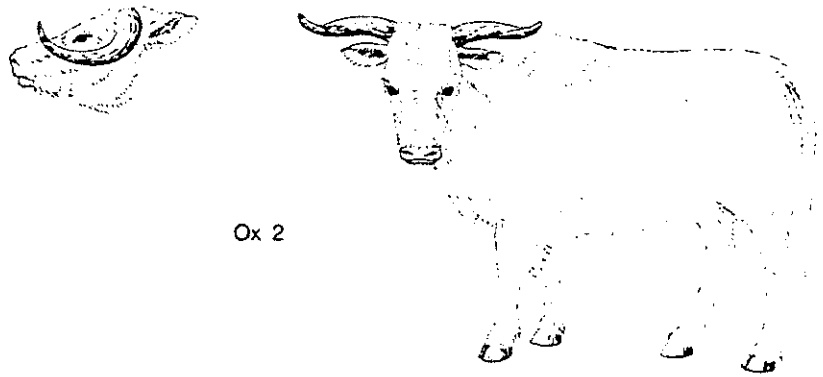
Bull 2



Cow



Ox 1



Ox 2

Table IV: Determination of sex from the horn core

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(1) MALE

Two forms are recognised:

1.1 Core is often large and robust, and is of an elongated conical shape. Slightly flattened on posterior surface of the base, otherwise the cross-section is circular throughout the length. Core stands straight outwards from the skull and is typically curved forewards in the horizontal plane, with the tip directed upwards with reference to the frontal profile.

see Figure 4 bull 1

1.2 Core generally smaller and less robust than 1.1 above. Broad at the base with a flattened, almost oval cross-section. Cross-section only becomes circular towards the tip. Viewed from in front, the core characteristical curves downwards whilst in the lateral view, the core is directed foreward

see Figure 4 bull 2

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(2) FEMALE

Long, tapering core, circular in cross-section at the base and throughout the length. Core typically curves forewards in the horizontal plane with the tip pointing downwards, as in the example from Cutlers Gardens (Plate I) or with a final upward tilt with reference to the frontal profile.

see Figure 4 cow

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(3) CASTRATE

Two forms are recognised:

3.1 Appearance of core is closer to that of cow than bull but much longer and more massive especially in the basal region. Generally circular in cross-section but there may be slight flattening of the base on the posterior side. Curved in similar way to cow but the additional length produces a more sweeping and impressive horn.

see Figure 4 ox 1

3.2 Core stands outwards from the skull as in 3.1 but the distal half twists sharply upwards in relation to the frontal profile. As a consequence of the twisting, the base is flattened (compressed) on the posterior side.

see Figure 4 ox 2

This helical form is less common than 3.1 and occurs infrequently in late 17th/early 18th century British longhorn cattle, in contrast to the Texas Longhorn where it is predominant in both steers and cows. In these beasts, the horn is much longer and the twist more pronounced, producing a configuration resembling the prong of a pitchfork (see Dobie, 1943).

Examples of horn cores from bulls, cows and oxen from the City of London, Southwark and Enfield are shown in Plates I, II, III & IV, and measurements taken of these specimens are given in Table II.

DISCUSSION

Although the recent discovery of the large assemblage of horn cores from Cutlers Gardens in the City of London, together with those made at the smaller site at Southwark and Enfield, have allowed detailed study and reconstruction of the appearance of 17th and early 18th century unimproved British longhorn cattle, I can not claim that all the potential types of horn that are likely to be encountere in this stock are described here. Many more forms no doubt await identification amongst excavated bone material from other post-medieval sites.

Unlike the modern breeds of pedigree cattle in which the types of horn are generally few and well defined under the regulations of the respective breed societ those of the unimproved longhorn were according to the late 18th and early 19th century writers on agriculture, many and varied. The so-called longhorn cattle of the early modern period, before the improvements carried out by Bakewell and his contemporaries in the late 18th and early 19th centuries, did not in any sense constitute a homogeneous population. All cattle, at this time, with exceptionally long horns were referred to as 'longhorns', but this was simply a convenient label and obscurred the reality that within the 'longhorn' group considerable variation existed between the different stocks innabiting the different regions of the country which reflected the differences in geology, soils and climate rather than the result by livestock farmers to develope through selective breeding and controlled matings, distinctive local varieties of longhorns. This phenomenon of regional variation within the longhorn stock and its causes was commented on by Youatt (1860:189): 'As either of these [small and larger types of longhorn from the Craven district of Yorkshire] found their way to other districts, they mingled to a greater or lesser degree with the native cattle, or they felt the influence of change of climate and soil, and gradually adapted themselves to their new situation; and each assumed a peculiarity of form which characterized it as belonging to a certain district, and rendered it valuable and almost perfect there. The Cheshire, the Derbyshire, the Nottinghamshire, the Staffordshire, the Oxfordshire, the Wiltshire cattle were all essentially long-horns, but each had its distinguishing feature, which seemed best to fit it for its situation, and for the purposes for which it was bred'. A great deal of work needs to be done in elucidating the differences

that existed between the regional stocks of cattle in the 17th and 18th centuries, and this information can only come from study of their skeletal remains found in the archaeological record.

The 537 horn cores (from the combined long, medium and short horn groups) from the late 17th and early 18th century levels, Cutlers Gardens are classified according to the system for ageing described in this paper as follows:-

Age class	Designation of growth stage & suggested age range	No.specimens	Percentage of total number of cores recovered from site
1	Juvenile 1 - 2 years	41	8%
2	Juvenile/sub-adult 2 - 3 years	37	7%
3	Sub-adult about 3 years +	158	29%
4	Sub-adult/adult 3 - 5 years	49	9%
5	Adult over 5 years	252	47%

From these figures, it is seen that out of the total of 537 cores, 459 (85%) are from animals whose ages are assesed at three years and over, compared with only 78 (15%) from juveniles aged between one and three years. This kill-off pattern wit its preponderance of mature and older animals fits very well the picture we have of the pattern of slaughter of cattle in the early modern period. According to contemporary documentary sources, the average age of the cattle, excluding calves, supplied to slaughteryards at this period was between four and five years (Wheaton-Smith,1963:59). The London meat markets were also frequently furnished with much older cattle, in the form of old draught oxen aged over six years (Trow-Smith,1959:166). Large numbers of veal calves were also being slaughtered in the City of London at this time (McGrath,1948; Trow-Smith,1959:22) but these animals would have had horns that were very little developed and, in consequence, they would not be expected to be represented in the material from Cutlers Gardens, where pieces of calves' skulls with their small horn buds would have been of no use in the construction of the lining to the industrial pits on the site.

Legends to photographic plates

Plate I: Late 17th/early 18th century cattle from Cutlers Gardens, City of London. Cores of a bull (top), cow (middle) and an ox (bottom). Lengths of outer curve: 409, 517 and 589 mm respectively.

Photo: Trevor Hurst

Plate II: Core of a late 17th/early 18th century longhorn ox. Length of outer curve: 473 mm. Cutlers Gardens, City of London.

Photo: Trevor Hurst

Plate III: Core of an early 18th century longhorn bull. Length of puter curve: 490 mm. New Guys House, Southwark.

Photo: Trevor Hurst

Plate IV: Core of a 17th/early 18th century longhorn bull. Length of outer curve: 475 mm. Upsdell Avenue, London Borough of Enfield.

Photo: Trevor Hurst

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APPENDIX: EXPLANATION OF THE TERMS 'unimproved longhorn' and 'Longhorn'

1) 'unimproved longhorn' refers to the unimproved form of the modern Longhorn breed, the term being used to identify the small, mainly black cattle that were locally abundant in the northern and western districts of Britain throughout the 17th and early 18th centuries. By the second half of the 17th century, the distribution of the unimproved longhorn had been considerably extended with their introduction into the midland plain and the counties of Hetfordshire, Middlesex and Essex (Housman,1915; Trow-Smith,1959; Kerridge,196 Armitage,1978). The unimproved longhorn was a dual-purpose animal and could be kept either as a milch beast or as a meat producer. In addition, they made powerful draught animals although their extra long horns were often a nuisance and caused injuries.

2) 'Longhorn' is the title of a recognised and distinct breed of beef cattle, and refers to the improved stock of longhorns established in the midland counties in the late 18th and early 19th centuries. Relic herds of these cattle survive up to the present day but in very reduced numbers. The improved Longhorn cattle of the late 18th and early 19th centuries were extremely variable in colour being either black, red, pied, or brindled. Whatever the colour of the coat, almost all of them exhibited a white stripe along the back, referred to as a 'finch back'.