

The Single Grave (Corded Ware) Economy at Kalvø

by PETER ROWLEY-CONWY

INTRODUCTION

The Single Grave settlement of Kalvø (for preliminary reports see S.H. Andersen 1982, 1983) lies on a small rise at the edge of Norsminde Fiord, eastern Jutland. At the time of occupation the small rise was an island measuring some 200 × 100 m, about 500 m from the shore. The site belongs to the Ground Grave period of the Single Grave culture, and has been radiocarbon dated to about 1900 bc (C14-years) (S.H. Andersen op. cit.).

The purpose of this article is to describe the economy of the Single Grave settlement. The Single Grave culture is the local facies of the Corded Ware, and settlements of this culture are rare throughout northwestern Europe. Economic reports are even rarer: no faunal reports have been published from Denmark, and very little is known of the Corded Ware economy from anywhere in northwestern Europe. Although there is only a small sample of animal bones and plant remains from Kalvø, these are therefore of great interest in providing information about a period concerning which little is known.

THE ANIMAL BONES

The identified animal bones are listed in table 1. Goats are very rare throughout the prehistory of Denmark, and it is assumed that only sheep are represented. Systematic sieving was not carried out, so fish, birds and smaller mammal bones will be underrepresented. Preservation was good.

Wild or Domestic?

All the cattle and all but one of the pigs listed in table 1 are regarded as domestic. This conclusion was arrived at by comparing the Kalvø cattle with the measure-

ments of wild cattle (all periods) and domestic cattle (pollen zone VIII) given by Degerbøl and Fredskild (1970), and with those from Fannerup (Middle Neolithic II, Funnel Beaker culture) definitely regarded as domestic (Rowley-Conwy in press). The pigs were compared with those from Middle Neolithic (Funnel Beaker) Bundsø (Degerbøl 1939) and Fannerup. The Kalvø bones are discussed individually.

A. The Cattle

1. *Lower third molar.* Two Kalvø specimens could be measured for length.

		Length (mm)
Kalvø 1		38
Kalvø 2		40
<i>Bos primigenius</i>	males	42.5–52.2 (24)
<i>Bos primigenius</i>	females	44.3–52.2 (11)
Domestic cattle	males	37.5–41.5 (6)
Domestic cattle	females	35.0–39.5 (3)
Fannerup (domestic)		35–40 (9)

Both Kalvø specimens are clearly in the domestic range.

2. *Scapula.* One Kalvø specimen could be measured.

	Glenoid, length	Glenoid, width
Kalvø	57	46
<i>Bos primigenius</i> males	76–91 (22)	64–77 (20)
<i>Bos primigenius</i> females	66–75 (12)	58–62 (11)
Domestic cattle	50–65 (20)	40–55 (7)
Fannerup (domestic)	52–58 (2)	43–48 (3)

The Kalvø specimen falls clearly in the domestic range.

3. *Distal Humerus.* Three Kalvø specimens could be measured.

	distal articulation width	trochlea maximum thickness
Kalvø 1	71	41
Kalvø 2	—	39
Kalvø 3	—	42
<i>Bos primigenius</i> males	95–108 (23)	—
<i>Bos primigenius</i> females	81–98 (5)	—
Domestic cattle	75–90 (6)	—
Fannerup (domestic)	74–76 (2)	—

The complete Kalvø specimen falls clearly in the domestic range. The two incomplete but very similar specimens are thus probably also from domestic animals.

4. *Proximal Radius*. One example from Kalvø could be measured.

	maximum width	articular width
Kalvø	78	73
<i>Bos primigenius</i> males	107–122 (23)	96–110 (22)
<i>Bos primigenius</i> females	91–110 (7)	83–98 (7)
Domestic cattle	71–93 (9)	74–80 (3)
Fannerup (domestic)	71–79 (3)	66–71 (3)

The Kalvø specimen falls clearly into the domestic range.

5. *Magnum (carpale 2 and 3)*. Four of these bones could be measured, and are compared with measurements of wild and domestic animals taken by the author from the Sværdborg and Troldebjerg collections respectively (figure 1a and 1b). All the Kalvø specimens fall in the Troldebjerg range.

	measurement 1	measurement 2
Kalvø 1	50	21.5
Kalvø 2	47	22
Kalvø 3	42.5	19
Kalvø 4	41	19

6. *Distal Metacarpal*. Three examples from Kalvø could be measured.

	articulation width	medial condyle thickness
Kalvø 1	59	31
Kalvø 2	73	36.5
Kalvø 3	75	38

These measurements are plotted in figure 2, being compared to Degerbøl and Fredskild's (1970) measurements. The wild females and domestic males overlap in

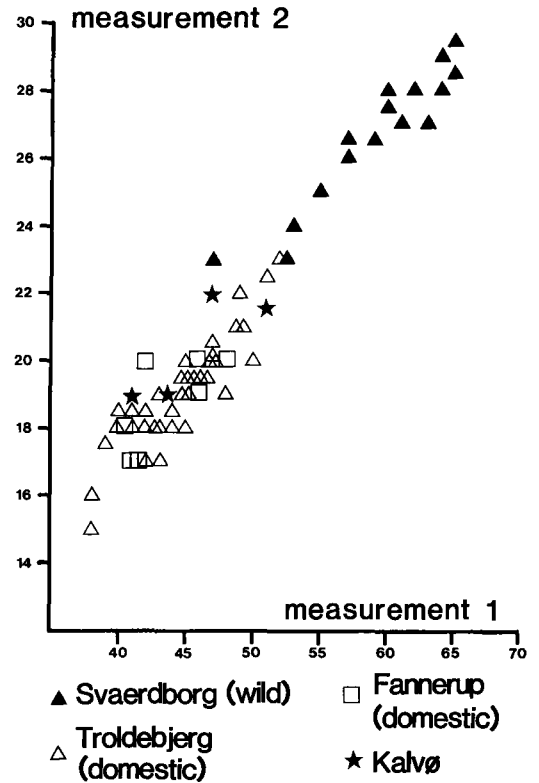


Fig. 1a. Magnum (Carpale 2 and 3) dimensions.

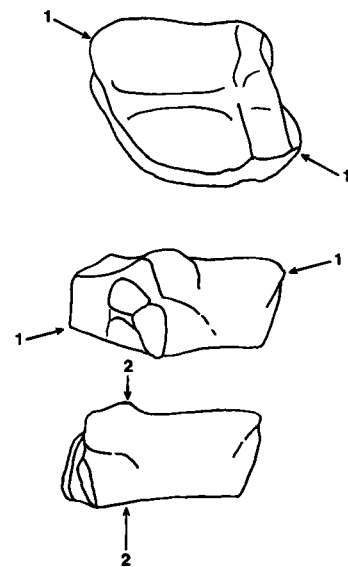


Fig. 1b. Magnum bone showing measuring points.

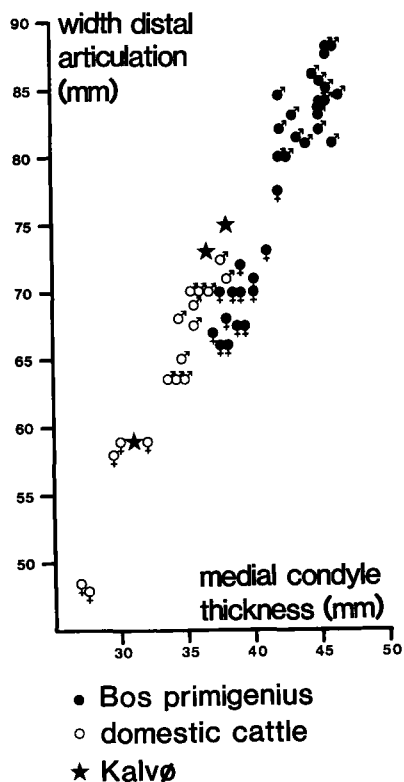


Fig. 2. Distal metacarpal dimensions. Wild and domestic cattle (and sexes) from Degerbøl and Fredskild 1970.

size for each dimension, but when plotted together do show a degree of separation (cf. Degerbøl op. cit. p. 104). The largest Kalvø specimen seems more likely to form an extension of the domestic range than a wild female outlier, and the other two fall in the domestic range. The Kalvø specimens apparently consist of 2 males and 1 female.

7. *Astragalus*. Four bones from Kalvø could be measured.

	length	distal width
Kalvø 1	67	41
Kalvø 2	68	41
Kalvø 3	70	45
Kalvø 4	76	48

These are plotted in figure 3. Three of the Kalvø specimens fall into the domestic range, while the fourth is on the overlap between wild and domestic.

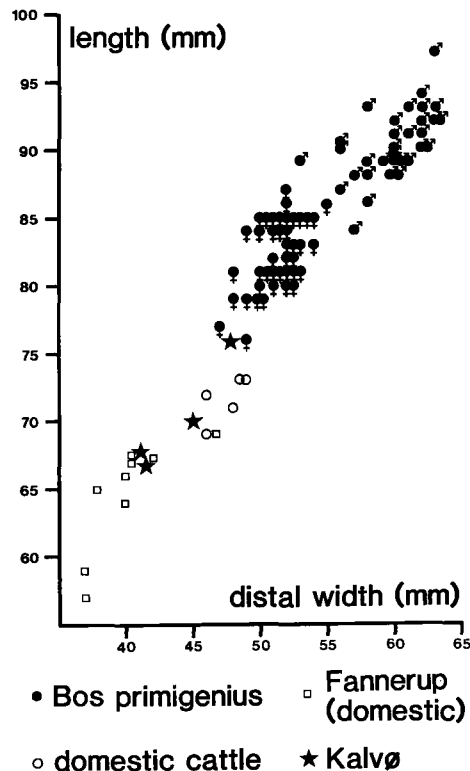


Fig. 3. Astragalus dimensions. Wild and domestic cattle (and sexes) from Degerbøl and Fredskild 1970.

8. *Naviculo-cuboid*. Two Kalvø specimens could be measured.

	maximum width
Kalvø 1	55
Kalvø 2	63
<i>Bos primigenius</i> males	74–82 (18)
<i>Bos primigenius</i> females	63–72 (21)
Domestic cattle	57–62 (7)
Fannerup (domestic)	49–57 (5)

One Kalvø specimen is clearly in the domestic range, while the other falls close to the overlap between wild and domestic. Two other examples from Fannerup could also be measured (63 and 64 mm); although these could not definitely be called domestic (they are as big as the smallest wild females), they form a logical continuation of the domestic range and seem unlikely to be wild. This argument also holds for the Kalvø specimen, which may well be domestic.

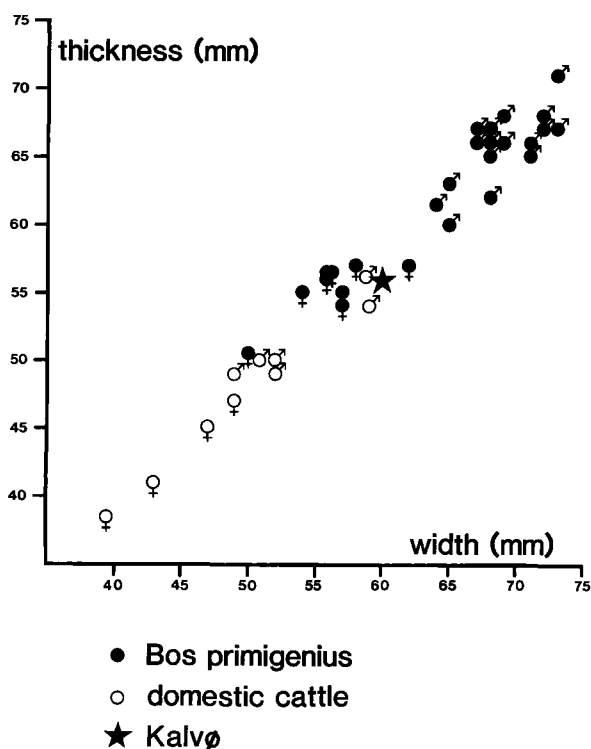


Fig. 4. Proximal metatarsal dimensions. Wild and domestic cattle (and sexes) from Degerbøl and Fredskild 1970.

9. *Proximal Metatarsal*. One Kalvø specimen was measurable.

	maximum width	maximum thickness
Kalvø	60	56

This bone is plotted in figure 4. When judged on size, the Kalvø specimen could clearly either be a wild female or a domestic male.

10. *Distal Metatarsal*. Three Kalvø specimens could be measured.

	articulation width	medial condyle thickness
Kalvø 1	59	33.5
Kalvø 2	54	32
Kalvø 3	47	28

These are plotted on figure 5, all falling clearly into the domestic range. When compared to the domestic speci-

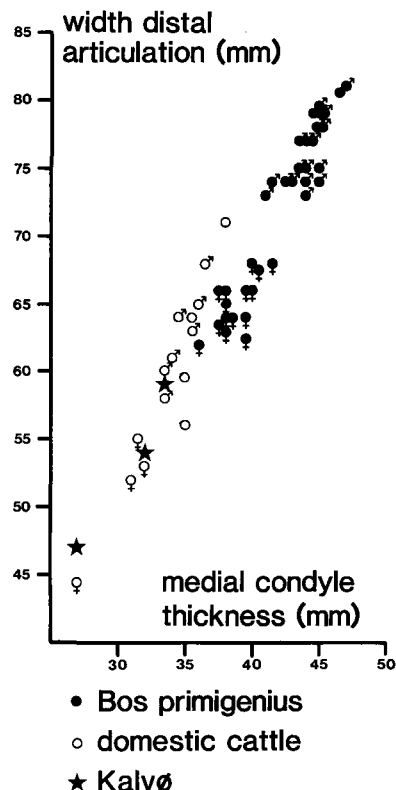


Fig. 5. Distal metatarsal dimensions. Wild and domestic cattle (and sexes, where indicated) from Degerbøl and Fredskild 1970.

mens of known sex listed by Degerbøl, the Kalvø bones appear to represent one male and two females.

The Kalvø cattle bones described above divide up as follows:

	domestic	wild/domestic overlap	wild
lower M3	2	—	—
scapula	1	—	—
distal humerus	3	—	—
proximal radius	1	—	—
magnum	4	—	—
distal metacarpal	3	—	—
astragalus	3	1	—
naviculo-cuboid	1	1	—
proximal metatarsal	—	1	—
distal metatarsal	3	—	—
Total	21	3	—

The presence of aurochs bones at Kalvø cannot therefore be excluded. A few are known from coastal settle-

ments of the Funnel Beaker culture, although domestic animals usually predominate. The 3 uncertain bones from Kalvø are tentatively referred to domestic cattle, however, on the grounds that the presence of 21 bones of domestic animals and the absence of demonstrably wild specimens makes this much the most likely. This is a similar line of argument to that used by Degerbøl regarding the *Bos* bones from the Ertebølle shell middens: the absence of any definite domestic animals on those sites, and the presence of numerous demonstrably wild ones, led to the conclusion that the doubtful animals were wild females, not domestic males (Degerbøl and Fredskild op. cit., p. 26).

B. The Pigs

Only six pig bones could be measured.

1. Distal Humerus.

	width articulation
Kalvø 1	28
Kalvø 2	42
Bundsø (domestic)	26–34 (10)
Fannerup (domestic)	26–31 (7)

The smaller Kalvø bone is clearly in the domestic range, while the larger is so large it must be wild. It compares well with bones of wild pigs from Ertebølle settlements.

2. Upper Third Molar.

	Length	Breadth
Kalvø 1	29	18
Kalvø 2	33	19
Bundsø (domestic)	29–35.5 (8)	17.5–21 (8)
Fannerup (domestic)	31–35 (6)	18–21 (7)
Bundsø (wild)	41	21
Fannerup (wild)	43	23

Both Kalvø specimens are clearly in the domestic range.

3. Lower Third Molar.

	Length	Breadth
Kalvø 1	36	16
Kalvø 2	40	17
Bundsø (domestic)	30–40.5 (12)	14.2–17.3 (12)
Fannerup (domestic)	30–39 (8)	16–19 (8)
Bundsø (wild)	41.5–47 (3)	17–20.8 (3)
Fannerup (wild)	43	19

Both Kalvø specimens are clearly in the domestic range.

Of the six measurable pig bones, therefore, five are from domestic animals, one from a wild animal. None of the other bones seemed on visual inspection large enough to have come from a wild animal.

Age at Death

A. The Cattle

Only two ageable cattle jaw fragments were recovered. One contained P2, P3, deciduous m3, M1, M2 and M3. The third cusp of M3 was not yet in wear, and P4 was visible beneath m3. This jaw falls into Higham's (1967) stage 17, aged at just under three years. The other fragment contained P3, P4 and M1. P4 was in an early stage of eruption. This jaw is only a little older than the first, falling into Higham's stage 18, aged around three years.

23 loose teeth were compared with the corresponding teeth in the first jaw fragment. Wear was estimated as follows:

worn less than corresponding tooth in complete jaw:	3
worn about the same as in complete jaw:	10
worn more than in complete jaw:	10

There are problems with this technique, because the degree of wear can be variable, and it is also difficult to distinguish between M1 and M2. It would seem, however, that few animals were killed much below about 2½–3 years.

Bone fusion is even more problematic. The age at which epiphyses fuse onto shafts is variable, and the ageing technique currently under discussion. No more than the most provisional conclusions can therefore be drawn. Table 2 lists the cattle bones against the conventional fusion ages given by Silver (1969). The early fusing bones are all fused; only when conventional fusion ages reach 2½–3 years are unfused bones found. Some of the unfused bones might of course have come from animals much younger than this; consistent absence of unfused bones with younger fusion ages suggests, however, that few animals were killed much under 2½–3 years.

B. The Pigs

One jaw fragment contained a worn M1 and deciduous m3, aged by Higham's (1967) scheme to about 7–12 months. A second fragment contained M2 and M3, the latter unworn, giving an age of about 17–21 months. 4 loose M3s were found, one with only the first cusp in

wear (age about 21 – 25 months), while three had all cusps worn (age over about 27 months). Three of the six ageable fragments thus come from animals aged less than about 2 years.

Bone fusion is listed in table 2 b.

C. The Sheep

Two ageable jaw fragments were found, one from a dentally mature animal (older than about 26 months on Higham's (1967) scheme), the other containing a worn M1, and deciduous m3 about to be replaced. Deciduous m3 is usually replaced at around 21 – 24 months.

Bone fusion is listed in table 2c. Unfused bones become more frequent when conventional fusion ages are around 2 – 2½ years, suggesting increased killing at this age.

THE PLANT REMAINS

260 litres of soil from the Single Grave level were put through a froth flotation system (Jarman, Legge and Charles 1972). This produced about 1 litre of charcoal. The most important result was the complete absence of cereal grains or chaff. Evidence of cereal agriculture might have been present elsewhere on the site, but if cereals were common at Kalvø it would be surprising for no evidence at all to be found.

Many seeds of other plants were found (cf Andersen 1982, 1983). Most of these were not charred, however, and so may well be intrusive into the Single Grave level. There are many ways in which such intrusions can occur, and this can lead to problems if due caution is not exercised. The best example of this is the case of cereals and other plant remains from Wadi Kubbania, near Aswan. These were found in a level dated to about 16,000 bc, but it has since been established that they are not charred (Hillman et al 1983) and are of recent origin (Gillespie et al 1984). The charred seeds from Kalvø consist of 8 *Chenopodium album*, 3 *Polygonum aviculare*, and 3 *Rumex acetosella*.

DISCUSSION

The information put forward above allows some suggestions to be made concerning the Single Grave economy at Kalvø.

ANIMAL	NUMBER OF FRAGMENTS
Cow, <i>Bos taurus domesticus</i>	120
Domestic pig, <i>Sus scrofa domesticus</i>	49
Wild pig, <i>Sus scrofa ferus</i>	1
Sheep, <i>Ovis aries</i> , or goat, <i>Capra hircus</i>	23
Red deer, <i>Cervus elaphus</i>	27 (+ 14 antler fragments)
Grey seal, <i>Halichoerus grypus</i>	2
Seal sp., Phocidae indet	8
Otter, <i>Lutra lutra</i>	2
Badger, <i>Meles meles</i>	1
Swan, <i>Cygnus</i> sp.	10
Duck, Anatinae	3
Red-throated Diver, <i>Gavia stellata</i>	3
Herring gull, <i>Larus argentatus</i>	4
Great Crested Grebe, <i>Podiceps cristatus</i>	1
Cod, <i>Gadus morhua</i>	56

Table 1. Animal bones from Kalvø. Changes in the cultural attributions of certain layers may mean minor changes in the numbers listed.

BONE	Conventional fusion age (months)	Fused	Unfused diaphysis	Unfused epiphysis
A. Cattle				
Radius, proximal	12–18	2	–	–
Humerus, distal	12–18	6	–	–
1st and 2nd phalanges, proximal	18	2	–	–
Metacarpal, distal	24–30	3	–	–
Tibia, distal	24–30	1	–	–
Metatarsal, distal	27–36	4	–	1
Femur, proximal	42	–	–	3
Femur, distal	42–48	2	1	1
Tibia, proximal	42–48	1	–	–
B. Pigs				
Humerus, distal	12	3 (+ 1 wild)	1	–
Radius, proximal	12	3	–	–
1st phalanx, proximal	24	–	1	1
Calcaneum	24–30	1	–	–
Femur, distal	42	1	–	1
C. Sheep				
Humerus, distal	10	3	1	–
1st phalanx, proximal	13–16	1	–	–
Tibia, distal	18–24	1	–	–
Calcaneum	24–30	1	2	–
Tibia, proximal	36–42	–	2	1
Femur, distal	36–42	–	1	–

Table 2. Bone fusion data from Kalvø. Fusion ages are from Silver (1969), and are only approximate estimates (see text).

So far as can be seen from the small sample, the cattle bones do not support the notion of a dairy economy.

Such an economy involves the high killing of very young male calves, and the maintenance of adult females and one or two breeding males (cf Legge 1981a, 1981b). No evidence of a high kill of very young animals was found at Kalvø. The fact that some animals were killed at around 2½–3 years of age hints that meat production may have been a major aim of the Single Grave herds-men. If so, then this is similar to the Middle Neolithic Funnel Beaker Sites of Troldebjerg (Higham and Message 1969), Bundsø (Higham 1969) and perhaps Fannerup and Sarup (Rowley-Conwy in press). In a dairy economy the majority of adult animals are females. Among the sexually dimorphic distal metapodials (figures 2 and 5), the Kalvø bones appear to contain a total of three males and three females. This even sex ratio among the adults also implies that a larger sample might show the cattle economy at this site to be based on meat rather than milk.

The little evidence available for sheep and pig also suggests meat as a major goal, as in the Funnel Beaker period (cf Higham 1969).

The apparent absence of cereals does not necessarily support the old view that Corded Ware groups were predominantly pastoralist. Economic remains cannot be viewed in typological terms. Pottery from a site may or may not (for various reasons) contain a wide array of current cultural traits, regardless of the type of the site. Economic remains on the other hand provide information about food consumption *at the particular site in question*; they cannot be assumed to reflect the economy of the culture as a whole.

If the absence of cereals in the flotation samples reflects a real absence of cereals at the site, then this absence provides evidence about Kalvø, not about the entire Single Grave economy. The absence of cereals at Kalvø is not at all surprising. The island on which the site lay was small (200 × 100 m), and had no source of water. It is therefore most unlikely that Kalvø was permanently occupied. It seems most likely that Kalvø was a temporary grazing station, the domestic animals being tended by perhaps only a very few people – and occupied maybe only for very brief periods. Such sites are documented in the recent ethnographic literature from for example Ireland (Severin 1978, 22) and Orkney and Shetland (Fenton 1978, 423) and are discussed in the archaeological literature (Bradley 1978, 58–9). Cereal cultivation at settlements on such briefly inhabited islets would be very unlikely.

Kalvø cannot therefore be used to argue for a decrease in agriculture and an increase in pastoralism and hunting in the Single Grave period. Similar economic activities were carried out at coastal sites of the Funnel Beaker culture, for example Fannerup (Rowley-Conwy in press), without the Funnel Beaker being regarded as a pastoralist culture. Much more must be learnt about the economies of inland Single Grave sites before conclusions can be at all definite; but for the time being Kalvø cannot be used to support the notion of an economic break between the Funnel Beaker and Single Grave cultures. Those aspects of the site discussed here were determined by the location, not the cultural affiliations, of the site.

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