

# OSTEOLOGICAL ANALYSIS OF ANIMALS BURIED IN HOSTIVICE (PRAGUE-WEST DISTRICT) FUNNEL BEAKER CULTURE (TRB) AND A COMPARISON OF ANIMAL REMAINS FROM HOSTIVICE WITH OTHER CONTEMPORARY FINDS FROM THE CZECH REPUBLIC AND CENTRAL EUROPE

OSTEOLOGICKÁ ANALÝZA ZVÍŘAT POHŘBENÝCH V HOSTIVICI (OKR. PRAHA-ZÁPAD)  
KULTURA NÁLEVKOVITÝCH POHÁRŮ  
A SROVNÁNÍ ZVÍŘECÍCH NÁLEZŮ Z HOSTIVICE S DALŠÍMI SOUVĚKÝMI NÁLEZY Z ČR A STŘEDNÍ EVROPY

**René Kyselý**

(Předloženo redakci 27. 6. 2001)

*In Hostivice-Litovice (district Prague-west, Czech Republic) a large quantity of features from the Funnel beaker period was uncovered in 1997/98. Of these, nine contained animal bone, which is archeozoologically described and analysed in the submitted article. (A smaller quantity of finds from the same period comes from the excavations from 1972 and 1977.) Most finds were found in pits 3, 5 and 6. Pits 3 and 5 contained animal burials. In pit 3 a whole domestic cattle individual was found. It was a female of between 5-7 years old with a withers height of 114-123 cm. Its head had been separated. Three articulated parts of skeletons of domestic cattle come from pit 5. The most massive - a male - was between 5-7 years old, its limbs and horns had been separated. The left horncore of another individual was placed in place of the right horncore. There is a round hole in the forehead bone, probably evidence slaughtering. In the case of the second individual there were again no limbs, except for part of the right back one. It is 2.5-3.5 years old of a height of 113 cm. This individual was exceptional for its time, because its horns were loose or hanging. A similar find has not been made up till now in the Central European area. The reason for this pathological condition could be recessive inheritance or deliberate break. These horns were cut off at the point of the connecting cartilages. A third individual is again limbless and 5-7 years old. The remains of a dog, whose teeth were burnt, were also present in pit 5. In pit 6, amongst other things, the skeletons of at least four puppies of up to five months old, which came from the litters of at least three females were found. The finds of the other types documented in Hostivice (pig, sheep/goat, horse, red deer, wild boar, deer, fox, hedgehog and catfish) make up an admixture and do not have any ritual character. Four massive horncores, some of which possibly belong to aurochs, come from the 1972 excavations.*

*The buried animals accompanied ritual practices (separating of the head; the limbs, the lower jaw, horns; charring). They represent sacrifices and could be connected with a cultic role of cattle. The finds were compared with many other cattle burials, which have been discovered in great quantities throughout the entire eneolithic over a wide Central European area and represent a phenomenon of this period. The burial rites of these animals are not uniform, even if some phenomena are regularly repeated. The Hostovice burials were compared from the point of view of representation of species, number of individuals, age and sex of the individuals, breeds and metrical evaluation. In addition the finds were compared with all non-ritual finds from the Funnel beaker period from the Czech Republic and thus a picture of breeding and hunting in this period was outlined. In the area of the present-day Czech Republic domestic types predominate over hunted ones. For the most part cattle thoroughly dominate.*

**Key words:** archaeozoology, cattle and dog burials, ritual practices, eneolithic, Czech Republic (Europe), loose horns

**Klíčová slova:** archeozoologie, pohřby skotu a psů, rituální praktiky, eneolit, Česká republika (Evropa), pohyblivé rohy

## 1. INTRODUCTION

Information about the everyday life and diet of prehistoric people is provided to us by, among other things, animal bones found in the cultural layers of settlements, waste pits, ditches, huts and other features. We mostly come across bones in a very fragmentary form here, mainly representing slaughter, kitchen and handicraft waste. Moreover these fragments often succumb to different taphonomic processes (erosion, washing away, gnawing by dogs, burning and so on) and so only in

exceptional cases do we find unbroken skeletons or parts of them. In the case of buried animals the situation is different. To begin with the archeozoologist has the certainty that the bones he has found belong to one individual. The metrical evaluation of these skeletons can then serve as comparative reference data for the assessment of isolated bones or fragments. For the archaeologists animal burials are interesting too as they indicate a lot about the relationship between man and animal and about the spiritual world of people, because they can have a cultic and symbolic character. It is necessary to be aware of the fact, that precisely animal graves do not necessarily contain individuals that were average or typical for the population of the period in question and also that the presence of animal species does not have to correlate with their representation in a breeding herd or in the diet of the human population.

In the course of the rescue excavations in Hostivice-Litovice, which were directed by Dr. I. Pleinerová in 1997 and 1998, a larger collection of animal bone material was obtained. The author of the article did not take part in the field excavations personally. Apart from bone finds of my own I also used an article from the Hostivice anthology (Pleinerová 1999), drawings of the finds situation and photos borrowed from Dr. I. Pleinerová as a source of information.

The site of Hostivice has been dealt with, from the archaeological point of view, and preliminarily published in the Hostivice (Pleinerová 1999) anthology and in detail in the preceding contribution (Pleinerová 2002). The author classified the finds into the period of the Funnel Beaker culture on the basis of the ceramic material.

## 2. OUTLINE OF THE ANIMAL MATERIAL FROM HOSTIVICE AND CHARACTERIZATION OF THE SKELETONS

### Methodology

No sieving techniques were used during the excavation, therefore it is possible, that some smaller bones and fragments were missed. Measurements were taken using the *Driesch* methodology (1976), other dimensions were also measured in exceptional cases (see explanatory notes in *tab 9*). The age of the animals was fixed according to the data provided by *Silver* (1969) and *Červený et al.* (1999). The gender was fixed according to the

Hostivice 1997/98 representation of animal species	Funnel beakers										Hallstatt
	pit 3	pit 4	pit 5*	pit 6	pit 7	pit 8	pit 11	pit 14	pit 15	Total	pit 10
frag./MNI										frag.	
<i>Bos primigenius</i> f. <i>taurus</i>	239/3	8/1	704/5	19/2	1/1	1/1		1/1	1/1	836	1/1
<i>Equus</i> sp.											1/1
<i>Sus scrofa</i> f. <i>domestica</i>		7/3	1/1	9/2						17	2/1
<i>Ovis/Capra</i>				1/1						1	
<i>Canis lupus</i> f. <i>familiaris</i>		1/1	9/1	31/4						41	
<i>Cervus elaphus</i>		2/2		1/1					1/1	4	
<i>Capreolus capreolus</i>		1/1								1	
<i>Erinaceus</i> sp.			1/1							1	
<i>Silurus glanis</i>				1/1						1	
unidentified	24/1	34	451	40			1/1		14/1	557	11
IN ALL	263/4	53/8	1166/8	102/11	1/1	1/1	1/1	1/1	17/3	1605	15/3

\* = the large amount of fragments is the result of the considerable fragmentariness of the cattle bones (mainly of the skulls and ribs)  
frag. = number of fragments, MNI = minimum number of individuals

Tab. 1. Number of fragments and minimum number of individuals in the individual pits in Hostivice (1997/98) — Tab. 1. Počet fragmentů a minimální počet jedinců v jednotlivých jamách v Hostivicích (1997/98).



Plate 1. Pit 3 - cattle 1: A - maxilla with praemolars, B - atlas, C - mandibula with teeth — Foto 1. Jáma 3 - skot 1: A - maxilla s praemolary, B - atlas, C - mandibula se zuby.

relative thickness of the metapodiums (using the chart by Novotný from 1966 and according to the data provided by Bökönyi - Kubasiewicz 1961), based on the total size and the character of the horncores.

The animal bones entirely originate from 9 pits: 3, 4, 5, 6, 7, 8, 14, 15. The majority of the material originates from pits 3 and 5, where, amongst other things, burials of animal skeletons or parts of them were found. The individual skeletons (or their parts) were not removed as a whole during the removal of the material from pit 5 and the laboratorial processing of the material did not make it possible to decide reliably on the affiliation of some bones to the individual skeletons. The total number of bones of different kinds and the minimum numbers of individuals in the features is given in *tab. 1*. The colour of the bones and fragments is sand coloured in almost all cases and in all the pits and the bones are relatively fragile. They are fragmented, in some cases considerably (for example skulls, ribs), due to their long stay in the ground and the pressure of the covering layers.

A total overview of the animal material from the site is provided in the specialist osteological report in the Archive of Find Reports at the Archaeological institute in Prague.

### Pit 3

The most important find from pit 3 is a largely preserved articulated cattle skeleton (**cattle individual no.1** - see *plate 1, 2, and 3*), which makes up the major part of the osteological material from this pit. The tarsus and phalanges from the long and wrist bones of the left limbs predominate, (because the body of the animal was placed into the pit onto the right side and the majority of the right limbs were not removed for technical reasons).

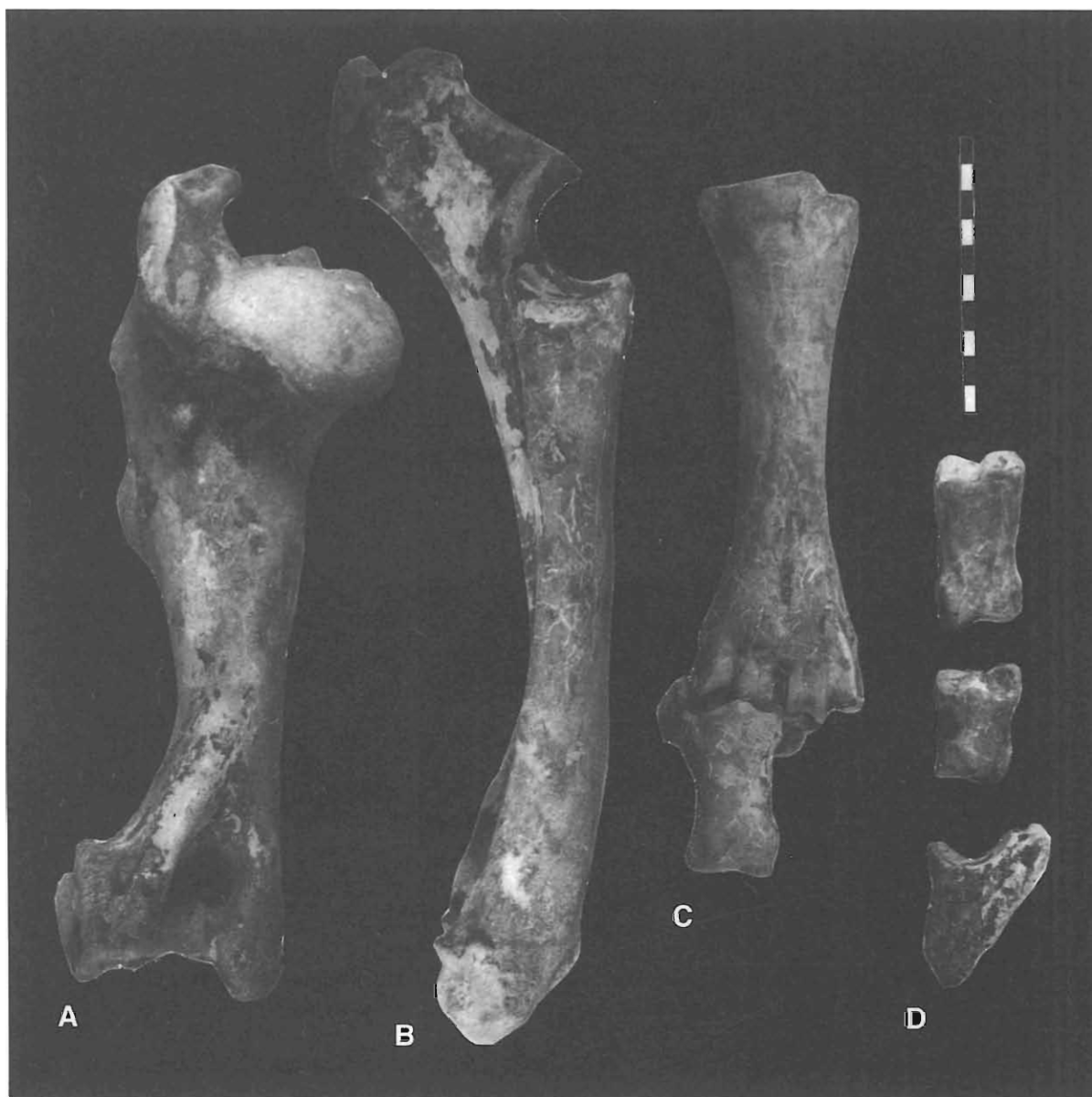


Plate 2. Pit 3 - cattle 1 - front limb: A - humerus, B - radius+ulna, C - metacarpus+phalanx, D - phalanx I, II, III — Foto 2. Jáma 3 - skot 1 - přední končetina: A - humerus, B - radius+ulna, C - metacarpus+phalanx, D - phalanx I, II, III.

Only the metacarpus and the phalanges connected to it (together they form the distal part of the front limb), the pelvis, some ribs, the lower jaw with all the molar teeth, a fragment of the upper jaw with some teeth (P3, P4, M1), the praemaxilla, some skull fragments and three incisor teeth were found from the right side of the body. All the anatomic parts, including the hyoid bone, the carpal, tarsal bones and the phalanges, in addition the lower jaw with all the molar teeth, a fragment of the upper jaw with some teeth (P<sup>3</sup>, P<sup>4</sup>, M<sup>1</sup>) and some skull fragments were found from the left side of the body. The atlas, the axis, another 3 cervical vertebrae, 10 thoracal vertebrae, 2 lumbal vertebrae, 2 caudal vertebrae and the entire sacrum from the spine are present in the excavated material, therefore only some presacral vertebrae and most of the caudal vertebrae are missing. The ribs are preserved in fragmented form, from the left and the right, the dorsal and the abdominal, the front and the back part of the thorax. The thorax as a whole is completed by the entire sternum and most of the rib cartilages. The fragments of the left and right upper jaws with some teeth and the fragments of the frontal bones together amount to about 1/4 of the facial bones of the calva, which cannot be glued together. Neither the back part of the calva (including the nape bones connected to the atlas) nor horncores were found.

According to the field drawings (Pleinerová 2002) the bones were situated in the ground in their anatomic position, as they are to be found in the body of the animal, only the calva was missing. It wasn't found in the place, where it would be expected, which is above or beside the very well preserved lower jaws. Fragments of the right upper jaw, premaxilla, the nasal and frontal bones were found in the region of the hind part of the individual's body (see Pleinerová - fig. 4), therefore in a completely unanatomical position. These fragments were assigned to individual 1 on the strength of the identical extent of abrasion of the teeth of the upper and lower jaw.

The fragments of the frontal bone show, that cattle skeleton no.1 had a wavy forehead (concavity between the eye sockets). According to the shape of the metacarpuses (max. length 192 mm, slenderness index:  $B/GL * 100 = 16.3$ ,  $Bp/GL * 100 = 31.7$  see also plate 1) and the morphology of the pelvis it is probably a female, although the index of the readings 16.3 and 31.7 would rather rank this individual among the males or castrates (comp. Bökönyi - Kubasiewicz 1961). All the teeth have come through, therefore this individual must be older than 2,5 years. The degree of abrasion of the molar teeth and incisor teeth, the uniting of all the epiphysis of the long bones and the uniting of the intervertebral discs and of three caudal breastbone joints (*sternebrae*) indicate an older individual of between 5 and 7 years of age (using data according to Komárek 1993; Kolda 1936; Silver 1969). No pathological changes were found on the hind part of the skeleton. Only the absence of the sec-

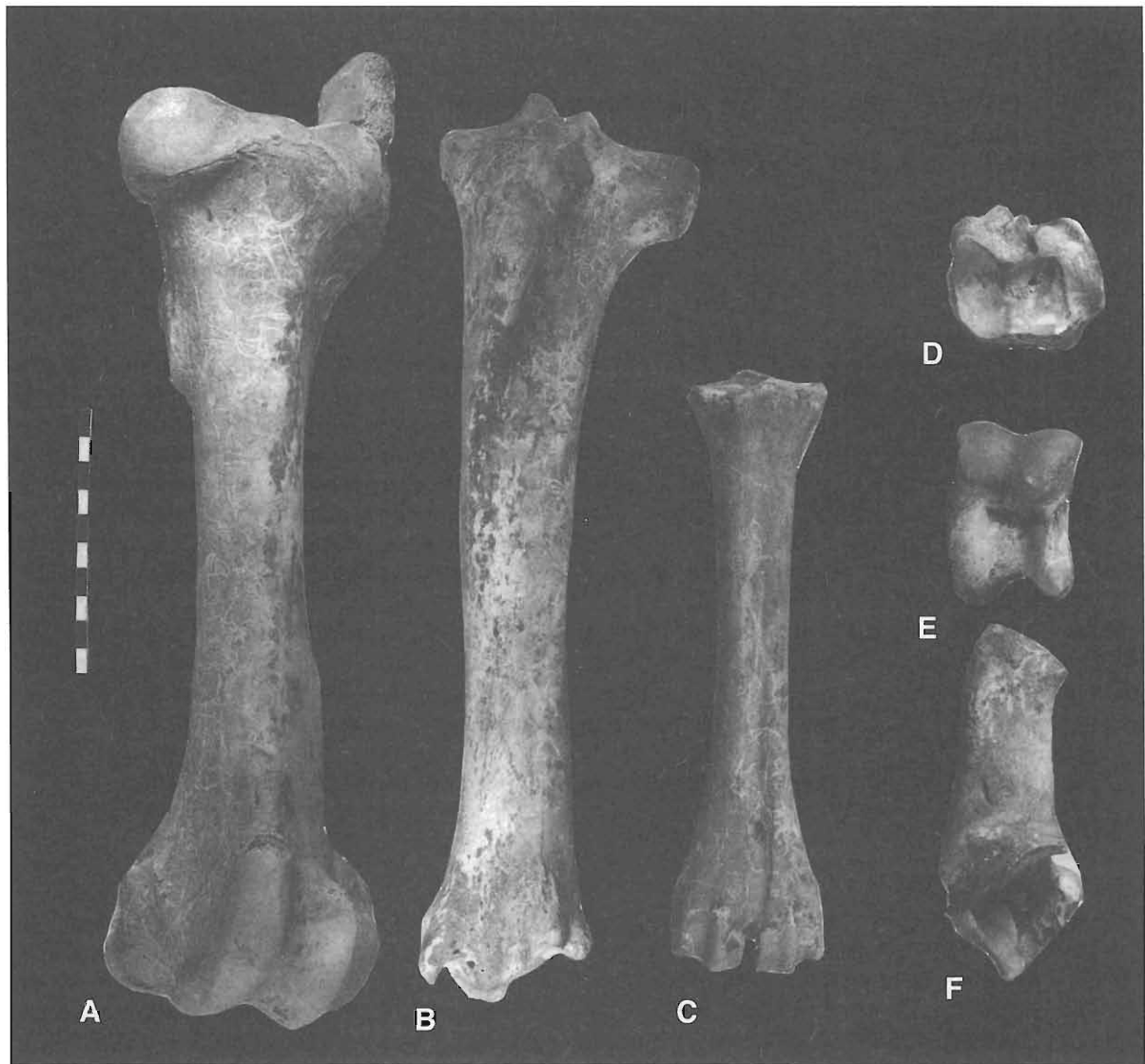


Plate 3. Pit 3 - cattle 1 - hind limb: A - femur, B - tibia, C - metatarsus, D - centroquartale, E - talus, F - calcaneus — Foto 3. Jáma 3 - skot 1 - zadní končetina: A - femur, B - tibia, C - metatarsus, D - centroquartale, E - talus, F - calcaneus.

ond lower praemolar teeth is unusual. This abnormality is quite common in cattle and is probably connected with a shortening of the facial part of the skull and therefore also the jaws. The tendrils for the sinews are well developed, this indicates a muscular, healthy individual, who is not, however, robust (see slenderness indices in *tab. 5*). By using the indices of several authors (according to *Driesch - Boessneck 1974*) the withers height of this individual was calculated to be 114 to 123 cm (average 117.4) according to various bones.

No cutting or chopping marks were found, not even on the skull fragments, where proof of the cutting off the horns could have been expected as the reason for their absence. All the fragments are in a similar state of preservation.

Apart from the described cattle individual there is some evidence for the presence of other individuals in the pit. These individuals are represented by fragments: A) first phalanx with unattached epiphysis - it belonged to a calf than was younger than 2 years, B) distal part of a left humerus - it belonged to an individual that was older than 1.5 years, it has much smaller dimensions than individual no.1, C) a fragment of a left lower jaw where the third molar tooth had come through - age about 2.5 years or more, D) the proximal part of the left humerus - size comparable to individual no.1, age more than 3.5 years, E) left lower praemolar 4 - age 2.5 years or more, F) two scapula fragments - one of them burnt black. From this outline it is obvious, that some finds cannot belong to one individual (e.g. A and C to E), there are **at least another two cattle individuals** apart from individual no.1 present, but there were probably more. The fragments that do not belong to individual no.1 occur sporadically, they do not form coherent skeletons and sometimes they have a different character (e.g. darker colour), one fragment is burnt black. There were no cutting or chopping marks found on these other individuals, either.

Two fragments of long bones belong to **middle sized mammals** (sheep/goat/pig/dog).

The fragments that do not belong to cattle skeleton 1 are mostly small and sporadic.

#### *Pit 4*

There were 59 fragments found in pit 4. There is at least one **cattle** individual: the proximal part of the radius is of relatively small dimensions, three fragments of a lower jaw, teeth, part of a kneecap. The abrasion of the third molar indicates a quite old individual (older than cattle no.1 from pit 3). In addition there are at least three **pigs**: part of the pelvis, fragments of thoracal vertebrae, a second molar, a first upper incisor, the diaphysis of a humerus. One is a bit younger than 1 year, the second has finished changing its teeth and is therefore older than 17 months and the third is older. A **dog** is substantiated by half of a lower fang. Two **red deer** individuals were identified by a first lower milk molar and an abraded upper molar - a young and an adult individual. The distal part of a tibia belongs to a **roe deer**. Its grown-together epiphysis indicates a non-juvenile individual.

Two fragments bear small cut marks, one fragment has probably been gnawed by a beast of prey. The diaphysis of the humerus of one pig bears characteristic gnawing marks (circular scratches formed by "rolling" the diaphysis in the muzzle), which can be caused by a pig. The fragments have the character of waste - they are broken, in various stages of erosion and there are no coherent parts of skeletons.

There was also an artifact found - the polished fragment of a large mammal's rib.

#### *Pit 5*

The bone fragments from pit 5 represent the major part of the entire finds assemblage from Hostivice (about twice the extent of pit 3). Apart from human bones the pit contains (see *Pleinerová 2002* - fig. 6), the bones of some cattle individuals and in addition dog, pig and hedgehog bones. Bearing in mind the fact, that the skeletons were not carefully separated during the field campaigns, it was not possible to subsequently assign a vast part of the material (mostly vertebrae and ribs) to particular individuals. It is, however, certain, that there are coherent parts of at least two, probably three cattle skeletons present in the pit (cattle 1, 2, maybe 3). The large

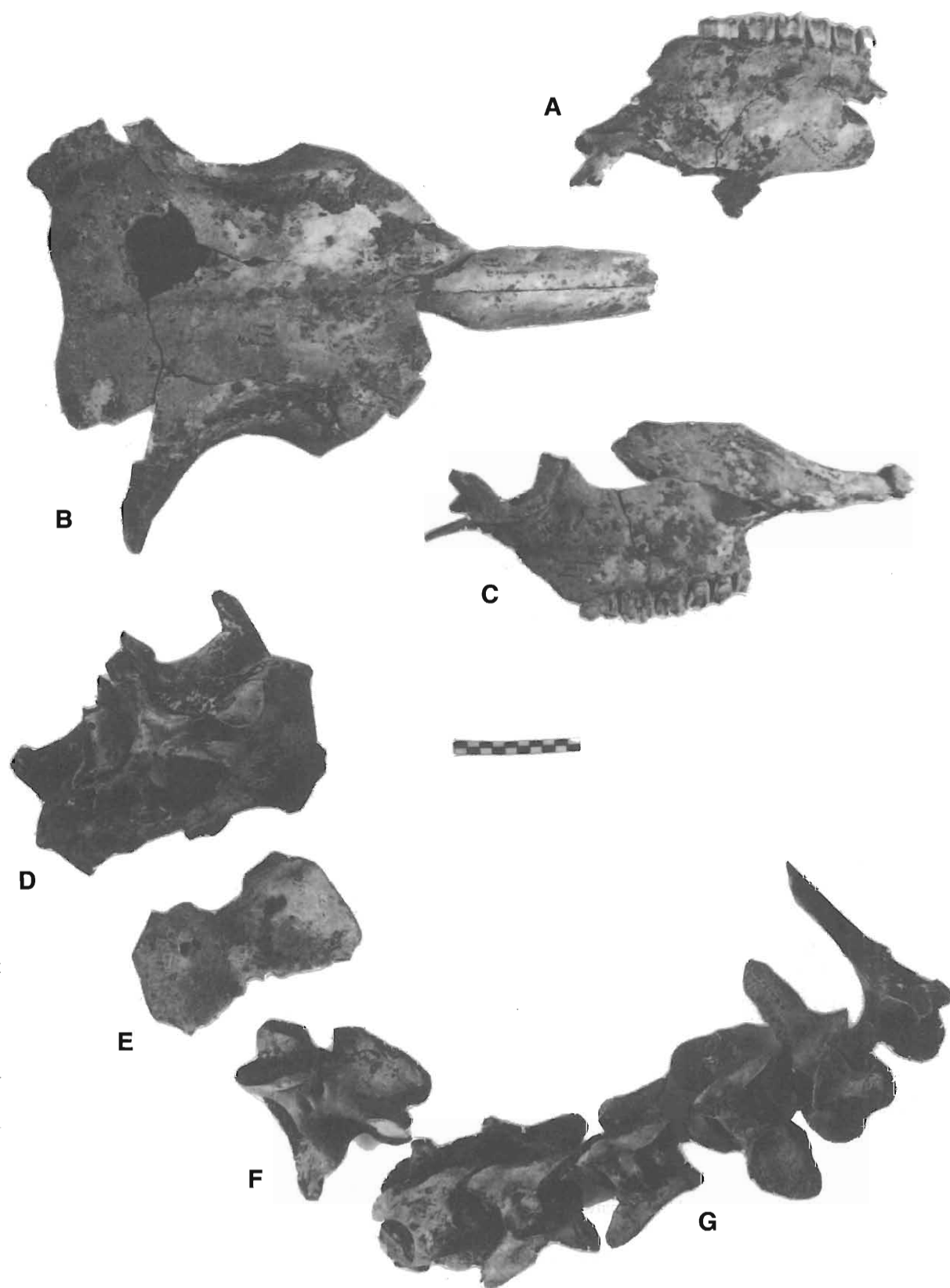
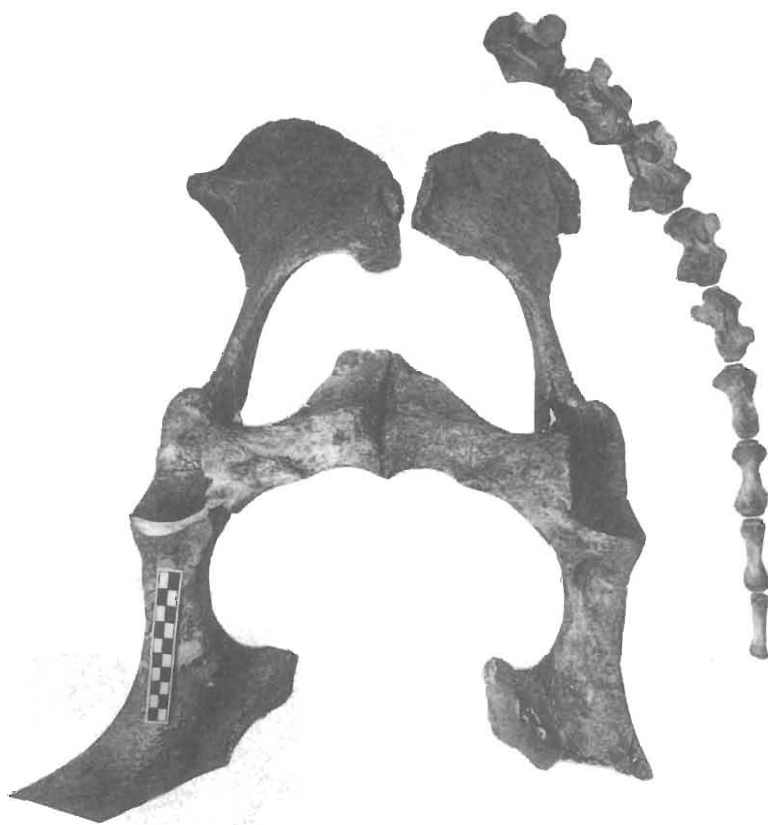


Plate 4. Pit 5 - cattle 1: *A* - maxilla with teeth (sinistra), *B* - skull (norma dorsalis), *C* - maxilla with teeth (dextra), *D* - caudal part of skull, *E* - atlas, *F* - axis, *G* - consecutive cervical vertebrae — Foto 4. Jáma 5 - skot 1: *A* - maxilla s zuby (sinistra), *B* - lebka (norma dorsalis), *C* - maxilla s zuby (dextra), *D* - kaudální část lebky, *E* - atlas, *F* - axis, *G* - následující krční obratle.

amount of fragments (together 1020 - see *tab. 1*) was caused by the considerable brittleness of some bones (most of all there are a large amount of cattle skull and rib fragments).

**Cattle no.1:** Individual 1 (*plate 4* and *5*) is the dominant find in pit 5. An almost complete calva, with all its teeth, belongs to this individual. The calva is about 4/5 preserved (nape bone incl. condyles, frontal bone with parietal bones, temple bones, nasal and jugal bones, upper jaw with all its teeth, premaxillas), some fragments can be glued together into continuous parts (see *plate 4*). The lower jaw and the horncores of individual 1 were not present (only the bases of the horncores are preserved). In addition all the cervical vertebrae (including atlas and axis), the thoracic and lumbar vertebrae, part of the sacrum and most or all of the caudal vertebrae, rib and pelvis fragments belong to individual 1. It seems, that all the vertebrae including the caudal ones have been preserved. It can not be ruled out, that two fragments of the left and right tibia also belong to individual 1. The other limb bones (including the scapulae) were missing.

From the photo and drawing we can tell, that all these bones were deposited in anatomical position in a way that the head pointed roughly upwards with its dorsal side, the body was coiled into an arch, the pelvis pointed upwards with the ventral side (the other way round as the skull) and the caudal vertebrae were preserved lined up like a tail, whose end pointed to the skull. Also the proximal part of the right tibia was probably found in roughly anatomical position. The left horncore of another individual was deposited in the place, where one would expect the right horncore (*plate 9*, see *cattle 5*).



*Plate 5.* Pit 5 - cattle 1 - pelvis and caudal vertebrae — *Foto 5.* Jáma 5 - skot 1 - pánev a ocašní obratle.

Individual 1 is the most massive of all the three individuals from which greater parts of the skeletons were found. The glued parts of the calva indicate a head of large dimensions, which is also testified by the length of the nasal bones (189 mm), the min. width of the neurocranium (203 mm) and the max. diameter of the horncore basis (103 mm). The top side of the skull is only slightly wavy, practically flat, if seen from the side or the front. A concavity between the eye sockets exists, but it is very shallow. The rampart between the horns doesn't project noticeably above the skull profile. The intercornual line is wavy from the dorsal perspective. Significant supraorbital grooves are present. The skull makes an altogether fragile impression. The massiveness of the skull could evoke the question of whether this might not be a female aurochs, but in this case the skull would have reached even greater dimensions, it would be sturdier and the teeth in particular would be



bigger. If it is therefore a domestic cattle individual, taking into account the massiveness of the horns, it was without doubt a male. Its horns, taking the diameter of the preserved base into account, reached considerable dimensions. On the grounds of the condition of the teeth (first molar half worn-down, third molar one third worn-down) we can observe, that it is a fully grown, older individual (probably about 5 to 7 years old). Not even the condition of the intervertebral discs (*discus vertebralis*) contradicts this. The one at the axis, for example, is connate, but the uniting line is significantly noticeable. The sutura sagittalis and coronalis has been obliterated. No pathological anomalies were identified, only the teeth crowns bear an abnormally thick layer of deposited cementum.

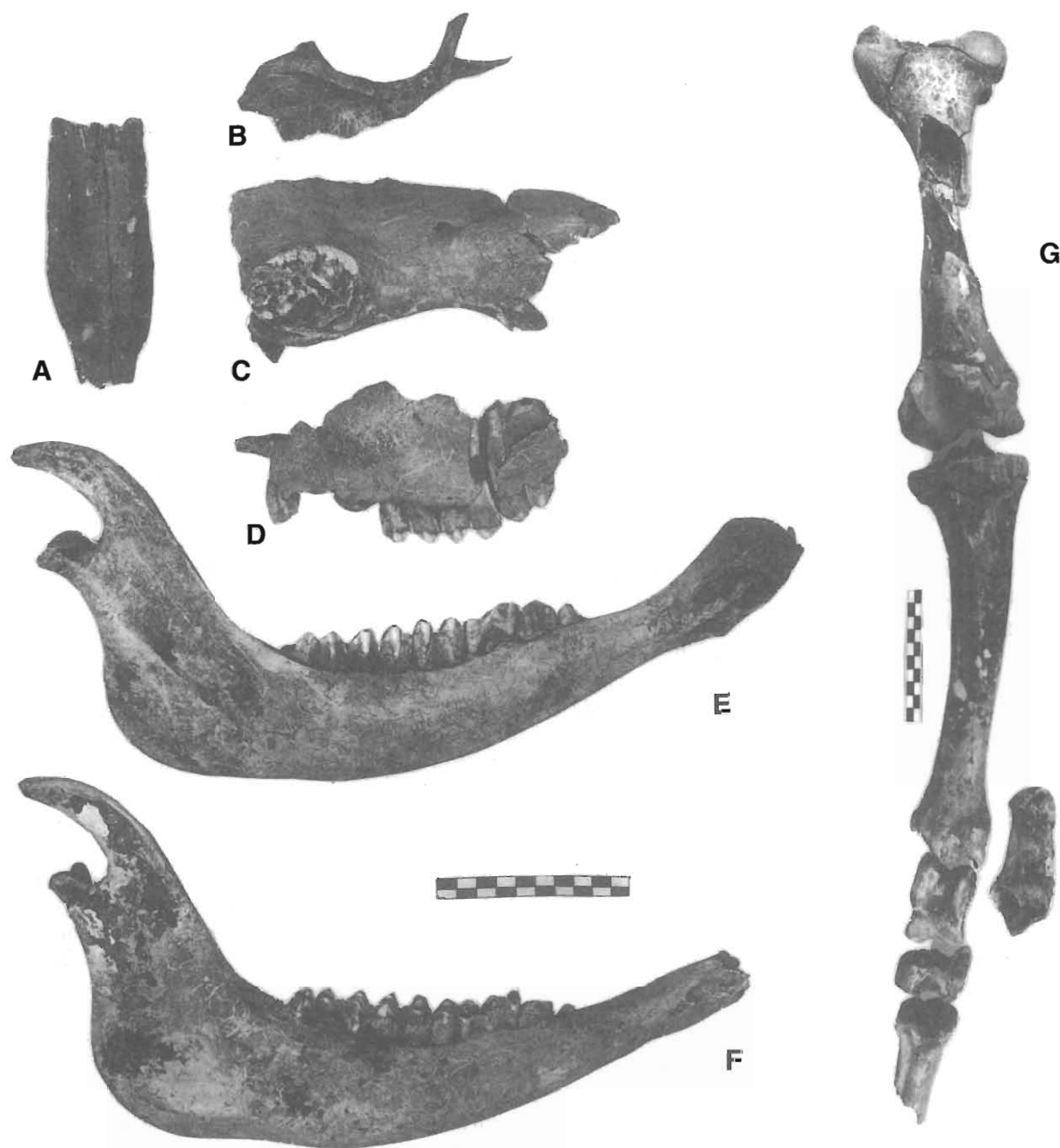


Plate 6. Pit 5 - cattle 2: A - nasale, B - zygomaticum, C - frontale with wrinkled place where the loose horn had been, D - maxilla with teeth (praemolars just come through), E - mandibula with teeth (sinistra), F - mandibula with teeth (dextra), G - preserved part of hind limb — Foto 6. Jáma 5 - skot 2: A - nasale, B - zygomaticum, C - frontale se zvrásněným místem, kde nasedal pohyblivý růžek, D - maxilla se zuby (praemolary právě prožívají), E - mandibula se zuby (sinistra), F - mandibula se zuby (dextra), G - zachovaná část zadní končetiny.

Neither chop marks nor other signs of carving were found, not even at places where you could expect them, in cases where the horns were separated. The round opening in the caudal right part of the frontal bone (original diameter 46 mm - reconstruction of the opening's original shape in *fig. 1*), perceptible also on photograph 4-B didn't occur naturally. It is a matter of intentional interference by a human hand (maybe during the slaughtering of the animal) conducted from the dorsal side.

Parts of the skull (parts of the frontal bone, the nasal bone, the jugal bone, the basisphenoid, the occipital bumps, the premaxillas, both the upper and the lower jaws with teeth (only the left P<sup>2</sup> is missing) and other small fragments belong to **cattle no.2** (see *plate 6* and *11*) - all were found in context and together they form about 2/3 of the skull, which could not be glued together, although it had been complete in its original position in the pit - see *Pleinerová* - *fig. 6*). The horncores, a coherent part of the right hind limb (the major part of the femur, the tibia, the calcaneus and the talus, the centroquartale and the proximal part of the metatarsus) were also found. Furthermore an uncertain number of vertebrae (probably also the first two cervical ones), the sacrum, rib fragments and the complete pelvis obviously also belong to this individual. The vertebrae, skull, pelvis and the part of the right hind limb obviously made up a coherent part or coherent parts of the skeleton in the grave. The majority of the limb bones, including both of the scapulae and all the phalanges were missing again.

The not yet attached epiphyses (at the tibia and femur + unattached vertebral discs) as well as the condition of the dentition (molar teeth, but the third lower milk molar is still present, the third molar has broken through with abrasion at the end) point to an individual just growing up at an age of 2.5 to 3.5 years. The gender could not be identified. The order of the breaking through of the praemolars is P<sup>3</sup> P<sup>2</sup> P<sup>4</sup> in both the lower and upper jaws. Its withers height has been calculated on the basis of the tibia to 113 cm, according to the *Matolcsi* index (1970). Considering the fact, that the distal epiphysis is not yet attached, which allows for further growth, the resulting height of the adult individual would have been a bit bigger. The lower second praemolars (P<sub>2</sub>) are present. The horncores were found in another context than the skull, but considering the character of the find they certainly belong to individual 2. The horncores weren't attached but were loose during its lifetime (see *chap. 3, plate 11*).

**Cattle no.3.** All the upper rows of teeth and some skull fragments have been preserved, but these cannot be glued together (about 1/3 of the skull including parts of the frontal, temporal, palate, jugal bones, the premaxillas, and the upper jaws with teeth (without P<sup>2</sup> and P<sup>3</sup> dex and P<sup>2</sup> sin) and probably also the nape protruberences and petrosal bones). There were no horncores found in the same context as the skull fragments, but it is possible, that an almost complete left horncore (see *reference* at *ind. 1*), which displays large dimensions, or the base of another horncore, which has, in contrast, small dimensions (see *ind. 5*) belongs to this individual. We can also assign a pelvis, axis, further cervical vertebrae, probably some thoracal, limbal and sacral vertebrae to individual 3. The bones of this individual could form a coherent part or coherent parts of the skeleton. It also can not be ruled out, that a tibia fragment assigned to individual 1 belongs to this individual.

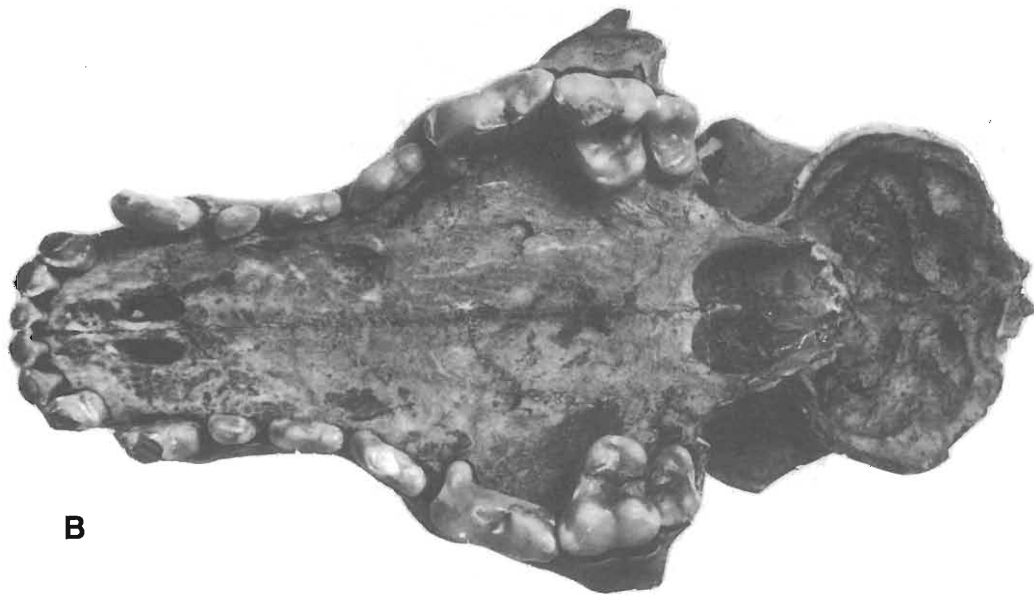
The individual was fully grown, obviously a bit older than individual 1, because the tooth abrasion is slightly more advanced. The skull fragments also show, that individual 3 was smaller than individual 1. The forehead was only slightly wavy.

**Cattle no.4** is represented by the distal diaphysis of the femur, which has not got an attached epiphysis and which, on the basis of the surface character and size, indicates a very young calf. Individual 4 is the youngest of all the individuals. Furthermore it is possible, that the proximal part of the metacarpus and perhaps one of the axis belonged to it (the axis is the most numerous anatomical part in the pit - it is present four times altogether). On the other hand not one of the horncore fragments can be assigned to it.

**Cattle no.5.** Two horncores cannot be safely assigned to the above described individuals. One could belong to individual no.3 and the second represents individual no.5. The dimensions of the bigger, almost complete, left horncore (it lay by the head of cattle 1 instead of the right horncore, see individuals 1 and 3 above), which obviously belongs to a male (*plate 9*), are: max. width at the base = 79 mm, the length of the preserved part (without the tip) = 300 mm, probable original length = 380-440 mm. The shape and length indicate that it is a "primigenius" type. The horncore is concave in a simple arch, slightly twisted (rotated around the lengthwise axis), its peak points rostral and slightly dorsal. It is a bit flattened. The seam between the frontal and the nape bone has grown together, but visible. The established dimensions of the fragment of the smaller, that is left horncore are: max. width at the base = 53 mm. It is not possible to decide, whether some other bone fragments also belong to individual no.5.



**A**



**B**



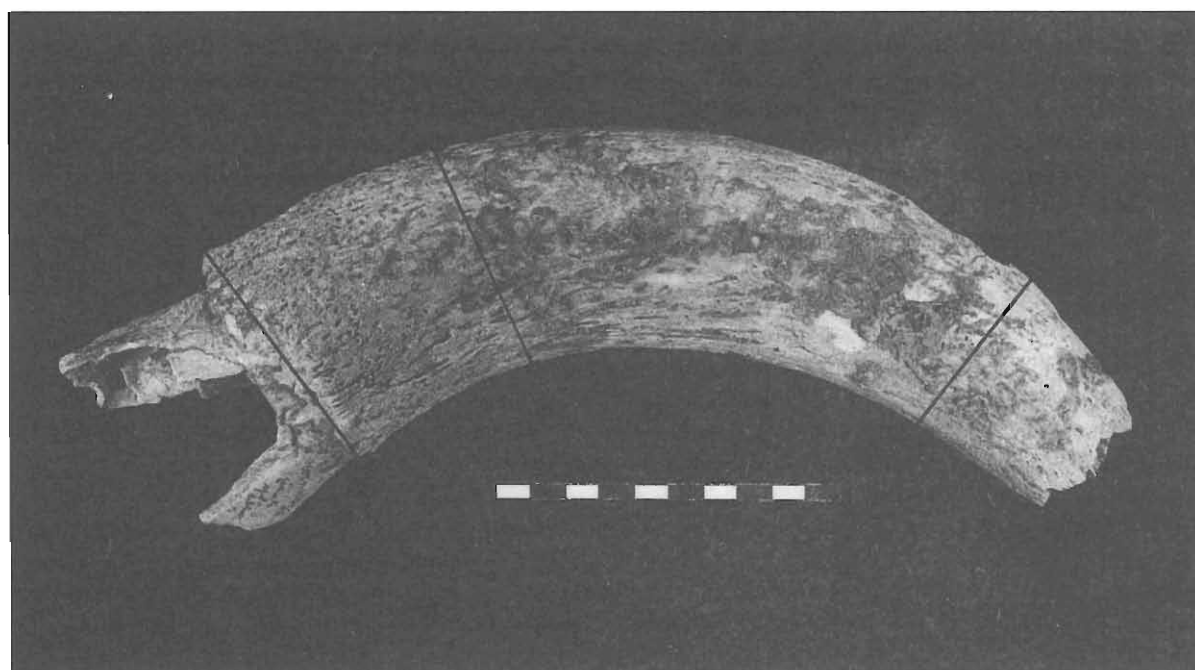
*Plate 7. Pit 5 - dog: skull: A - norma dorsalis, B - norma ventralis — Foto 7. Jáma 5 - pes: lebka: A - norma dorsalis, B - norma ventralis.*



Plate 8. Pit 5 - dog: *A* - skull - norma lateralis, *B* - lumbal vertebrae with recognisable pathology (*spondylarthrosis*) — Foto 8. Jáma 5 - pes: *A* - lebka - norma lateralis, *B* - bederní obratle s patnou patológií (*spondylarthrosou*).

The above-mentioned outline shows, that some anatomical parts of some individuals are missing. For example complete lower jaws were only found with individual 2. Also most of the limb bones are missing [only a coherent part of the right hind limb of individual 2, fragments of the tibia of individual 1 (?), a fragment of the femur of cattle 4, a fragment of the ulna (individual?), a femur fragment (individual?) were found]. The scapulae and phalanges are completely missing. On the other hand some anatomical parts are more copious: 4 axis, 3 pairs of upper jaws with teeth, 3 almost complete pelvises, 2 connected rows of caudal vertebrae (individual 1 and ?).

For the sake of completeness it is necessary to mention the finds from the initial clearing, which are not necessarily connected with the described finds. Cattle bones here consist of a horncore fragment (shape and size are roughly that of the larger horncore mentioned above with individual no.5 - it could be even this individual), a lower jaw fragment, a third upper molar, parts of two vertebrae, a radius fragment and a hoof bone. There is at least one individual (the horncore probably belongs to a male, the teeth belong to an adult, but not old individual - age about 3 years).



Ø23 cm

Ø21,4 cm

Ø18,8 cm

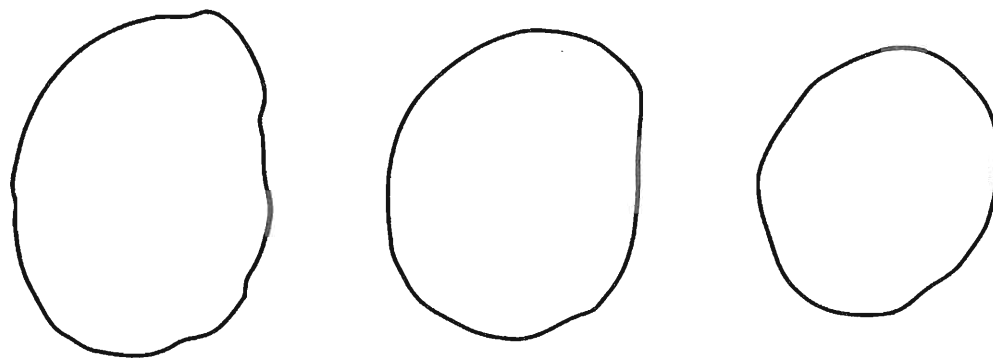


Plate 9. Pit 5 - individual 3/5: horncore, which lay by the skull of individual 1, with illustrated cross-sections through the horn at three different levels — Foto 9. Jáma 5 - jedinec 3/5: rohový výběžek, který ležel u lebky jedince 1, znázorněny průřezy rohem ve třech různých rovinách.

An almost complete skull (the lower jaws and part of the brain pan are missing), half a rib, the distal halves of the tibia and the fibula, the distal part of the humerus, half a scapula, an axis and two connected lumbar vertebrae belong to the dog found in pit 5 (see *plate 7* and *8, fig. 3*). The bones obviously belong to one individual. It is noticeable, that its skeleton is far from complete. All the limb bones and the rib are from the left side. The single fragments found don't form one coherent part of the skeleton, but taking into consideration that the distal part of the tibia and fibula correspond to their position in the body, it is likely that at least in some cases parts of the body were deposited in the grave (for example part of a shinbone, part of a lumbar spine) and not only individual bones.

The dog is of small or medium size (distal tibia width = 18,7, distal humerus width = 28,2, max skull length 143 mm). One of the lumbar vertebrae bears pathological excrescences (*spondylarthrosis*), through which it was originally fused with the adjoining vertebra - see *plate 8*. It is an adult individual (a higher age is assumed bearing in mind the pathological growth on the spine). The facial part is neither extended nor shortened, the forehead is not significantly bent, the facial part of the skull makes a wedge-shaped impression from the side, the skull is fractured in the area above the eye-sockets (see reconstruction - *fig. 3*). The skull is different from breeds with extended heads and long faces (greyhound, collie, borsoj, dachshund). Although the facial part of the skull quickly becomes wider and higher in caudal direction, its shape also does not correspond to breeds with a short face (boxer, St. Bernhard), because its frontal line is not significantly bent. Although it was not possible to precisely glue the caudal brain pan fragment to the facial part, the reconstruction indicates that the brain pan stoops in caudal direction and isn't extended. It was not possible to reconstruct the shape of the sagittal crest, but according to a fragment of the distal brain pan part this crest was present or at least hinted at. The *crista frontalis externa* is noticeable. The premolars do not overlap, there are only small gaps between them. Many parallels in shape and size were found to prehistoric breeds (for example of the *palustris* type).

Incisive teeth and the left fang and the left jugular arch show signs of burning on an open fire. These are exposed parts, which testifies, that the burning was carried out on the head while it still bore soft parts and not on the skull.

In the same context as the long dog bones the distal part of a **domestic pig's** tibia was also found, which is the only proof of the presence of this animal species. The distal part of a humerus belongs to a **hedgehog**. The identification of two rib fragments, which could belong to a sheep or a goat, remains uncertain. All the fragments which do not belong to cattle are sporadic and lay in the top layer of the pit.

Altogether the remains of at least five cattle individuals of different age and a dog are present in pit 5 and there is sporadic evidence of domestic pig and hedgehog. Only cattle individuals 1 and 2 (possibly 3) are represented by more or less coherent skeletons. It isn't certain, with how large a part (or parts) of the body skeleton 3 is represented, but it is clear, that this individual, similar to individuals 1 and 2, was deposited in the grave on purpose. The other individuals are represented only by some or a single fragment and obviously they form part of the fill similar to the pig and the hedgehog bones. The assumed process of filling is described by *I. Pleinerová (2002)*. The best-preserved skeletons - cattle 1 and 2 - could represent male and female, but especially in the case of cattle individual 2 the gender couldn't be identified safely.

One of the axis bears scratches, which probably originated through gnawing by a beast of prey which was not smaller than a fox. Some fragments from the top part of the pit (vertebrae and claw bone of the cattle from the initial clearing and the axis from the north part of the pit) show surface erosion.

#### Pit 6

Where the amount is concerned, much fewer finds come from pit 6 than from pits 3 and 5 - altogether 116 fragments were found here. Pit 6 does not contain burials of whole animal bodies or their parts (maybe with the exception of the puppies). In view of the fact, that there are no coherent skeletons a synoptic chart was made, which shows the anatomical parts found for each species (*tab. 2*).

The species represented most is **dog** - finds of dog puppies are a peculiarity of this pit. Almost all kinds of bones are represented amongst the dog bones (see *tab. 2*), though clearly no coherent skeleton or a larger part

	<i>Bos primigenius f. taurus</i>	<i>Sus scrofa f. domestica</i>	<i>Ovis/Capra</i>	<i>Canis lupus f. familiaris</i>	<i>Cervus elaphus</i>	<i>Silurus glanis</i>	Large ungulate (cf. <i>Coelodonta antiquitatis</i> )	Medium mammals	Undetermined bone	Total
Minimal number of individuals (MNI)	2	2	1	4	1	1	1			12
unidentified							12	3	21	36
Calva				1			1			2
Cranial element						1				1
Frontale				2						2
Antler					1					1
Maxilla	1	1		1						3
Mandibula				6						6
Caninus sup.		1								1
Molar 3 sup.	1									1
Molar 1/2 sup.	1									1
Molar 2/3 inf.		1								1
Vertebra cervicalis	1			1						2
Vertebra thoracica							3	1		4
Vertebra lumbalis	1									1
Costa	5	3	1	3				8		20
Scapula				2			1			3
Humerus				2						2
Radius	2			3						5
Ulna				2						2
Ilium				1						1
Ischium				1						1
Femur	1			3			1	1		6
Tibia	2	1		1			3			7
Talus	1									1
Calcaneus	1									1
Metatarsus	1		1							2
Metatarsus 5		1								1
Metapodium		1		3						4
Metapodium lat.		1								1
Phalanx I	1									1
Total	19	10	2	32	1	1	21	13	21	120

Tab. 2: Hostivice 1997/98 - pit 6 - anatomical parts found with the individual species — Tab. 2: Hostivice 1997/98 - jáma 6 - anatomické části nalezené u jednotlivých druhů.

of any individual has been preserved. The entire jaws of three juvenile individuals are an important find. Two of them, whose lower jaws with a max. length of 79 and 74 mm haven't even got the first premolar (P<sub>1</sub>) or the first permanent molar (M<sub>1</sub>), are about 3 to 4 months old. The third dog is a little bigger and older (it has already got P<sub>1</sub> and the incisive teeth and M<sub>1</sub> are just breaking through), the length of the lower jaw is 87 mm and the assumed age is 4 to 5 months. On the basis of postcranial finds another fourth individual was distinguished with a radius length of 38.4 mm (without epiphysis), which is the youngest of them all.

Two individuals could originate from the same litter, therefore the minimum number of litters, from which the puppies come, is three. The maximum time difference between the youngest and the oldest litter is four to five months.

The recognition of dog and wolf puppy bones is practically impossible, therefore the obvious question to ask is whether the puppies in pit 6 are not wolf puppies. The different ages and sizes indicate puppies from different litters, in case they were wolf puppies we could assume they were from the same litter.

We can't assess, whether these puppies served as human food. We can only observe, that some anatomical parts are not present and also that there are not any cut or chop marks present on the dog bones.

Puppy bones were found in more layers, but the majority in layers 11 and 12 (in the north as well as in the south part of the pit). Around 80 % of all puppy bone finds come from one place (11th and 12th layer, from the south part of the pit). The frontal bone from the 3rd layer does not necessarily belong to the finds from the 11th and 12th layers and could therefore represent another (fifth) juvenile individual.

There are rib fragments present in the pit, which could belong to a pig, a sheep/goat or a non-juvenile dog. Apart from the puppy bones there could therefore also be an adult or almost adult dog present.

**Cattle** is the second most represented species. There are: teeth, a rib fragment, a talus and a phalanx. On the basis of two isolated teeth at least two individuals were identified of which one is adult and the second adolescent. The rib fragment found near the dog bones bears diagonal chop marks from the cranial direction from a heavy, relatively sharp instrument in two places near the neck.

**Pig** is represented by at least two individuals. On the basis of the upper jaw with teeth the age of one of them was estimated to be about 9 to 12 months. The isolated eyetooth of the second individual belonged to a female, which was older, but not yet fully adult.

A metapodium fragment and probably several rib fragments belong to a **sheep or goat**.

**Red deer** is only substantiated with an antler fragment (5<sup>th</sup> layer), which bears several diagonal cut or chop marks from both sides which on one side led to the separating of a part of the antler. The operations were probably carried out with an implement with a relatively straight edge.

**Catfish** is represented by one fragment (3<sup>rd</sup> layer). Its length was about 100 cm.

There are traces of probably the teeth of a beast of prey on one fragment of a middle-sized mammal (8./9. layer). Slight burning is registered on another fragment (a femur) of a middle-sized mammal there (12. layer), the other bones, including the puppy bones, are not burnt. A severely eroded cattle talus was found near some dog bones and a cattle phalanx which were not eroded at all. The fate of these fragments must have been different, before they ended up in the pit.

The material has the character of finds from settlement layers or waste pits. The richness in species, the high degree of fragmentation, the variety of fragments and the absence of coherent skeletons testifies to this.

Some fragments belonging to large mammals found in different layers (layers 3 to 8) show a high degree of petrification. They have a very different character than the other fragments (as if they were burnt) and apparently they are not connected to the contents of the pit. These fragments (mostly they are vertebrae and a small tibia fragment) are geologically older and most probably belong to a **woolly rhinoceros**. It is not possible to consider this animal as human food in the eneolithic because it had already disappeared from our region at the end of the ice age (therefore it is also not mentioned in *tab. 1* and *3*). While the eneolithic inhabitants were digging the pit they obviously disturbed older - glacial - layers. The bones of the woolly rhinoceros therefore represent a contamination of the eneolithic pit.



method	Hostovice 97/98 - without pits 3, 5, 6	Hostovice 97/98 - pit 6	Hostovice 1972	Hostovice 1977	Hořany	Dobroměřice	Malé Březno	Lumbeho zahrada	Stránská skála	Praha-Baba 75/76	Praha-Baba 74	Makotřasy	Vikletice	Čimburk ***	Evaň	Lhotka	Křesín
	frag.	fr./MNI	fr./MNI	frag.	frag.	frag.	frag.	frag.	frag.	%	MNI	fr./MNI	fr./MNI	frag.	frag.	frag.	frag.
<i>Bos primigenius</i> f. <i>taurus</i>	13	19/2	32/4?	6	11	144	min.28	31	1285	35-40	13	1636/55	22/3	371	26	7	23
<i>Equus</i> sp.			3/1			2			5	2	1	14/3		22			
<i>Sus scrofa</i> f. <i>domestica</i>	7	9/2	4/2?	1	1	11		24	88	15-18	5	372/38	21/3	57	10		5
<i>Ovis/Capra</i>		1/1			2	27		7	407	17-20	6	173/15	6/1	47	7	2	3
<i>Canis lupus</i> f. <i>familiaris</i>	1	31/4	3/1			4			2	6-8	4	50/7	1/1	4	1	1	
<i>Bos primigenius</i>			13/3*			1						5/1		114			
<i>Bos</i> sp.			28			1			22			63	9/1	59			
<i>Cervus elaphus</i>	3	1/1	11/3		2	4	34	1	21	4	1	45/3		293			
<i>Capreolus capreolus</i>	1								3			5/2		42			
<i>Sus scrofa</i>				1								10/2		99			
<i>Sus</i> sp.												4	2				
<i>Lepus europeus</i>							1	2	10	4	1	7/5	41/3	2			
<i>Castor fiber</i>									1			2/2		2			
<i>Sciurus vulgaris</i>														1			
<i>Cricetus cricetus</i>												1/1					
<i>Arvicola terrestris</i>												1/1					
<i>Felis sylvestris</i>																	
<i>Ursus arctos</i>									1			2/1		1			
<i>Canis lupus</i>												3/1		1			
<i>Canis/Vulpes</i>						1											
<i>Vulpes vulpes</i>			1/1											11			
<i>Meles meles</i>														1			
<i>Martes martes</i>														3			
<i>Putorius putorius</i>														2			
<i>Gallus gallus</i> f. <i>domestica</i> **								2									
<i>Coturnix coturnix</i>									2								
cf. <i>Tetrao urogallus</i>												1/1					
Anatidae													1/1				
<i>Anser anser</i>												3/1					
<i>Anser</i> sp.														1			
cf. <i>Cygnus</i>												3					
<i>Emys orbicularis</i>						2											
<i>Silurus glanis</i>		1/1							6								
Fishes												2	1/1				
<i>Margaritifera margaritifera</i>												1/1					
<i>Unio</i> sp.							1	1									
wild															4	2	2

\* (including 4 horns)

\*\* the presence of this species is ruled out for the eneolithic

\*\*\* including material from the Baden (?) culture

frag. or fr. = number of fragments, MNI = minimum number of individuals

Tab. 3: Species representation on Funnel Beaker culture sites in the Czech Republic — Tab. 3: Zastoupení druhů na lokalitách kultury nálevkovitých pohárů v ČR.

A connection is assumed between some fragments from different layers (puppy bones - layers 3, 11 and 12, petrified fragments - layers 3 and 8). This connection could maybe unravel some circumstances of the pit-filling process. The cattle, pig and sheep/goat (?) fragments were distributed altogether evenly throughout the different layers.

Items manufactured from the scapula, metatarsus (probably cattle) and the metapodium of a big hoofed animal were also found in fragmented form in the pit. The first two artefacts are heavily polished from longterm use. They come from different contexts (4<sup>th</sup> and 8<sup>th</sup> layer). The third artefact from the (probably cut off) proximal part of the metapodium diaphysis of a big hoofed animal is smoothed on all sides (by a rough stone?) and a part of it is broken off.

#### *Pit 7*

It only contains a fragment of a **cattle** thoracal vertebrae.

#### *Pit 8*

It only contains the proximal part of a **cattle** metacarpus of larger dimensions.

#### *Pit 14*

It contains a mostly preserved left lower **cattle** jaw, which contains milk as well as permanent molars. The third molar is just beginning to break through, which indicates an age of about 2.5 years (*plate 10-B*).



*Plate 10. A - pit 15 - cattle scapula (maybe smashed through by a human), B - pit 14 - cattle mandibula with teeth — Foto 10. A - jáma 15 - scapula skotu (možná proražená člověkem), B - jáma 14 - mandibula skotu se zuby.*

It contains the right scapula of a **cattle** individual with a pierced hole (*plate 10-A*), which could have originated during the killing of the animal with a spear-shaped object. According to some authors, these openings served for hanging the limb parts in the smokehouse. These interpretations are only one of many explanations in our case, especially if we don't know, whether the opening was caused by a human being. The minimal diameter of the opening is 31 mm.

In addition there is a cattle skull fragment, an upper tooth belonging to a **red deer**, three fragments belonging to middle-sized mammals and another 11, unidentifiable, fragments present in the pit.

*Finds from the 1972 and 1977 excavations (Dr. Moucha)*

Apart from the above described collection, a smaller bone collection from this period (Funnel Beaker culture) was found earlier (1972 and 1977) at an adjacent place (Litovice) by Dr. Moucha, amongst which there are also four well preserved cattle horncores belonging to at least three individuals (see *chapter 6, plate 12*). A report about this animal bone collection from 1972 and 1978 was prepared by Dr. Peške (stored in the finds report archive of the Archaeological institute). The collection was checked once again and metrically evaluated (*tab 9*).<sup>1</sup>

*3. CATTLE WITH LOOSE HORNS - A UNIQUE FIND*

Cattle no.2 from pit 5 proved to be not only exceptional for the site of Hostivice, but also in a European context. In the case of this sub-adult individual parts of the skull and horns, amongst other things, were present (although the horns lay a certain distance away from the skull (see *Pleinerová 2003*), there can be no doubt about their affiliation to the skull bearing in mind the character of the find).

**The horncores of this individual had not grown together with the skull** but they must have been connected with the frontal bone by the connective tissue (*pseudoarthrosis*). This conclusion ensues from the character of the horncores and the related areas of the frontal bones. Both horncores which were found do not contain cavities as is usual, but are filled with spongiozoa. They are relatively heavy, their surface does not bear distinctive lengthwise grooves, max. average of the left core (at the base) is 57.1 x 44.3 mm, its max. length (after the outer curve) 157 mm, max. average of the right core is 57 x 43.6 mm and a length of 148 mm. Because the points are worn-down, the cores were originally about 10 mm longer. The left and right horncore do not differ from one another, both are short and only slightly curved (see *plate 11*). In the case of individual 2 a place on the frontal bones, from which the horncore normally grows, has round-shaped pleated surfaces of a max. average of 52.3 mm (right side), partially reminiscent of a healed injury (*plate 6-C*). Normally horncores are apophyses of the frontal bone and a growth zone of connective tissue does not exist between the horns and the frontal bones (we are not talking about the epiphysis here) (*Kolda 1936*). The condition when horncores have not grown together with the frontal bone is pathological.

Obviously the **horns** of the described individual were more or less **moveable** during its lifetime. Bearing in mind their weight they could also have been hanging down (three possible positions of the horns on the head of the cattle are represented in the reconstruction on *Fig. 2*). This could have been disadvantageous for the breeder in the case, that he would have wanted to harness the cattle to a yoke. This is perhaps the reason, why it was excluded from breeding and slaughtered at an adolescent age (that is at an age, at which it had already achieved a sufficient slaughtering weight, but earlier than it would have been possible to count on it as a breeding individual useful for draught). The other individuals from Hostivice exemplified by the greater part of the

---

<sup>1</sup> In order to get the full picture it is necessary to mention, that features of Hallstatt age [(features 1, 2, 10 (is obviously part of feature 1) and 11)] were also found at the Hostivice site by Dr. I. Pleinerová. Feature 10 contained a fragment of a cattle lower jaw, a fragment of a tibia and a rib of a pig, rib fragments probably belonging to a sheep or goat and a lower back tooth of a horse. Feature 11 only contained a diaphysis fragment from a long bone of a middle-sized mammal. The bones from features 1 and 2 were not studied.

skeleton (no.1 and 3 from pit 5 and no.1 from pit 3 - see *chap. 2*) are fully adult to old. Bearing in mind the ritual character of the burial and considering the fact that we commonly encounter young individuals in graves on other sites, this reason is less likely. The uniqueness of the individual may have rather been the reason for its selection as a sacrifice, no matter whether it had a magical or some other role bestowed on it.

A similar find of loose horns has not been found amongst archaeological sites in the available archeozoological literature and it is not common in contemporary breeding practice either. There is a mention of the existence of this condition in *Kolda's Anatomical atlas (1936, p. 562)*, which I quote in full: "*The transition from horned cattle to hornless usually makes up forms with loose or hanging horns. In the case of a loose horn the horncore secondarily detaches from the frontal bone, from which it originated, to the extent, that the horns can be attached onto the forehead, but after disengaging they take up the original position again. With the hanging horn the disengaging of the horncore is so increased, that the horns hang from the sides of the head and can also fall off, by which hornlessness is caused.*" A more recent work by *Siegert (1955)* demonstrates, in contrast to *Kolda*, that loose horncores originate from independent centres of ossification. This is proved by the fact, that no frontal cavities interfere with them. Variations in form and size of the horns, including the presence of hornless forms and forms with loose horns (*wackelhörn*), are described for European and Indian cattle and for the Southern Asian buffalo in *Fischer 1958; 1958-59; Fischer - Richards 1965 and Siegert 1955*.



Plate 11. Pit 5 - cattle 2: horncores not attached to the skull (loose horns) — Foto 11. Jáma 5 - skot 2: rohové výběžky nepřirostlé k lebce.

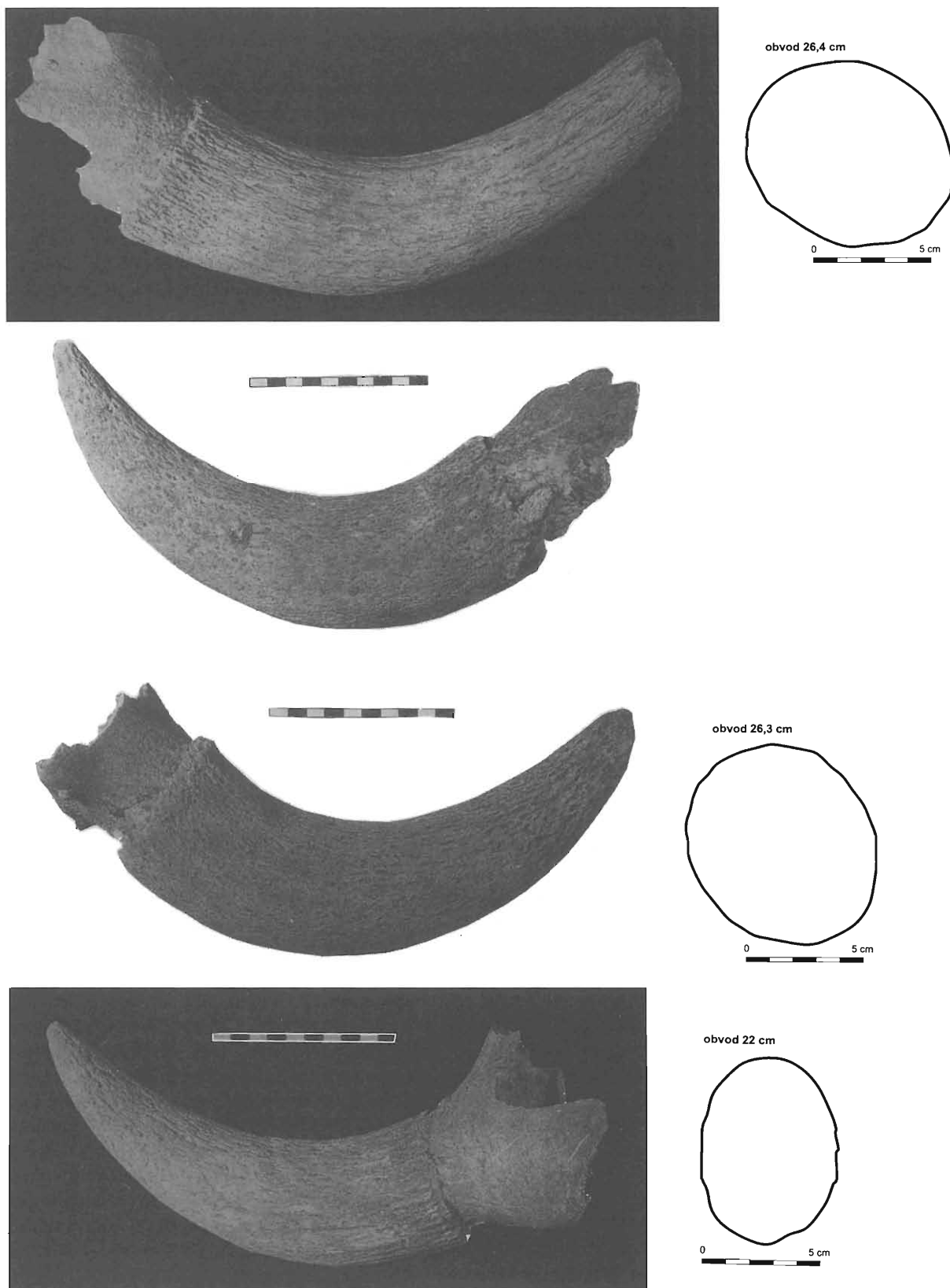


Plate 12. Horncores of cattle from the 1972 excavation, belonging to at least three individuals, above the biggest, below the smallest, right: shape of the cross-section through the horn at the base — Foto 12. Rohové výběžky turů z výzkumu r. 1972 patřící minimálně třem jedincům, nahoře největší, dole nejmenší, vpravo: tvar průřezu rohem na bázi.

These authors demonstrate, that the loose horns can have a different length on each side, that they do not influence the economic use of the animal and that their inheritance is probably recessive with incomplete penetration.

There could be three **reasons for the pathological condition of the horns** of cattle no.2: (1.) it is either a matter of a developmental flaw (teratological), (2.) an inherited characteristic on the basis of mutation (3.) or the result of an injury or break. A similar but far more common phenomenon is that of hornless cattle (*akeratos*). Evidence also exists of hornless cattle from archaeological excavations from the eneolithic of Central Europe (Złota - *Gabalówna 1958*, Halle-Mötzlich - *Müller 1963*, Štúrove, Podolie - *Ambros 1988 et al. - Świeżyński 1958*) even if such cases are rare. Hornlessness in the case of cattle is inherited and is conditioned by a dominant allele of a single gene. It is a matter of the qualitative character of the inheritance (caused by a gene with a great effect), which can be modified in its phenotype through a specific environmental influence or caused by a modification of the gene. Hornlessness is dominant above hornedness even if often incompletely. This means in practice that the calf entirely customarily inherits hornlessness from one of its parents. The loose horns of cattle 2 from pit 5 could similarly also have been an inherited mutation as the right-left conformity of this individual suggests. A number of contemporary investigations confirm this characteristic **of inheritance** in cattle. Even if it is not completely clear in this case, *Fischer (1958-59)* and *Siegert (1955)* assume, that the inheritance of loose horns is recessive, which means that, loose horns can occur in the population completely by chance and unexpected by normal parents, which carry within themselves recessive alleles for loose horns (loose horns would be conditioned by a homozygotic condition). However the opinion also exists, that loose horns are a peculiar result of the crossing of hornless and horned individuals (loose horns would be conditioned by a heterozygotic condition).

It also cannot be ruled out that the loose horns are the result of an injury. Such cases are also known from contemporary breeds where it is generally, however, a matter of one-sided injury. The conformity in form between the left and right horncore of the described individual does not indicate a chance injury. We could be dealing with, the result of a **deliberate break** at a very young age (as a part of ritual manipulation or because of making the animal less danger).<sup>2</sup>

According to Dr. *I. Pleinerová's* drawings (2002) the horns lay outwith the skull itself. Bearing in mind that there were no traces of cutting off on the hornledges or the skull, the horns must have been necessarily **cut or chopped off** in the place of the connective tissue.

#### 4. RITUAL CHARACTER OF THE FINDS

Cattle and dogs played another role in the life of prehistoric people (especially in the neolithic and aeneolithic) in addition to their economic function. This is indicated by the **finds from Hostivice** too. The burial in pit 5 in particular and certainly also the cattle skeleton from pit 3 **are a record of a burial ceremony**.

**The breaking off and shifting of cattle horns** rank amongst the **ritual operations** that have been observed in the case of the animal bones. The most striking example is the fact that the left horncore of another individual was deposited in place of the right horncore of cattle no.1 from pit 5 - the original horncore was probably somewhat bigger. The horncore on the left side of the head was completely missing. Both horns must have been knocked off and not cut off, for traces of cut or chop marks were not recovered. The horncores of cattle no.2 from pit 5 were cut or chopped off at the place of the connective tissue and put in another place. The horncores were probably also separated from the skull of cattle 3 from pit 5. The horncores are completely missing in the case of cattle 1 from pit 3. In this case it was possible to ascertain, that the whole calva was not in its anatomical position, only both lower jaws were placed in their anatomical position (considering the fact, that the head had been separated, the lower jaws had of necessity to have been separated too in order to be put into their anatomical position). Also the four cattle (aurochs?) horncores from Dr. Moucha's excavation in 1972 are isolated and they could have also been ritually manipulated. No cut or chop marks from the separation of the head, horns or lower jaws were found in Hostivice.

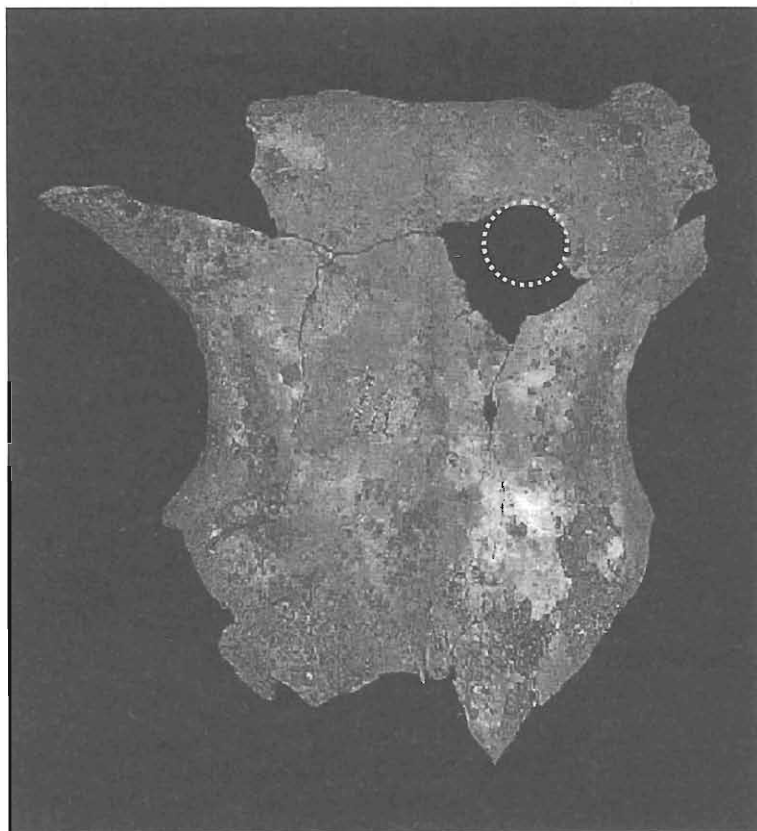
---

2 *Comment by Dr. V. Černý:* Some pastoral tribes of central and east Africa break off horns of some cattle individuals. The horns are hanging down all the life (see also *Pavitt 1999*). This phenomenon is also visible in carvings on rocky massives in the central Sahara from 3<sup>rd</sup> millennium BC (*Černý et al. 2001*).

Obviously the removal of other parts of the body also provides evidence of a cultic character. Most of all there is a marked **absence of limbs and lower jaws** with cattle no.1 (pit 5). The missing of some anatomical parts (most of all limbs) was also detected with other individuals from this pit. The lower jaw and the proximal part of the right hind limb are present (see *plate 6*) in the case of individual 2, in contrast to cattle 1. The dog skeleton from pit 5 was also far from complete. If we assume, that all the bones were taken out of the grave during the field excavations and the grave hadn't been secondarily disturbed, in the case of the dog only separate bones or parts of the body were put into the pit - the skull without the lower jaw, part of the scapula and the humerus, part of the tibia and the fibula, two lumbal vertebrae and an axis. The fragment of the tibia and the fibula and the lumbal vertebrae are in accordance with their anatomical position on the body which indicates that at least in the case of the shinbone and the lumbal part of the spine parts of the body and not separate bones were put into the grave (It can no longer be ascertained if some smaller fragments were removed during the field work. The absence of a large part of the right side of the cattle skeleton from pit 3 isn't a result of ritual practices, but of the fact, that the pit contents were not entirely removed during the field work).

The isolation of certain anatomical parts could symbolize a specific, nowadays hard-to-guess, phenomenon. The isolation of limbs and lower jaws in cattle no.1 and 2 from pit 5 and the separation of the cattle skull from pit 3 are difficult to explain - it could have had a symbolic, but also a dietary reason (limbs contain high-quality meat, for example leg, the skull contains the brain and the lower jaw the tongue). In prehistoric times, similarly to medieval times, the horns were cut off deliberately and served as a horn source. The breaking off of the horns from the animal skulls found in Hostivice clearly did not have this economic purpose as is evidenced by the presence of horns in the graves and their shifting about. Generally burials of entire animals or parts of their bodies were evidently disadvantageous from the economical point of view, because the cattle bodies were certainly a precious source of food and raw material (skin, horn, bone, and so on), even if deceased. For this reason alone we would not expect animals to be thrown into a pit without a special reason.

Also the **burning of the dog teeth** from pit 5 could be the result of ritual practices, especially when we know, that only the front teeth (incisive and a fang) and the zygomaticum are burnt, which indicates that the burning was carried out on the flesh-covered head. Here the possibility presents itself, that the dog was killed by suffocation in the smoke from the fire. But it is necessary to point out, that burnt teeth are not a sporadic phenomenon. We also come across it, with dogs as well as with pigs, in the material from settlement sites from later periods, where we would not expect a ritual reason for the burning.



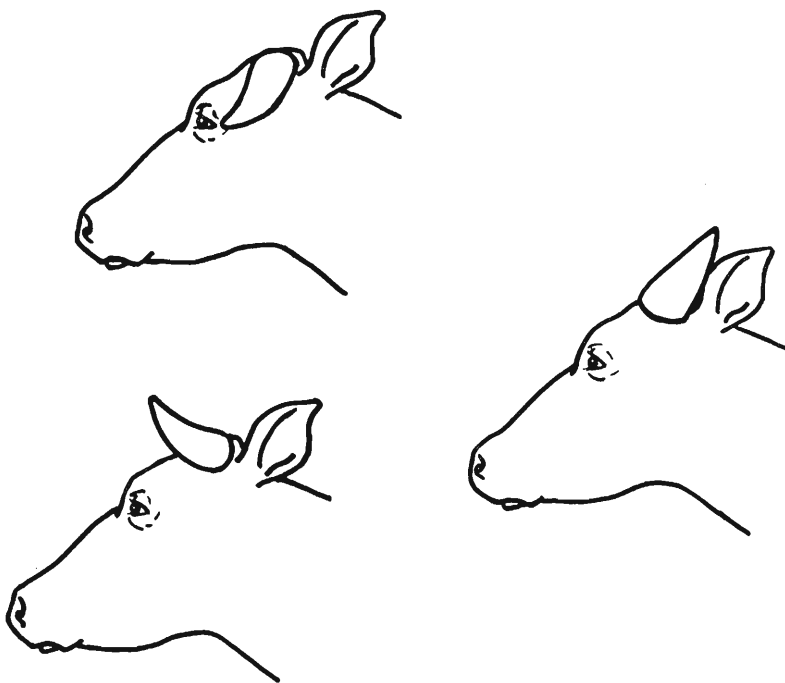
*Fig. 1. Pit 5 - cattle 1 - reconstruction of the original shape of the opening in the frontal bone — Obr. 1. Jáma 5 - skot 1 - rekonstrukce původního tvaru otvoru v čelní kosti.*

Also the presence of a larger number of **puppies** accumulated in one place in pit 6 is not a normal phenomenon. They could be deceased individuals, but also sacrifices or at least individuals which were deliberately killed at one time. Their concurrent death is obvious, especially when we take into account, that their positioning in one horizon of the pit (layer 11 and 12) was patently a one-off action.

In some cases we can observe on the bones whether the animal had been killed deliberately and how. There are several possibilities to **kill an animal**: strangling, slashing the throat, breaking the neck, piercing with spears, a **blow against the forehead** and others. The first two ways cannot be proved by osteology. The second and third can only be revealed by the bones in special cases. The originally round opening in the skull of cattle 1 (see *fig. 1*) from pit 5 (the max. diameter had originally been 46 mm) is a deliberate human operation. It was made by a blow from above and could be proof of the animal's slaughter. But taking into consideration, that its position is somewhat left and caudally from the centre of the forehead (where the brain pan is the thinnest), it isn't certain whether this blow led to the killing of the animal. The skulls of the other individuals were considerably fragmented, and therefore it wasn't possible to detect similar operations on them. But it is not out of the question, that the fragmentariness of the skulls was also the result of a deliberate blow. No similar human operations on the skull were confirmed in the case of the dog from pit 5 but again the skull is not entirely complete. Even suffocating in the smoke from the fire cannot be excluded in the case of the dog (see *above*).

**The opening in the scapula** of the cattle individual from pit 15 (*plate 10-A*) could have originated during the piercing of the body with a spear shaped object (the scapula is located at heart level). This scapula, however, does not come from the grave and is not part of a coherent skeleton.

From the discoveries mentioned above it follows that the burying of cattle and dog bodies in Hostivice was accompanied by certain rites. The buried animals could have been randomly chosen individuals of their species, but they could also have been especially honoured individuals or at least individuals which were not chosen at random. This is indicated by the presence of the **exceptional cattle** individual (no.2) with loose horns in pit 5. It is important to point out, that in view of the recessive heredity of loose horns these horns could entirely unexpectedly appear in the population (there is also the possibility that loose horns are result of break - see *chapter 3*). Why were cattle and dog especially chosen for the burials? It seems, that these species had a special status in the life of the eneolithic people. This is also indicated by the fact, that these two species are most often found in neolithic and eneolithic graves (*Gabalówna 1958; Behrens 1964; Žid 2000*) and that in most cases whole animals, their largest parts or their skull are buried there. At the same time, both these species had a significant economic role in the life of the people of that time. Cattle was, as kitchen waste finds



*Fig. 2. Pit 5 - cattle 2 - reconstruction - three possible positions of loose horns on the skull — Obr. 2. Jáma 5 - skot 2 - rekonstrukce - tři možné pozice pohyblivých rohů na lebce.*



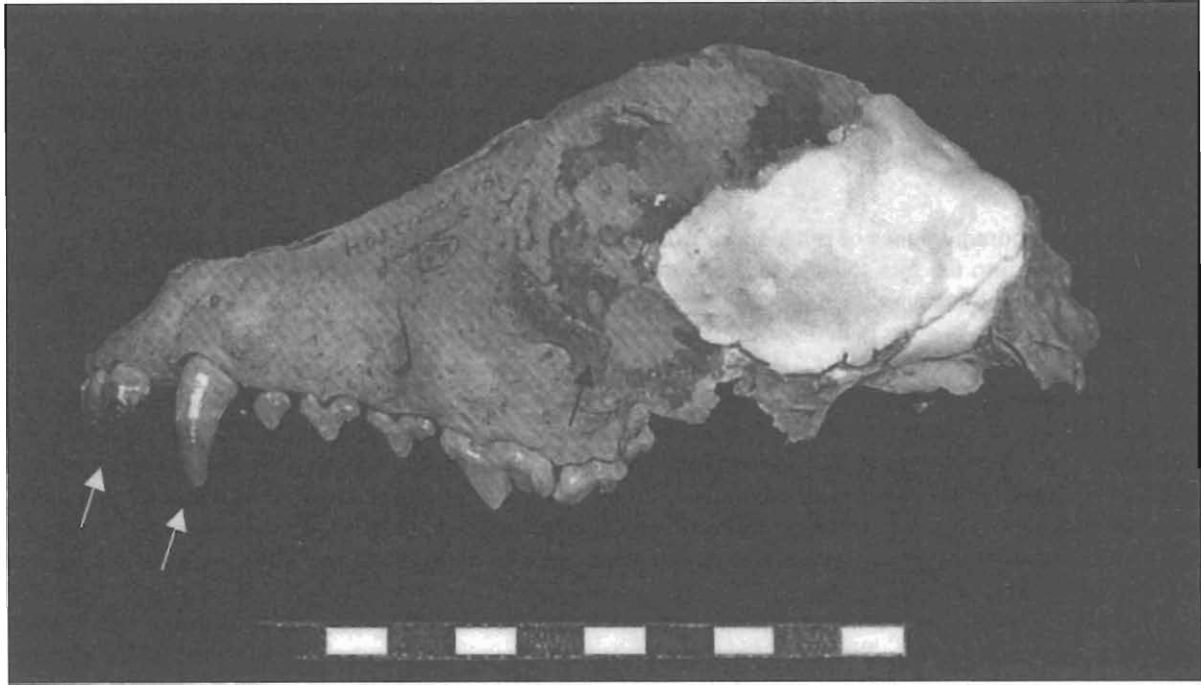


Fig. 3. Pit 5 - dog - reconstruction of skull of dog (after patching up the brain-pan) - norma lateralis, arrows show places with charring —  
 Obr. 3. Jáma 5 - pes - rekonstrukce lebky psa (po nastavení mozkovny) - norma lateralis, šipky ukazují místa opálení.

from settlements from the same time show (see *chapter 6*) also the most important species from the economic point of view, eneolithic people were dependent on it to a considerable extent (it was, taking its size into account, the main source of meat and raw material, maybe milk source and it was probably already commonly used for traction). From this point of view, there wasn't a greater sacrifice in the eneolithic than cattle (maybe with the exception of the horse).

The existence of a **bull cult** is manifested by a lot of finds, often also connected with a virility cult (see *Kalicz - Raczky 1981*). The bull cult is known from the early European neolithic, with various cultures and in various regions. It is well documented by diverse ceramic finds from the Balkans and the Carpathian basin. Earthenware imitations of bulls' horns are amongst the frequently occurring evidence, cattle figures with horns on the back, zoomorphic decorations on vessels and other objects from them were often placed in prehistoric sanctuaries. In the Czech Lands horned idols (human with horns) are known in the Jevišovice-Řivnáč horizon. Also the finds from animal graves including Hostivice, where their separating and shifting has been proved, provide evidence of the significant role of the horns. The bull has also been numerously represented in later periods, there are for example a lot of figures known from the hallstatt period. A significant role is played by the cow and bull in a lot of ancient mythologies, for example in Egypt, Crete, with the Celts and elsewhere. The mound of Irthlingborough in Great Britain from the early bronze age, where 184 cattle heads were found, is a very effective example (*Davis - Payne 1993*). The cited authors also mention the site of Harrow Hill from the iron age, where reputedly more than a thousand cattle skulls were found, and other finds of single skulls from the neolithic to the bronze age, and on the basis of these finds they discuss the possibility, that the cultic significance of cattle in prehistoric times could have been greater than their economic significance (similar to the situation in India today?). To what extent the burials are connected with the bull cult is not certain, because not only bulls are buried, but also cows, calves and oxen have been recorded, too, and other domestic and wild animal species. Nevertheless, there was certainly a relation between the buried cattle and their mythological, magic, religious or cultic role.

The dog has been man's friend and helper from the earliest of times, therefore burials of a human with a dog are sometimes explained by the emotional relationship between them, thus the dog also accompanies the deceased after his death. There is evidence from a lot of neolithic and eneolithic burials, that a dog was the object of ritual ceremonies, this is also indicated by the absence of some anatomical parts of the dog buried at Hostivice (and elsewhere - see *chap. 5*) and the burning of his teeth here. We get a surprisingly versatile picture of the **mythical position of the dog** in the neolithic and eneolithic (investigated on the basis of the

lengyel, tiszapolgár culture) from an article by *Zalai-Gaál (1994)*. It seems for example, that in some cases the dog had been the peoples' guide to the other world. *Andratojć (1986)* shows various forms of dog burials from Central Europe (on burial sites, in settlements, in the foundations of houses, inside and outside of huts, together with people and individually), he discusses possible reasons for burying (for example sacrifice into the house foundations, blood ceremonies and so on) and also he shows the various functions of the dog in different mythologies.

The more sporadic bones of other species found in Hostivice are probably all part of the fill and weren't deliberately put into the pits. This is indicated by their fragmentariness and the small size of the fragments (which don't symbolize anything), perhaps their erosion and their random scattered occurrence. No articulated parts of skeletons other than dogs' and cattle were found.

**Reasons for the burial** of animals in Hostivice can be varied. It could be a matter of cultic sacrifice, the totemisation or sanctifying of an animal, of a blood sacrifice, of the obtaining of magical powers or magical protection for reasons of protection of or improvement of health, the harvest, fertility, victory in battle or it could be a matter of ritual augury. The burials could also have a symbolic significance representing for example a kinship bond, also the separating of specific anatomical parts can have a particular meaning. It can be a matter of accompanying a person into the after-life, of the (emotional) connection between man and animal, of a gift or of food for the dead people.

A number of reasons for animal burials have been considered (*Gabalówna 1958; Behrens 1964; Pollex 1999*). At this point I would like to emphasize in tabular form (using the system of division devised by Behrens), what can be the reasons for burial from the point of view of the exclusiveness of the animals.

Is important and is buried:	in contact with human burials	independent animal burials
1. a particular individual	emotional (favourite animal of the buried person)	emotional (fear of or respect for the animal)
2. an individual of a particular species	religious (e.g. guide to another world) or cult	totemistic, cult (burial of an individual of a totemistic type)
3. any individual (any thing)	social (gifts to a person of high rank)	religious (sacrifice to God, to found a house, for a good harvest and so on)

This overview does not make any claims to absolute validity, for example in the case of a burial of a totem animal it does not have to be a matter of any particular individual of a certain species, but of a particular individual that was selected beforehand. If we use this division, it seems that, the cattle burials in Hostivice fall into category 2 (any kind of individual of a particular species), and the reason for their use could be equally well both totemic (cultic) or religious. In the case of individual 2 from pit 5, which could be exceptional, it is possible, that it belongs to category 1 (respect for the animal).

Not of the reasons can be completely ruled out in Hostivice, even if some are not very probable (e.g. gift, food for the dead), others more probable (cult sacrifice or sanctifying of the animal, the sacrifice of a cattle for a good harvest and fertility). The answers to these questions requires a synthesis of archeological, archeoantropological, archeozoological and ethnographic data.

## 5. ANALOGY AND COMPARISON

Burials of animals or parts of their bodies are neither a novelty nor a sporadic phenomenon in the eneolithic. Already the Neandertal hunters had put bears' heads into stone cabinets, which was a display of a cult (see finds from the Dragon's hole in Switzerland). From the beginning of the neolithic the burying of animals became commonplace and in some cultures (Funnel Beaker, Baden, Globular Amphora) finds of buried animals are especially numerous. In some cases animals or parts of their bodies are put into human graves, where they serve as food for the dead (with the Celts, for example, it was often pigs). Sometimes the most valuable parts of the body containing most meat serve as gifts, somewhere on the contrary worthless parts without meat (*Zikmundová 1960*). Cattle bodies put into human graves are only interpreted as gifts if the grave had been rich as a whole, which indicates the burial of a significant person. In other cases the buried animals were sacrifices. At the same time the sacrificed animals could be animals of cultic significance connected with mythology, religion or magic and their burying was linked with certain rites. An example of a cult known in southeast and central Europe from the beginning of the neolithic, with which the numerous eneolithic cattle burials can also be connected, is the bull cult. Animals, which were

connected with agriculture (cattle?) can be regarded as sacrifices, which had to ensure harvest and abundance. Apart from that, sacrificing could have different reasons (protection, gaining the animal's strength, success at war, curing from a disease, sacrifice to the foundations of a house, accompanying a dead person after death and so on). In some cases (for example with dogs) the emotional bond to the animal could also, apart from cultic reasons, be of importance. In later periods the worship of virility didn't apply so much any more, and the man as a warrior stepped into the foreground. This is also reflected by burials of warriors and magnates with their horses (in our country for example the Bylany culture burials together with a chariot, the Germanic burial of Záluží (*Sklenář 1974*), the Slavonic-avar graves (*Ambros - Müller 1980*)). As is stated by *Gabalówna (1958)*, however, animal burials do not occur as often and as uniformly in any other periods as in the neolithic and eneolithic.

It is necessary to differentiate between deliberate, ritual burials and discarded animal corpses (for example the horses in the trench at Stará Boleslav (unpubl.), animals with pelts and so on), or deceased animals (for example at a fire (*Petříčková 1997*) or naturally - cat, hamster and other skeletons). These are not the subjects of the following discussion.

Since insufficient attention has been paid to animal burials in the Czech Lands from the archeozoological point of view (partially due to a lack of finds), a relatively large area will be singled out in this chapter for comparison with other sites and for a general look at animal burials in the eneolithic in conjunction with a comparison, not only of Funnel Beaker finds, but also of finds from other cultures. Special attention will be paid to zoological categories such as: animal species, the anatomical parts found, the age and gender of the animals and a metrical comparison.

### *Neolithic and eneolithic animal burials in Central Europe and their comparison with Hostivice*

While comparing the Hostivice finds with other neolithic and eneolithic burials it is necessary to differentiate between deliberately buried individuals or parts of their bodies and bones which form an **admixture** and are part of the fill. The presence of pigs, sheep/goats and wild species in Hostivice, for example, is not the result of burial customs. Also in the metrical comparison it is necessary to differentiate between burial features and the admixture (for example in the case of horns), though this is sometimes difficult.

Another important sign is whether whole bodies or parts of bodies were put into the earth or just isolated bones. With the buried individuals from Hostivice (1 from pit 3 and 1, 2 and 3 from pit 5) it is evident, that whole bodies or their parts were put into the earth. The preservation of small ossicles (metatarsus, carpal bone) and the spine in the exact anatomical position also testifies to this. Another type of find is an accumulation of bones, which can also come from several individuals, which occur spread out in an anatomically disarticulated condition, but represent a cultic place (for example Zachow - *Teichert 1990*, Buchow-Karpzow - *Teichert 1984*). Although these finds have a different character than the above mentioned ones, they display a ritual and cultic aspect and therefore they will be considered as well.

*Gabalówna (1958)*; *Behrens (1964)*; *Pollex (1999)* and *Žid (2000)* have dealt comprehensively with neolithic and eneolithic burials in Central Europe. According to the latest statistics (*Žid 2000*) the most frequent species in graves are cattle (53 % of altogether 216 finds) and dog (39 % of finds). Cattle have been found on 48 % of the sites and dog on 52 % of the sites out of 126 Central European sites. Hostivice is no exception in this matter. Apart from the two animal species mentioned above other species have also been discovered in neolithic and eneolithic graves in Europe: domestic pig, goat, sheep, horse, aurochs, European bison, red deer, roe deer, sporadically also wild boar, wolf, fox and hare (*Behrens 1958*; *Žid 2000*). Of these the domestic pig has been found most often.

It is, however, generally valid for all these species (in contrast to cattle and dog), that often only remains of their skeletons are found and not the complete skeletons. Domestic species are entirely dominant in the animal graves.

If we only focus on the **Funnel Beaker culture** (see *Žid 2000*) we do not find any fundamentally extraordinary features in the representation of species in the graves - again the prevailing species are cattle and dog. Pig, sheep/goat, red deer and roe deer were also found there. Cattle burials in the Funnel Beaker culture have been recorded on five sites in Central Europe at least (minimum 37 individuals) and dog burials at at least eight sites (at least 44 individuals). This culture occupies the first place for the number of dog individuals found in graves (the Lengyel complex is in first place for the number of sites with dog finds) within the framework of Central Europe's neolithic-eneolithic cultures. Most cattle burials (but also other domestic even-toed ungulates - sheep/goats and pigs) come from the Globular Amphora/Złota culture complex, the Funnel Beaker culture occupies second place for the number of individuals (third for the number of sites). The above mentioned cultures rank amongst the richest for animal burials within the framework of the neolithic and eneolithic. We can conclude from the above that the animal burials in Hostivice are not anything unusual and singular within the framework of the Funnel Beaker culture.

It is interesting, that in the earliest Central European (*Žid 2000*), but also Europe-wide (*Behrens 1964*) neolithic (**LnK**, **StK**) no cattle burials have been found, although burials of other animal species, most of all dogs, appear quite often (in addition pigs, goats, red deer, wild boar and hare). Cattle burials are already represented in Lengyel cultural contexts, but they are not numerous until the onset of the Funnel Beaker culture, to which Hostivice also belongs. It seems, that the turn of the neolithic and eneolithic heralds a change in sacrificial customs (the bull cult, however, had already existed here from the beginning of the neolithic).

Cattle and dog burials are also documented later [bronze age and later periods: for example cattle heads from Holešov from the late bronze age (*Struhala 1951*), the bull burial at Uherský Brod from the middle bronze age (*Hrubý 1958*), the dog burials of the štítarské culture from Ostrov-west and from Záluží from the Roman period (unpubl.) and others]. The burials are, however, already much rarer and often their character and meaning has changed. Similarly the bull cult also survives the stone age [for example statues of bulls' heads next to a buried cattle skeleton and two bulls' skulls from the middle bronze age found in Uherský Brod (*Hrubý 1958*), the bull's significance in the Aegean culture of the bronze age and in other cultures]. In concurrence with other authors (*Gabalówna 1958; Pollex 1999*) we can state in conclusion, that the typical burials of cattle, cattle pairs or in some cases more cattle individuals are chronologically limited to the Central European eneolithic and are therefore a phenomenon of this period.

According to *Behrens (1964)*, most often one animal body appears in the grave, (in 71 % of the cases), two bodies are relatively numerous, but also the appearance of more bodies is common (see also *Pollex 1999*).

*For further comparison published finds from Central European countries will be used. For clarity of arrangement, the allegiance to a culture will be mostly only given as abbreviations: Be = Bernburg culture, BK = Baden c., EHK = Elbe-Havel c., KK = Baden c. (kanelovaná), KKA = Globular Amphora c., KNP = Funnel Beaker c., KŠK = Corded Ware c., KZP = Bell Beaker, LgK = Lengyel c., LnK = Linear c., MMK = Moravian painted, PK = Tisza c., WK = Walternienburg c. These signs are also used in the tables and graphs. The geographical allegiance of the site can be found in the graphs (the abbreviation of the country is shown behind the name together with the abbreviation of the culture).*

In a lot of cases there are only **parts of animals' bodies** in the graves. Sometimes the body lacks its **head**: Klementowice-station XV, grave 1 (*Lasota 1972*, KNP/KKA), Šarovce (*Ambros 1958*, KK) and maybe also Biendorf (*Götze 1936; Gabalówna 1958*, WK). The deliberate separating of the head is emphasized by *Lasota* for Klementowice and by *Ambros* for the calf from Šarovce. Often, on the other hand, only the isolated head (or heads) appears without the body: Branč (*Lichardus - Vladár 1968*, LgK), Komjatice-Tomášovce (*Točík 1979a*, LgK), Dobře (*Gabalówna 1958; Behrens 1964*, KKA), Weissenfels (*Behrens 1953*, KNP), Tangermünde (*Behrens 1964*, EHK), Bicske-Galagonyás (*Makkay 1986*, Sopot-Bicske), but also the burial-mound at Irthlingborough from the early bronze age (*Davis - Payne 1993 - see chapter 4*) and the skulls from the bronze age at Uherský Brod (*Hrubý 1958*) and at Holešov (*Struhala 1951*). In the case of Weissenfels there were 19 isolated skulls present in the grave, mostly without the lower jaws. The lower jaw was also missing from one individual in Biendorf and in Uherský Brod the lower jaws were displaced. In Weissenfels, in Jordanówo-pit 5, in Biendorf and elsewhere only parts of bodies and isolated bones were found (*Gabalówna 1958*).

**The isolation of the horns**, too, is not a sporadic phenomenon. In Brześć Kujawski not even a single horn was found amongst eight individuals and the skulls are very fragmentary, similar to other Polish burial sites (*Bökönyi - Kubasiewicz 1961*). Considering the fact, that it was a horned cattle form, the horns must have been knocked off (*Świeżyński 1958*, KAK). Horns were also not found in Alsónémedi (*Bökönyi 1951*, BK). The horns of the skulls in Klementowice-grave 2 (*Lasota 1975*, KKA) and in Jordanówo-pit 5 (*Gabalówna 1958*) were broken off. The cattle horns with a part of the frontal bone found in Svodín (*Lichardus - Šiška 1970*, LgK), the horns with the frontal bone in Jordanówo (*Žid 2000*, neolithic-eneolithic), but also the horns (with the frontal bone) of an aurochs (?) in Zengövárkony (*Dombay 1960*, LgK) can be classed as further evidence of the isolation of horns. Obviously in all these cases we are dealing with ritual manipulation.

It is worth drawing attention to the fact, that in Hostivice the transfer of a calva or at least part of it (cattle 1 - pit 3) was recorded together with the removal of the lower jaws (cattle 1 - pit 5) and the removal and transference of horns (cattle 1 - pit 3, cattle 1 and 2 - pit 5), but also the presence of upper jaws (or the whole skull) and lower jaws together (cattle 2 - pit 5). In this respect the Hostivice find is diverse and not uniform.

**The separating of limbs** (or other anatomical parts) is rather exceptional. Limbs are not recorded on the plan and photo of an individual in Biendorf (see *Götze 1936*). The second document comes from one of the pits

in Zeuschwitz (*Behrens 1964*, KKA), where the hind limbs of a cattle individual were separated and transferred to the front of the front limbs.

If just a part of a dog skeleton is found, it is often a skull (often without the lower jaws). Isolated **dog skulls** have been found for example in Džbánice (*Horňanský - Skutil 1950*, MMK), in Čičarovce (*Vízdal 1980*, PK), in Złota (*Andratojć 1986*, KK), in Nitrianský Hrádok (*Ambros 1955*, BK), in Jordanówo (*Gabalówna 1958*), in Weissenfels (*Behrens 1953*, KNP) and elsewhere. Apart from that just one limb, limbs or at least limb bones have been repeatedly found (Zschemnitz-KŠK (*Andratojć 1986*), Bernardstahl-LgK (*Zalai-Gaál 1994*) and at the cultic site of Buchow-Karpzow 2 (feat. 5 - *Teichert 1984*, EHK)).

*Žid (2000)* shows, that in the period under discussion only isolated skulls were found with cattle in 14% of the cases, with dogs in 27 %, remains (skeleton parts, bones) were found with cattle in 18 % and with dogs in 11 % of the cases. Sometimes the grave only contains skeletons or only skulls or only remains, but often a combination of a skeleton (skeletons), a skull (skulls) and a part of a skeleton (parts of skeletons) are found.

The particulars mentioned above testify to the fact, that the **dissection of animals' bodies and the removing of parts of them or, on the contrary, putting only certain parts into the grave is a common and relatively run-of-the-mill phenomenon** in eneolithic burials of Central Europe, with a lot of parallels with Hostivice. For example the separating of the head and the manipulation of it (like in Hostivice in pit 3) is a very widespread phenomenon, especially in the Funnel Beaker culture (which Hostivice belongs to, too), in contrast to, for example, the Globular Amphora culture. The separating of lower jaws (like with cattle 1 and the dog in pit 5 in Hostivice) and most of all horns (like in Hostivice in pit 5) has been recorded, with the horns being removed from the grave, deposited or transferred. The isolation of the head, but also of other parts including the limbs, is repeatedly documented in the case of dogs. On the other hand the isolation of only the limbs (all or some of them) of cattle (like in pit 5) is rather extraordinary and we do not encounter any other case that matches Hostivice. The documentation of the separating of the head and horns from Hostivice as well as from other sites shows the significance of these anatomical parts and corresponds with non-osteological finds ascribed to the bull cult (see *chap. 4*). The separating of limbs and lower jaws is a phenomenon that has not as yet been explained.

**The burying of bones of (ritually) consumed animals** is known from ethnography. In Hostivice, like in many other sites we do not reckon with this phenomenon in the case of the cattle, because the skeletons or their parts were articulated and also small carpal bones, a hyoid bone, phalanges and others were found in their anatomical positions (pit 3). The complete articulated spine including the caudal part (at least with individual 1) was found in pit 5. The burying of isolated bones is feasible with the dog from pit 5 (and as the case may be with some cattle bone fragments from pit 5 which could, however, also be part of the fill).

In Hostivice the skeleton of an adult cow was found in pit 3, in pit 5 the remains of 5 individuals, of which larger parts of the skeleton were only present in two (or three) cases (a younger - 2,5 to 3,5 year old and an old - 5 to 7 year old individual and maybe one more old individual). **Pairs of cattle skeletons** have been found at many sites: Brześć Kujawski (*Świeżyński 1958*, KKA), Parchatka (*Gabalówna 1958*, KKA), Zdrojówka (*Bökönyi - Kubasiewicz 1961*, KKA), Klementowice XV-grave 1, *Lasota 1972*, KNP/KKA), Alsónémedi (*Bökönyi 1951*, BK), Budakalász (*Behrens 1964*, BK), Biendorf-WK, Dölkau-KKA, Mittelhausen-KKA (the last according to *Gabalówna 1958*), Falkenwalde (*Lehmkuhl - Nagel 1991*, EHK), Derenburg (*Döhle - Stahlhofen 1985*, Be), Osterburg (*Behrens 1964*, KKA/Tief), Plotha (*Behrens 1964*, KKA), therefore mostly in Globular Amphora culture contexts. It is not clear how much of skeleton 3 is represented in pit 5 in Hostivice, but it is certain, that parts of three individuals were deposited there deliberately. Graves with **three individuals** have also been uncovered in the Central European eneolithic, for example in Klementowice (*Lasota 1975*, KKA), Zauschwitz (*Döhle 1988*, KKA), Dölkau (*Behrens 1964*, KKA), Oschersleben (*Döhle - Schlenker 1998*, KKA), therefore again in the Globular Amphora culture.

A combination of an old (or adult) and a young (or subadult) individual has been discovered in Dölkau, in Brześć Kujawski (graves 3, 5) and at the sites of Plotha and Alsónémedi (graves 3 and 28). **The age difference** is very striking, especially in Alsónémedi (in grave 3: 8 years and 1.25-1.5 years, in grave 28: 6 years and 10-12 months) and in Plotha (3-5 years and at least 10-12 years). Both individuals from grave 2 in Brześć Kujawski and in Biendorf, on the contrary, are both 3.5 to 4 years old. Both the individuals from the grave in Klementowice (here non-adult) are of the same age and the individuals from pit 12 in Zdrojówka (3.5 and 2.5-3 years), and in Osterburg (both more than 12 years) are of similar age, in Derenburg all of the six individuals (altogether from three graves) are even of the same age (4-5 years). In some finds the burial of a cow

with her calf is assumed. This combination is unlikely for Hostivice (pit 5), in view of the fact, that individual 1 is obviously a bull and individual 2 is already almost adult. It has not been ruled out, that we are dealing with a male and a female in Hostivice (as has been shown for example at Osterburg, Biendorf and Alsónémedi - grave 3), but the **gender**, especially in the case of individual 2, is difficult to guess. The presence of couples of males and females is not the rule, for example in Brześć Kujawski there are two bulls in grave 5, in Oschersleben two castrates, in Zdrojówka (pit 12) two females. A pair can also symbolically represent a team, which has already been known in the eneolithic, especially in the form of two cattle next to each other. This thought is supported by the fact, that the discovery of cattle burials goes hand in hand with the first appearance of carts. Nevertheless there are a number of indications, which *Pollex (1999)* describes summarily, that argue against this theory (for example the different genders that appear in the buried pairs are not suitable for teams, the young individuals which often appear are not suitable for teams).

**Both genders** are usually present in the **graves**, sometimes in the combination of bull (bulls) and cow (cows) and a castrate is also listed at Alt-Töplitz (*Gabatówna 1958*), Weissenfels (*Behrens 1953*), Zauschwitz (*Döhle 1988*), Derenburg (*Döhle - Stahlhofen 1985*) and Oschersleben (*Döhle - Schlenker 1988*), but no uniform rule for the combination of the genders and ages of the individuals in the graves has been discovered. Pikutkowo (KAK) can serve as an example of multiformity as, according to *Žid (2000)*, a cow and calf and another non-adult individual were found in grave 1 while in another part of the grave there were the bodies of two young individuals, one of which was identified as a bull. *Behrens (1953)* and *Nobis (1954)* uncovered males, females and castrates in the relation of 6:8:4. from Weissenfels (KNP) They are of different age, but mostly not older than 4 years. Also *Pollex (1999)* draws attention to the disharmony in the appearance and combination of the genders. It is possible, that (at least in some cases) it did not depend on gender and age when it came to the burying of animals.

Generally **cattle** individuals of different **age** are found in the graves and the different age categories are on the whole represented equally. In a lot of cases young individuals predominate (Brześć Kujawski, Weissenfels, Stobra). Very young calves (much younger than individual 2 from pit 5 in Hostivice) come from the graves in Šarovce (10-12 months), in Budakalász (8-10 months), in Alsónémedi (10-12 months) and in Falkenwalde (6 months and 7 to 10 months). Very old individuals (over 10-12 years), on the contrary, are recorded at the sites of Plotha and Zauschwitz. In Hostivice the relation of adult (or older) and younger (non-adult) individuals, of which the greater part of the body had been buried, is 2:1 (or 3:1, if we count individual 3 from pit 5), but on the whole (also on the basis of the finds which do not belong to the skeletons) the relation of older and younger individuals is balanced.

Likewise the buried **dogs** can be of different **ages**. The dog buried in Brandýsek was only 6-8 months old (*Zikmundová 1960*). Some of the dogs in Weissenfels (*Behrens 1953*) were only 2 to 3 months old. The puppies from Hostivice pit 6 (*chap. 2*) also had a very low age.

According to *Behrens (1964)* non-adult animals (80 %) are more common in the graves than adult ones (20 %).

Eneolithic cattle burials are not nearly as commonly found in the Czech Republic and Slovakia as in Poland, Germany or Hungary. On the territory of the **Czech and Slovak Republics** a cattle burials has been found in: Dolní Věstonice (cattle and four people, BK - *Koštuřík - Šebela 1992*), Šarovce (cattle, KK - *Ambros 1958*), Svodín (cattle, Baden culture - *Němejcová-Pavúková 1982*). Only cattle skulls have been found elsewhere (for example Tomášovce-Komjatice, boleráz - *Točík 1979a*).

Dog skeletons are more commonly found at neolithic and eneolithic sites in the Czech and Slovak Republics. They are present in graves: in Brandýsek (1 dog, KZP - *Zikmundová 1960*), in Dolní Věstonice (3 dogs, BK - *Koštuřík - Šebela 1992*), in Hluboké Mašůvky (1 dog, MMK - *Neustupný 1950*), in Vedrovice (1 dog, neolithic - *Podborský 1988*), at Hurbanovo (1 dog, LnK - *Ambros - Novotný 1953*) and Iža (1 dog, LnK - *Dušek 1961*), in Blatná in Slovakia (1 dog and 2 children, LnK - *Pavúk 1980*), in Šarovce (dog and human, BK - *Novotný 1958*), in Nitriansky Hrádok (1 dog and 1 human, KK - *Ambros 1955*), in Tomášovce-Komjatice (dog skeleton, LgK - *Točík 1979b*) and in Svodín (1 dog and 1 human, LgK - *Němejcová-Pavúková 1982*).

A combination of animal species as in Hostivice in pit 5 (= cattle and dog) has only been found in Dolní Věstonice (pit 200, *Koštuřík - Šebela 1992*) on Czech and Slovak sites. The Globular Amphora period pit here contained a single cattle and three dog skeletons. The finds have not yet been described in osteological detail, but from the drawings it seems, that the skeletons are complete. The cattle individual buried in isolation in Šarovce is different from the cattle individual in pit 3 most of all as regards the age of the animal. The head is, however, separated as well (as opposed to Hostivice-pit 3 neither the upper nor lower jaws were found).







**The joint appearance of cattle and dog bones beside human skeletons** (as in Hostivice in pit 5) has been recorded at a lot of sites in the Central European area. Amongst them the find from Weissenfels in Germany (graves 7 and 27 - *Behrens 1953*, KNP-Baalberg group), which also agrees in cultural terms with the Hostivice find, is at least partially similar to the Hostivice find from pit 5. The graves from Weissenfels differ most of all in the presence of a larger number of cattle and dog individuals and of a lot of isolated skulls (including a pig skull in grave 7). The find from Jordanówo in Poland is also similar to Hostivice (*Seger 1906*, *Gabalówna 1958*). At that site there was a (wild?) cattle skeleton whose horns had been broken off and the head cut off but not removed from the grave. A dog skeleton lay on the skull and a child's skull and another two dog skulls were also present. The cultural association of the finds is unclear but *Behrens* connects them with the Funnel Beaker culture.

In the Central European area mostly animal burials from Germany have been osteozoologically analysed in detail: Weissenfels (*Nobis 1954*, KNP), Falkenwalde (*Lehmkuhl - Nagel 1991*, EHK), Derenburg (*Döhle - Stahlhofen 1985*, Be), Zauschwitz (*Döhle 1988*, KKA), Buchow-Karpzow (*Teichert 1984*, EHK), Zachow (*Teichert 1990*, WK), Oschersleben, Plotha, Storba and Osterburg (*Döhle - Schlenker 1998*, KKA); from Poland: Brześć Kujawski (*Świeżyński 1958*, KKA), Klementowice (*Lasota 1972; 1975*, KKA, KNP), in Adolfin, Zdrojówka (*Bökönyi - Kubasiewicz 1961*); and from Hungary: Alsónémedi (*Bökönyi 1951*, BK), Üllö, Hódmezővárhely (*Bökönyi - Kubasiewicz 1961*); and sporadically from Slovakia: Šarovce (*Ambros 1958*, BK). These papers also provide **metrical evaluations**. The withers **height** (reckoned from the long bones) is only given by the authors in some cases: in Alsónémedi 128-132 cm (female), 130-133 cm (female), 120 cm (young male), in Brześć Kujawski 118.5 cm (female), 130.2 cm (male), in Falkenwalde 106-112 cm (female?), 126 cm (male), 106.7 cm (female?), in Derenburg 137 cm (castrate), 132 cm (male), 129.3 cm (male), 136 cm (male), 132.5 cm (castrate), 128 cm (female), in Zauschwitz 122.5 cm (female), 142.6 cm (castrate), 145.6 cm (castrate). If we compare these heights with the heights found in Hostivice (117.4 cm - adult female, 113 cm - a not completely grown individual) and allow for the fact, that some individuals here were even taller (cattle 1 from pit 5), the withers heights from all sites roughly correspond. Nevertheless it is obvious, that the female from Alsónémedi and the individuals from Derenburg and Zauschwitz are somewhat taller. It is also possible to estimate the size of a cattle individual by the **dimensions of the long bones**, in this way it is possible to compare more particulars than using the given withers heights (which can be, in addition, calculated using slightly different indices). For this comparison (see *tab. 4*) were chosen the metacarpus, metatarsus, the radius and the tibia - these bones are most often found complete. Altogether nineteen Central European sites were assessed. The length dimensions were compared also graphically (*graph 1-4*), the dimensions from Hostivice are set off in the diagrams. The *graph 1-4* and *tab. 4* show again, that the cattle from Hostivice (individual 1-pit 3 and individual 2-pit 5) essentially do not deviate in size, but are somewhat smaller than the average. It is important to make clear, that the tibia and radius of the juvenile individuals from Alsónémedi and Šarovce, similar to the tibia from Hostivice, do not have an attached epiphysis, therefore their length could still grow somewhat. The very young calves from Šarovce and Alsónémedi of 10-12 months, for which the authors estimated a height during life of 70-80 cm and 85-95 cm, are not encompassed in *graphs 1-6*. For comparative purposes, the cattle in the graphs and the table are also compared with contemporary cattle (according to *Bökönyi 1951* and *Lasota 1972*) and with the aurochs (according to *Nobis 1954*). The comparison of all long bones showed the relatively larger dimensions of the individuals from German sites compared with the individuals from more Eastern regions (Poland, Hungary, Bohemia - these are always concentrated on the left half of the graph). The influencing of this result by gender difference is not probable, as can be noted from the gender distribution shown in the graphs (signs > < v). Generally we are dealing with cattle of different sizes in the described graves but they are always smaller than an aurochs. Although a detailed analysis of the size and morphology of cattle has not been carried out for the investigated period on our territory, on the basis of the *Peške* descriptions (*1994*) we can say, that the cattle from burials do not differ in size from cattle from settlement layers. Descriptions from surrounding countries also result in similar conclusions (*Nobis 1954; Benecke 1994; Bökönyi - Kubasiewicz 1961* - see *chap. 6*). Nevertheless the buried castrates from the German sites of Derenburg and Zauschwitz (*graph 1*) significantly exceed the upper limit published by *Benecke* (he shows a metacarpus length of between 185,7 and 205,8 mm for the period analogous to the eneolithic).

The cattle individual from pit 3 in Hostivice obviously had well developed muscles, this can be deduced from the character of the muscle tendrils. *Bökönyi* on the other hand mentions that the female from Alsónémedi had been gracile with weakly developed tendrils for the muscles and generally the cattle there were of delicate **build**. *Table 5*, which compares the slenderness indices of individuals from 15 sites, allows the comparison of the relative width respectively the slimness of the long bones. According to the comparison, cat-

tle 1 from pit 3 in Hostivice has a relatively robust radius and tibia (*zeugopodium* bones), and according to *table 5* it has the broadest tibia of all the compared individuals. The metapodium (most of all the metacarpus) of this individual on the other hand, according to which it was classed as female, are quite slender in relation to the *zeugopodium*. The females from Brześć Kujawski, Weissenfels, Zauschwitz and Derenburg are, according to their metapodia, altogether more delicate than the assumed female from Hostivice. The females from Adolfin on the other hand are more robust. The long bones of individual 3 from Falkenwald are surprisingly slender, nevertheless they were defined as male by the authors.

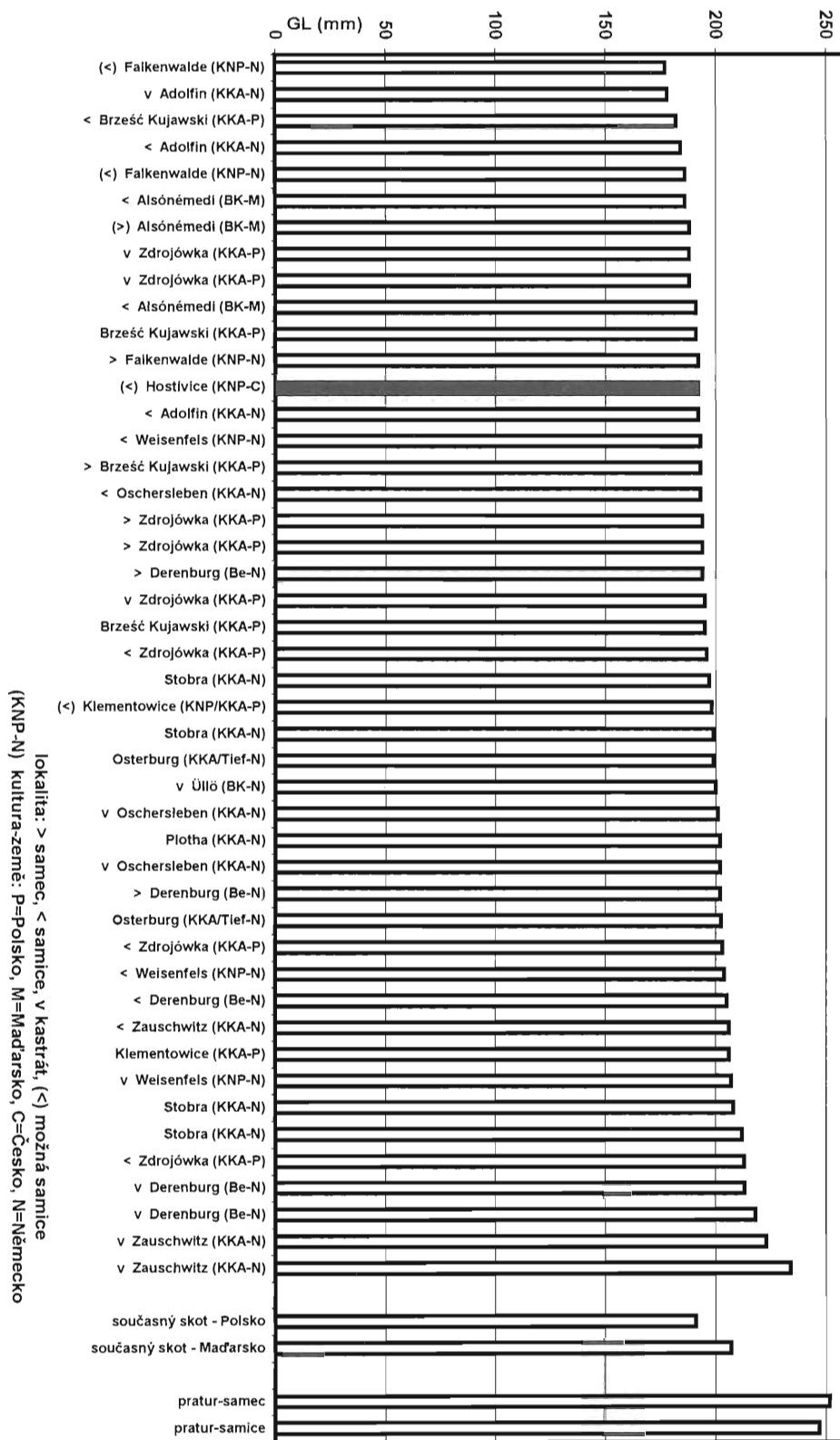
The **dimensions** obtained from **the teeth** were compared with 12 sites altogether (*tab. 6*). Although the absolute values differ somewhat on the individual sites, the differences are not too considerable (the length of the rows of upper molars determined at the Buchow-Karpzow site is somewhat bigger and the value from Üllö somewhat smaller than the corresponding dimensions identified in Hostivice, the row of upper back teeth of individual 3 from Alsónémedi is a little shorter, the dimensions of the lower back teeth from Weissenfels, Adolfin and Zdrojówky are somewhat smaller than in Hostivice).

The **body proportions** are characterized by the indices in *tab. 4, 5* and the *graphs 5, 6* and *7*. The relationship between the length of the tibia and the metatarsus or between the radius and the metacarpus (*tab. 5, graph 5* and *6*) differ with the compared individuals: the relationship between the radius and the metacarpus up to 19 %, the relationship between the tibia and the metatarsus up to 20 % (juvenile individuals are not included into the graphs, because they display lower indices due to the unfinished growth of the radius and the tibia). It seems, that the *zeugopodium* bones (radius and tibia) of the males are comparatively longer than those of the females (see gender distribution in *graphs 5* and *6*). The relationship between the metatarsus and metacarpus, or the tibia and radius, does not differ so much with the individuals (the relationship between metatarsus and metacarpus differs only by 6 % maximum - *tab. 5, graph 7*). This indicates, that with eneolithic cattle (from the burials) there weren't any essential differences between the length of the front and hind limbs (not even in the case of the juvenile individual from Šarovce). In this characteristic feature the eneolithic cattle from the burials were therefore uniform.

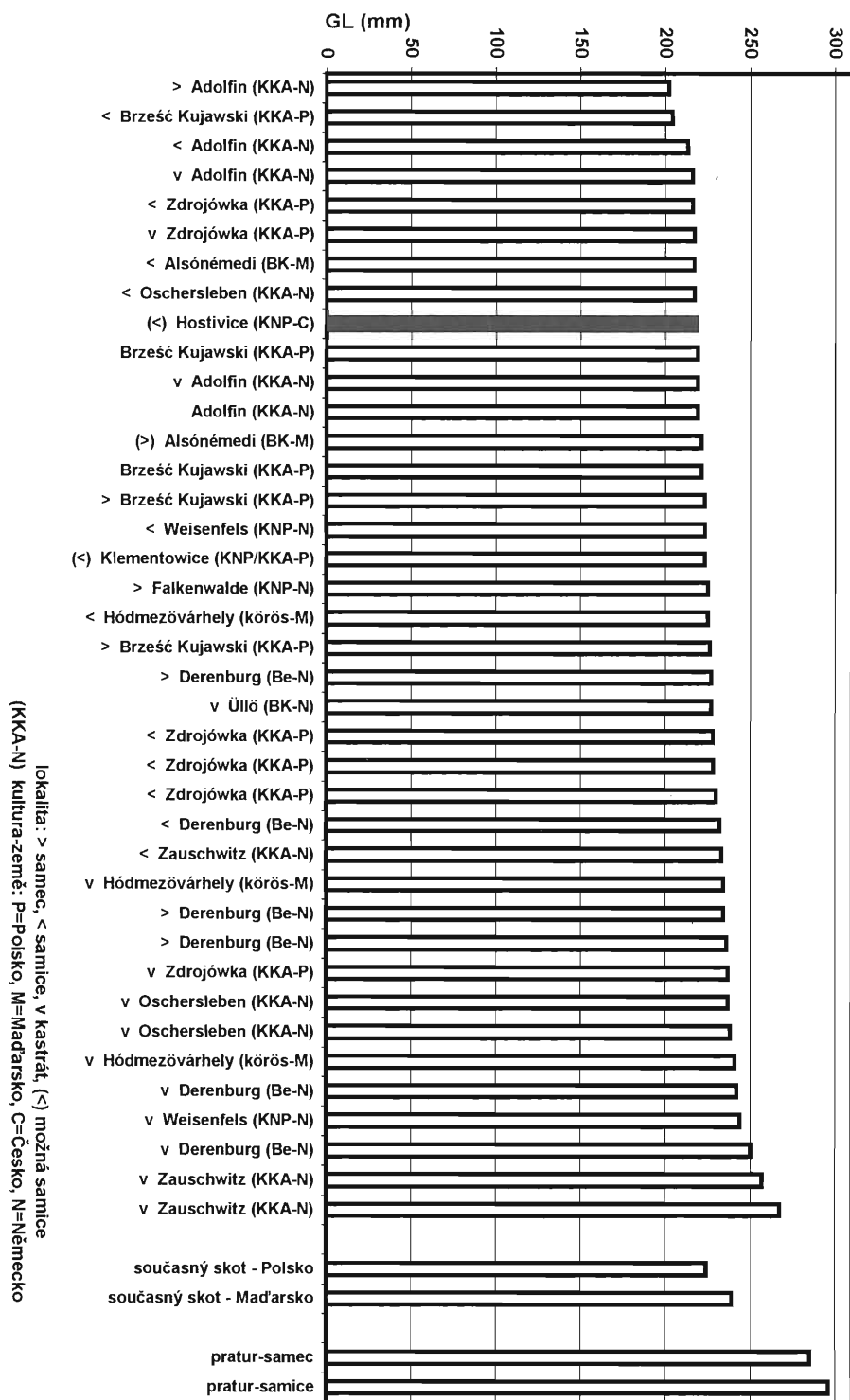
The individual from Hostivice (from pit 3) has (in relation to the *zeugopodium*) relatively long metapodium (respectively short *zeugopodium* bones - *graph 5* and *6*), in the case of the tibia and metatarsus to the extent of having the longest of all the compared individuals (*graph 6*). In comparison with other sites this individual has broad *zeugopodium* bones (*tab. 5*). The individuals from Derenburg (judged as a whole), on the other hand, have comparatively long *zeugopodium* bones (in relation to the metapodia). The relationship of the lengths of upper and lower back teeth rows of the individual from Alsónémedi is different from that of the individual from Hostivice, as is the relationship between the length of the row of molars and the total length of the back teeth row (evident for example in the case of the individual from Falkenwalde) (*tab. 6*).

From the analysis **disproportions (allometry)** in the comparative lengths (between the *zeugopodium* and metapodium) and in the relative robustness of the long bones and in the dental dimensions arise in the case of eneolithic buried cattle. **The disproportions mentioned can be influenced by the gender and age of the animal, nevertheless it seems, that the individuals did not belong to one uniform breed, but to "variations" ("breeds"?) with a different build. Also the general size of the compared individuals displays a relative large variability.** On the other hand almost no disproportions at all were found there in the relationship between the lengths of the hind and front limbs (the hind and front metapodium).

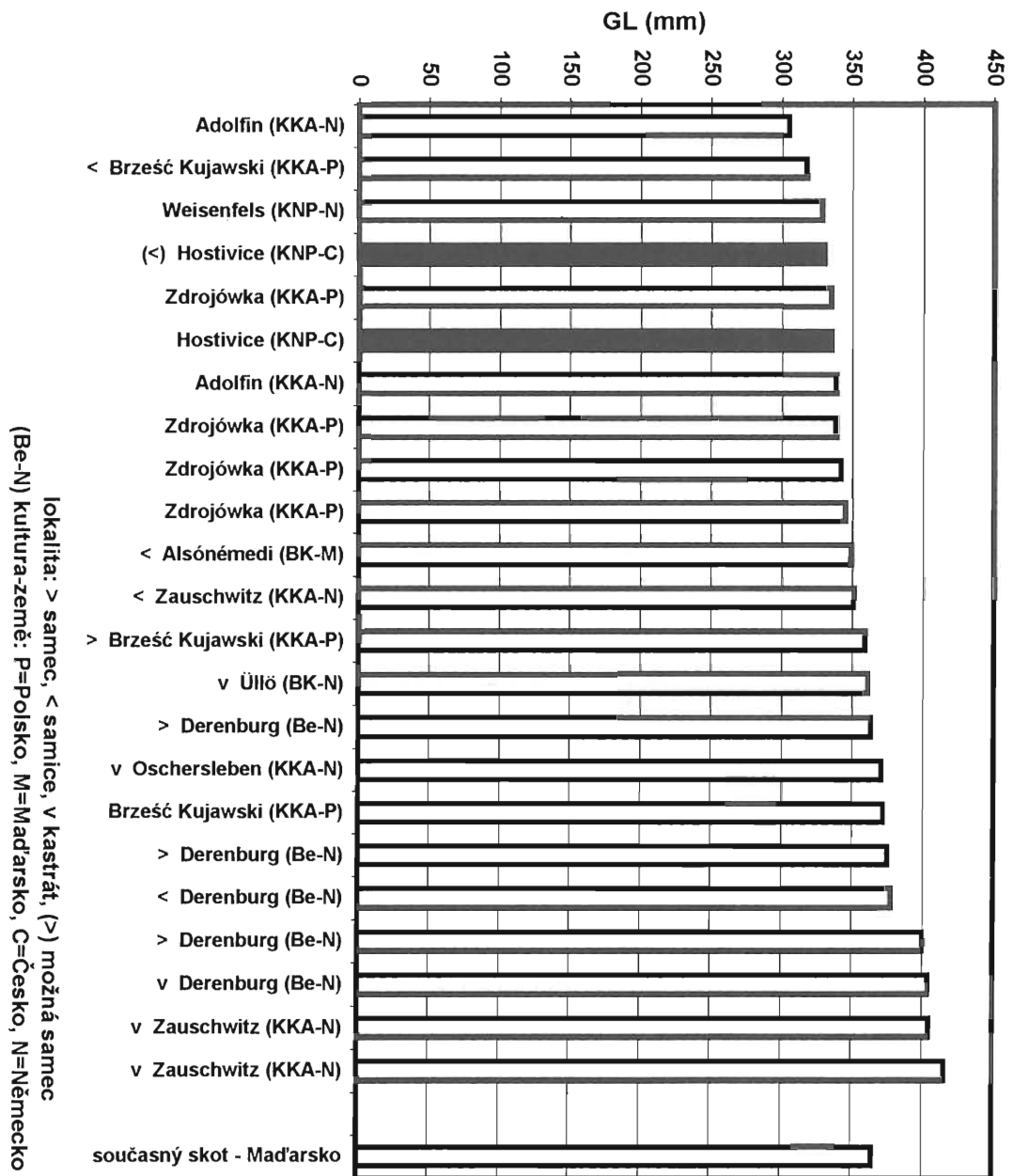
**The horncores** from Hostivice belong to the "*primigenius*" type, the "*brachyceros*" type was not reliably documented here. The short horncores of individual no.2 from pit 5 were loose, which is a pathological condition and must therefore be examined from another point of view - see *chap. 3*. All horncores whose shape could be determined are bent arch-like, but they are not significantly twisted or rotated, they are flattened, but not too significantly. A more detailed description and a metrical evaluation of the horncores of buried cattle from other sites were only found in the literature for the cattle from Weissenfels (*Nobis 1954*) and from Oschersleben, nevertheless *Seger (1906)* mentions both the *primigenius* and the *brachyceros* type at Jordanów. *Gabalówna (1958)* and *Behrens (1964)* give information about a burial of a hornless cattle form the site of Złota (KKA/Złota), where, according to *Behrens*, there was a hornless and a horned form. The attached photographs of cattle from Weissenfels (*Nobis*) show horncores that are variable in shape (there is a horncore which is only slightly bent as well as a horncore which is bent into a pronounced arch and twisted in dorsal direction). On average, though, they are similar to aurochs horncores. Although the cattle individual from Weissenfels belongs entirely to the *primigenius* type (see dimensions: the max. lengths of the ten horncores here are between 180 and 300 mm with the exception of two: 130 and 440 mm, the base perimeter is between 170 and 268 mm,



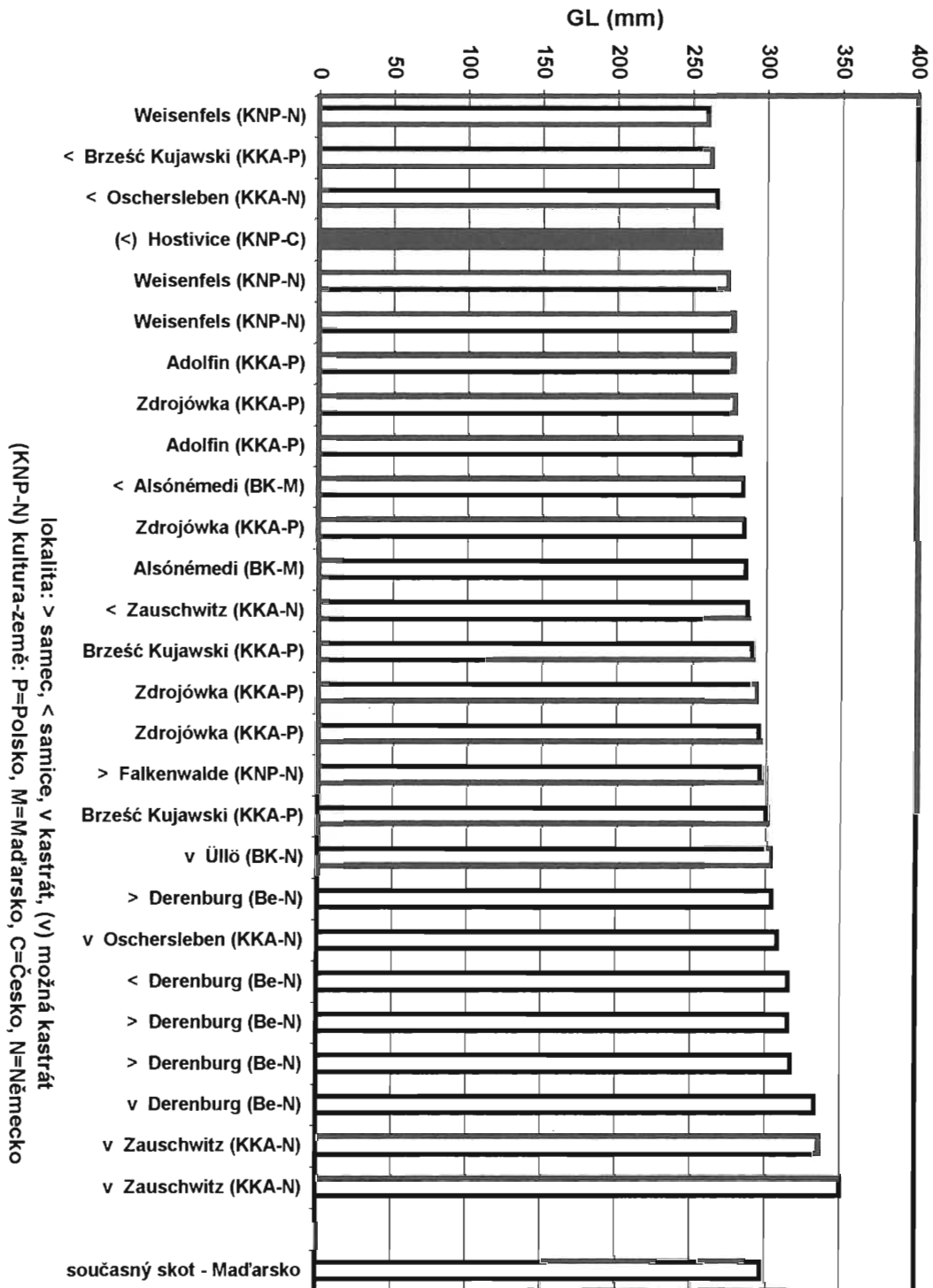
Graph 1. Cattle (*Bos primigenius* f. *taurus*) - metacarpus - max. length - on the basis of data from eneolithic burials in Central Europe (explanation see graph 7) — Graf 1. Skot (*Bos primigenius* f. *taurus*) - metacarpus - max. délka - na základě údajů eneolitických pohřbů ze střední Evropy.



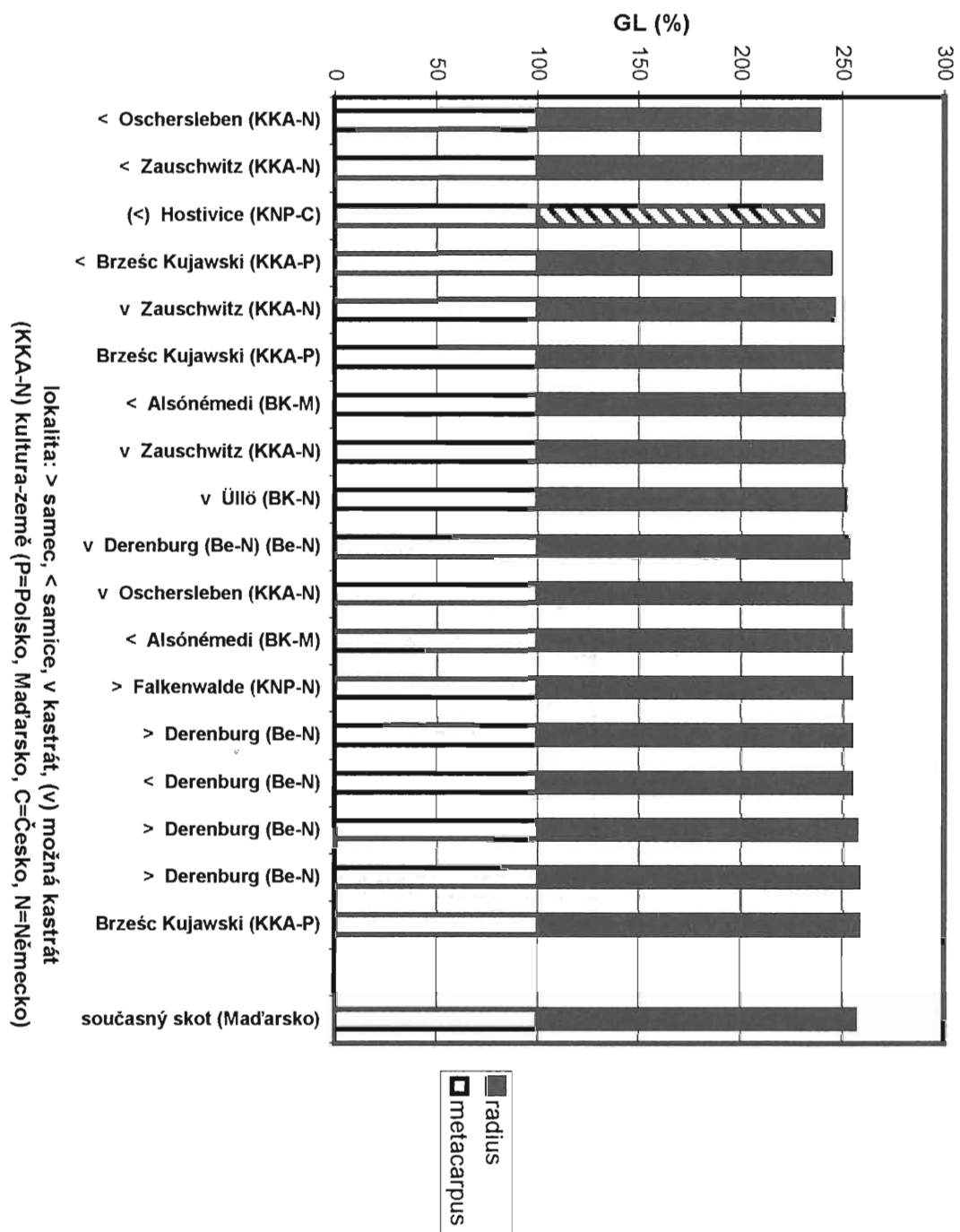
Graph 2. Cattle (*Bos primigenius* f. *taurus*) - metatarsus - max. length - on the basis of data from eneolithic burials in Central Europe (explanation see graph 7) — Graf 2. Skot (*Bos primigenius* f. *taurus*) - metatarsus - max. délka - na základě údajů z eneolitických pohřbů ze střední Evropy.



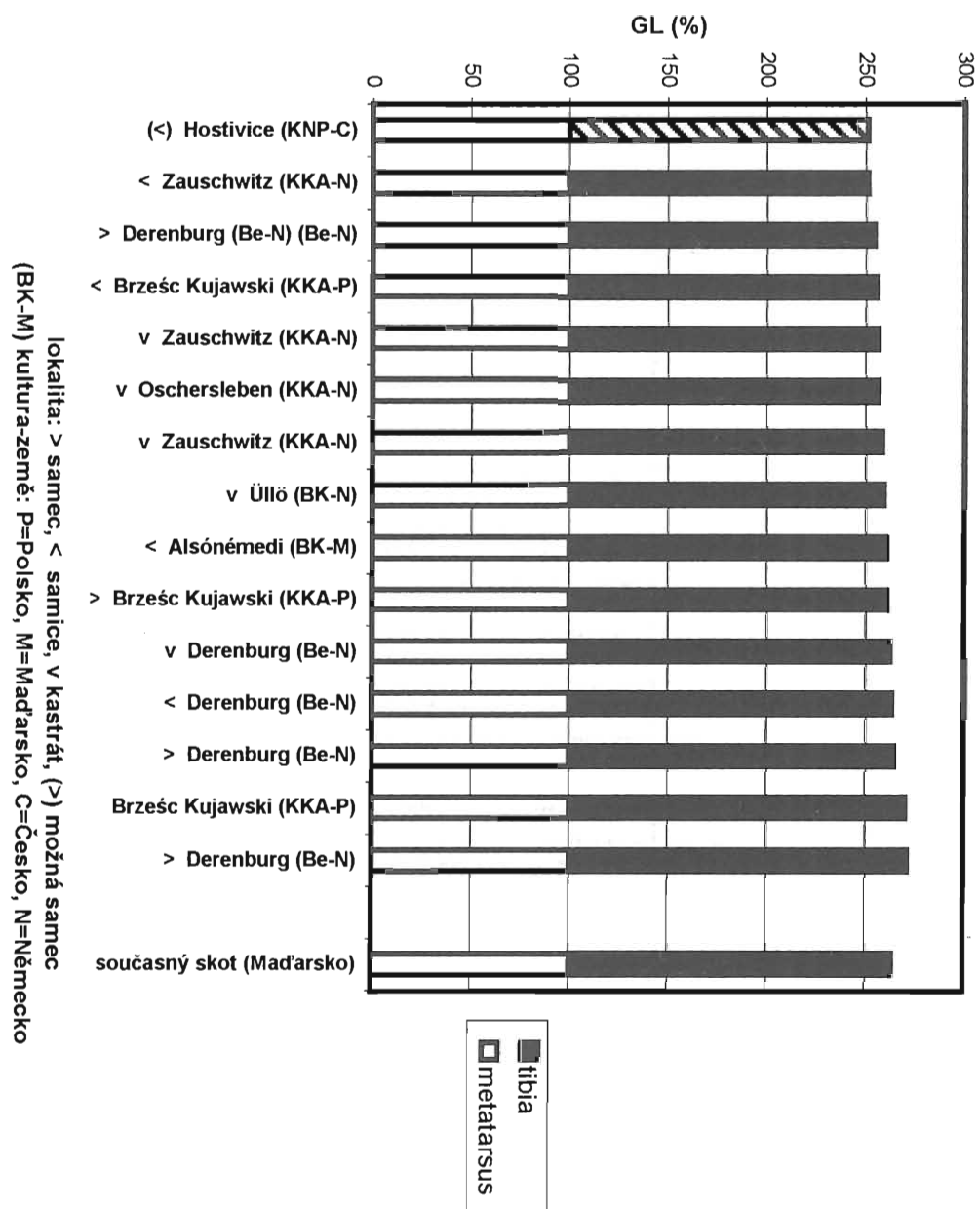
Graph 3. Cattle (*Bos primigenius* f. *taurus*) - radius - max. length - on the basis of data from eneolithic burials in Central Europe (explanation see graph 7) — Graf 3. Skot (*Bos primigenius* f. *taurus*) - radius - max. délka - na základě údajů z eneolitických pohřbů ze střední Evropy.



Graph 4. Cattle (*Bos primigenius* f. *taurus*) - tibia - max. length - on the basis of data from eneolithic burials in Central Europe (explanation see graph 7) — Graf 4. Skot (*Bos primigenius* f. *taurus*) - tibia - max. délka - na základě údajů z eneolitických pohřbů ze střední Evropy.

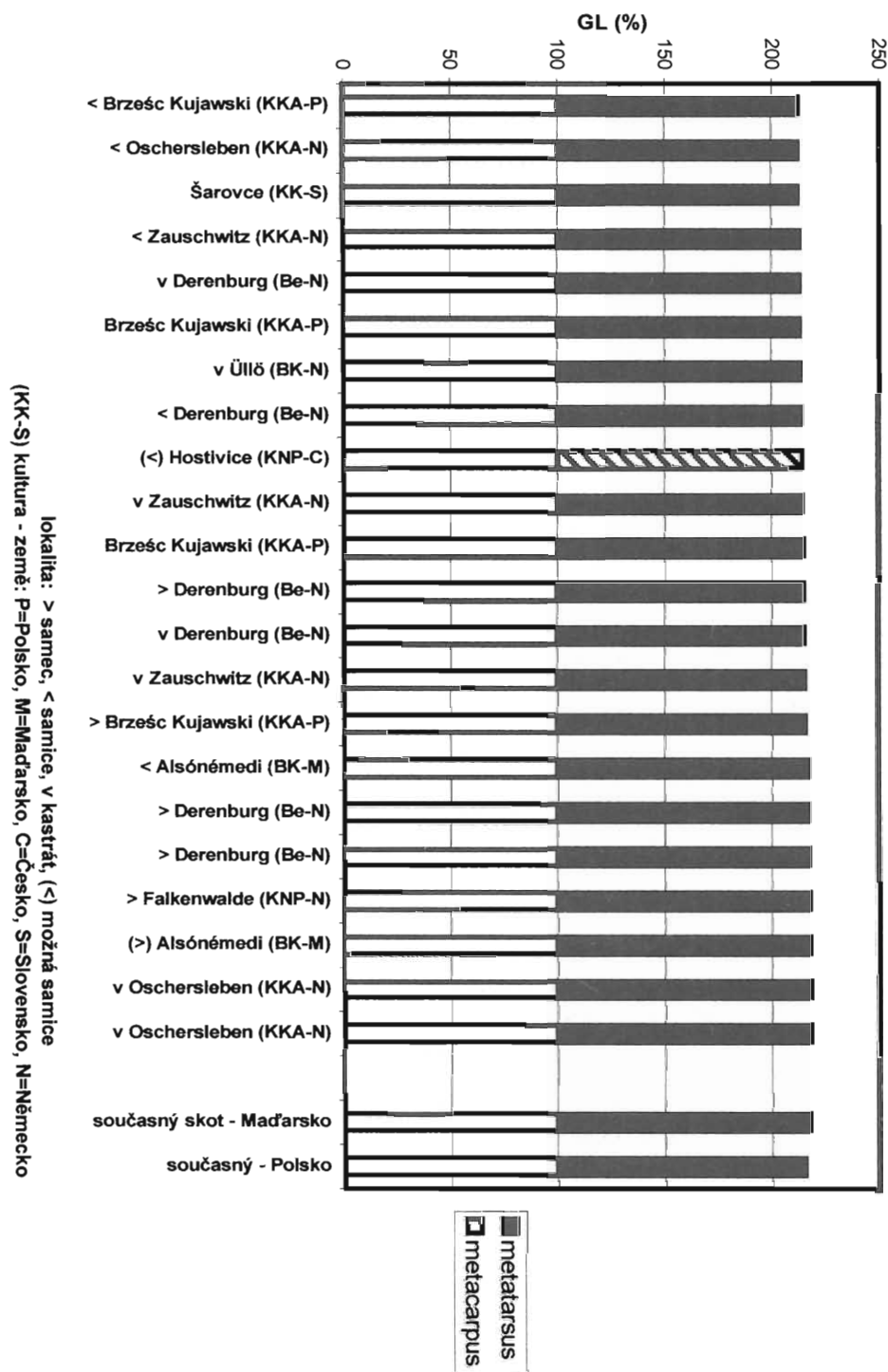


Graph 5. Relationship of max. length of metacarpus and radius of cattle (*Bos primigenius* f. *taurus*) from burials at Central European eneolithic sites (explanation see graph 7) — Graf 5. Poměr max. délky metakarpu a vřetenní kosti skotu (*Bos primigenius* f. *taurus*) z pohřbů z eneolitických lokalit střední Evropy.



Graph 6. Relationship of max. length of metatarsus and tibia of cattle (*Bos primigenius* f. *taurus*) from burials at Central European eneolithic sites (explanation see graph 7) — Graf 6. Poměr max. délky metatarsu a holenní kosti skotu (*Bos primigenius* f. *taurus*) z pohřbů z eneolitických lokalit střední Evropy.





Graph 7. Relationship of max. length of the metatarsus and metacarpus of cattle (*Bos primigenius* f. *taurus*) from burials at Central European eneolithic sites — Graf 7. Poměr max. délky metatarsu a metakarpu skotu (*Bos primigenius* f. *taurus*) z pohřbů z eneolitických lokalit střední Evropy.

[Explanation: > samec = male; < samice = female; v kastrát = castrate; (>) možná samec = maybe male; (<) možná samice = maybe female; (v) možná kastrát = maybe castrate; lokalita = site; (kultura - země = culture - country: P = Polsko = Poland, M = Maďarsko = Hungary, C = Česko = Bohemia, S = Slovensko = Slovakia, N = Německo = Germany); současný skot = recent cattle, pratur = aurochs].

the index of the flattened base shape is between 69.2 and 98.5 %) and according to the classification by Adamez skull 11 is of the *brachyceros* type. At the site under discussion the intercornual line is sometimes almost straight, sometimes wavy. A very small horncore (base: 52.5 x 44 mm, perimeter 157 mm) belonged to a cow buried in Oschersleben (*Döhle - Schlenker 1998*) - it is smaller than any of the horns from Weissenfels and Hostivice. The preserved horncores from Hostivice (see *tab. 7, chap. 2*) on the one hand are of large dimensions (individual 1 and 3/5 from pit 5 and the horns from the 1972 excavation) and on the other hand of small dimensions (individual 3/5 and the individual from context 38 from pit 5). The dimensions of the horncores from Hostivice correspond with the border values (the smallest and the largest) for the variability which is not only found in graves (Weissenfels), but also in the entire population (comp. e.g. the finds from Germany - *Müller 1964* and Poland and Hungary - *Bökönyi - Kubasiewicz 1961*). The **variability in the size of the horns**, which has been ascertained in Hostivice merely from comparatively scanty material (4 + 5 horncores or their fragments) is therefore **considerable** (*tab. 7*). Similar to Weissenfels but also to settlement finds this variability is much greater than the variability in the complete body size and is mostly the result of gender dimorphism.

The dog from pit 5 in Hostivice corresponds roughly with the dimensions given for the dogs from Hurbanovo (*Ambros - Novotný 1953*), Nitrianský Hrádok (*Ambros 1955*) and Brno-Černé Pole (*Ambros 1952*).

A **round hole** was found in the centre of two cattle skulls from Wiltshire (*Davis - Payne 1993*, neolithic-eneolithic) - clearly proof of **slaughter**. Large openings created by a sharp instrument were found on the forehead of two young cattle from grave 3 from the site of Stobra. They were connected with the killing of the animal (*Gabalówna 1958*, KKA). The discoveries mentioned above show, that the finding of a round hole in the cattle 1 from pit 5 in Hostivice is not an isolated case is suggestive of the manner of slaughtering cattle. The Hostivice find differs from the find from Wiltshire in the position of the hole (see *chap. 4, fig. 1*). The points found in the thorax area of buried aurochs, which have also been connected with the killing of the animal, testify to another way of killing animals (Parchatka-KKA, Złota - KKA/Złota - *Nosek 1967*).

Analogous finds of cattle with **loose horns** were not found in the literature. But the hornless form is known in Central Europe from the eneolithic, from graves as well as from settlement finds (see Złota - *Gabalówna 1958*, Złota, Halle-Mötzlich - *Müller 1963*, KNP (Salzmünd c.), Štúrovo, Podolie - *Ambros 1988*, BK and others - *Świeżyński 1958*), and it must be added, that the oldest finds originate from the Funnel Beaker culture period.

The **burning of the teeth** (as with the dog from Hostivice from pit 5) is not mentioned by any of the authors, but it is necessary to remark, that this burning is a sign which can be easily missed. I discovered burning of the teeth on the dog skull from Konobřž (Pod zámkem, feature 2/70-common settlement pit, preliminarily dated into the Knovíz period - unpublished) and on the dog skull from Černý Vůl (unpublished). The burning of animal bones from some finds (Biendorf-WK, Klementowice-grave1-KKA) is connected with a (cultic) fireplace placed directly in the grave (*Götze 1936; Gabalówna 1958*). It is necessary to observe, that the burning of the teeth of the dog from pit 5 is the only evidence of burning from this pit.

**Conclusion:** Although many parallels and conformities were found, not one of the finds described above exactly corresponds with the Hostivice find from pit 5 in the number of individuals of the relevant species and in the representation of anatomical parts. The find from Šarovce, where one individual whose head had been separated is also buried (*Ambros 1958*, Badene c. - kanelovaná) is quite similar to the Hostivice cattle find from pit 3.

Although cattle burials are a phenomenon that appears over a widespread area of Central Europe during a long timespan and are obviously a manifestation of more or less unified religious or cultic conceptions, no uniform rule (combination of species, number of individuals, combination of genders and ages of the individuals, removing of anatomical parts) was found for the mode of burial (see also *Pollex 1999*). It is possible, that gender and age were not taken into account when burying the animals. Burials of pairs (or trios) of cattle in the Globular amphora culture and the separating and transferring of cattle heads in the Funnel Beaker culture are a regular occurrence (as the essays of *Gabalówna 1958; Behrens 1964* and *Žid 2000* also imply). The separating of limbs is rather exceptional in cattle.

source						<i>Bökönyi 1951</i>		<i>Döhle - Schlenker 1998</i>			<i>Döhle 1988</i>			<i>Döhle-St. 1985</i>		**	<i>Bökönyi - Kubasiewicz 1961</i>					
site	Hostivice					*Alsónémedi		Oschersleben			Zauschwitz			Derenburg			Üllő	Adolfin	Zdrojówka			
pit	3	5	5	5	1/72	28	3	x	x	x	x	xx	xxx	1	2	2						
individual	1	1	2	3		1	3	1	2	3	1	2	3	A	A	3						
P <sup>2</sup> -M <sup>3</sup>		135	140				128								141							
M <sup>1</sup> -M <sup>3</sup>		82,5	82,2	76,6							82	90	89		87		73					
P <sup>2</sup> -M <sup>3</sup>			(148)		148,4	143	148	154	142	139	147	157	(159)	(146)	154	132						
M <sup>1</sup> -M <sup>3</sup>	87,1		(90,5)		94,2			96	88	90	95	100	92	90	95	93		85	85	86	91	85

source	<i>Teichert 1990</i>	<i>Teichert 1984</i>	<i>Teichert 1984</i>	<i>Nobis 1954</i>																
site	Zachow	Buchow-Karpzow-8	Buchow-Karpzow-2	*Weissenfels																
pit	inv.no. 1/15	several features	several features	graves 7 and 27																
individual		several individuals	several individuals	several individuals																
P <sup>2</sup> -M <sup>3</sup>			132 (n=1)																	
M <sup>1</sup> -M <sup>3</sup>		85-94 (x=89,3, n=9)	81-87 (x=83, n=3)	78	80	80	81	86												
P <sup>2</sup> -M <sup>3</sup>			142 (n=1)								136	138	138	139						
M <sup>1</sup> -M <sup>3</sup>	98	86-107 (x=96,8, n=11)	84-94 (x=88,7, n=3)														83	84	85	86

\* measurements according to *Duerst 1926* — měřeno dle *Duersta 1926*

\*\* *Lehmkuhl - Nagel 1991*, Falkenwalde

(values in brackets are not completely precise) — (hodnoty v závorkách nejsou zcela přesné)

## 6. DOMESTIC AND WILD ANIMALS

### IN THE FUNNEL BEAKER CULTURE PERIOD – A COMPARISON OF HOSTIVICE WITH OTHER SITES IN THE CZECH REPUBLIC (ECONOMIC ASPECT, CHARACTER AND SIGNIFICANCE)

In the period of the Funnel beaker culture six species of domestic mammals were known and bred on the territory of the Czech Republic (cattle, pig, sheep, goat, dog and horse). At least four of these (cattle, pig, dog and sheep or goat) are also present at Hostivice (1997-98). The horse in particular is missing (it is present in the 1972 excavations) and the evidence found for sheep and goat cannot be safely distinguished. The discovered species representation does not have to correspond with the representation in the herd, because the pits (especially 3 and 5) do not represent a randomly chosen sample of osteological material, as may be the case in settlement layers and features. An overview of species in the individual pits is given in *table 1*.

#### *Hostivice – Funnel beaker culture*

The cattle from the 1997-98 excavation did not reach a large size, although they were bigger than cattle from the middle ages. The withers heights discovered are 113 cm (cattle 2 - not yet finished growth, pit 5) and 114-123 cm (cattle 1, pit 3). Some individuals (for example cattle 1, pit 5) were obviously bigger. Also the horncores from the 1972 excavation must have belonged to a larger cattle individual (see also finds report by *Peške* from 1972). These **horncores** (*plate 12*) either belonged to male domestic cattle or to wild cattle, they are sizeable and have a strong wall (see dimensions on *table 7*). In their morphology they correspond to the longhorned (primigenium) type. They have the shape of aurochs horns and the dimensions fall within its size variability. Aurochs horncores usually have an almost round base (*Nobis 1954*). Although the described horncores from Hostivice (1972) appear relatively round in section, the discovered indices (min. diameter/max. diameter at the base) rather indicate allegiance to the domestic form. The biggest horncore most probably belonged to an aurochs (see also its relative length and the overall size - *table 7*), the smallest belonged to a domestic cattle individual (comp. flattened shape indices of the base - *table 7*), the allegiance to a form has not been determined for two middle-sized horncores obviously belonging to one individual (maybe they belonged to a female aurochs - the section of the base is quite round - *table 7*). A fragment of the smallest horncore from Hostivice (1997/98) originates from pit 5, its maximum diameter at the base is only 53,3 mm, the biggest horncore (cattle 1, pit 5 - only the horncore base has been preserved) measures 103 x 96.6 mm at the base. The size variability of the cattle horns (*table 7*) in Hostivice is much greater than the discovered variability of the entire body, which could be a result of gender dimorphism. Decidedly shorthorned (*brachyceros*) or hornless cattle have not been safely attested. The horn shape could be traced in the case of individual 3/5 from pit 5 and four horncores from the 1972 excavation - all of them are simply concave arch-shaped. They are not too significantly distorted or twisted and are not too flattened (the index of the relative base thickness is never less than 72 % - see *table 7*). The orientation compared with the skull of the horncores from the 1972 excavation could also be ascertained: all of them protrude from the skull to the sides, then they turn arch-like in dorsal and rostral direction, their surface has no lengthwise grooves and has a uniform felt-like character. It seems that an intercornual mound (*torrus intercornualis*) was present or at least indicated except for the biggest horncore where it could not be detected. A unique discovery was the presence of a cattle individual with loose horns (pit 5 - *plate 11*), which is evaluated individually - *chap. 3*. Trends towards a shortening of the jaws are already known in the neolithic and eneolithic, a manifestation of which is also the absence of the second lower premolar from individual 1 from pit 3. There is a *pila basalis* (slender accessional dentine pillar) on the upper and lower molars and a secondary email opening often appears roughly in the middle of the abrasive area of the molars.

Various **age categories** are represented (*table 8*). A large part of the cattle individuals is subadult (in pits 3, 4, 5, 6, 14), the youngest individual was somewhat less than 2 years old (cattle 4, pit 5). Cattle 1 from pit 3, the cattle from pit 4 and individual 1 and 3 from pit 5 were, on the contrary, older (around 5-7 years). No entirely juvenile or newborn calves or extremely old individuals have been attested in Hostivice. The ratio (according to the bone and tooth age) between the subadult and adult individuals is roughly even. Although the **gender** was not safely determined in most cases, both genders are most probably represented (female: ?cattle 1, pit 3; male: cattle 1, pit 5 and as the case may be the cattle horns from the 1972 excavation). The cattle found in Hostivice had probably been in a good state of health, because there are no pathological cases and cattle 1

species	excavation	pit/feature	individual	side	deposited deliberately in pit?	GL	base circumference	max. base diameter	min. base diameter	index: base circumference/GL*100	index: min./max. base diameter*100
<i>Bos primigenius</i> (?)	1972	3		dex	yes?	(410)	260	92,3	74	(63,4)	80,2
<i>Bos primigenius</i> f. ?	1972	3		dex	yes?	340	262	89,7	73,5	77,1	81,9
<i>Bos primigenius</i> f. ?	1972	3		sin	yes?	350	260	83	74	74,3	89,2
<i>Bos primigenius</i> f. <i>taurus</i> (?)	1972	3		sin	yes?	215	215	78,5	56,7	100,0	72,2
<i>Bos primigenius</i> f. <i>taurus</i> (male)	1997/98	5	1		yes			103	(96,6)		(93,8)
<i>Bos primigenius</i> f. <i>taurus</i>	1997/98	5	2*	dex	yes	158	161	57	43	101,9	75,4
<i>Bos primigenius</i> f. <i>taurus</i>	1997/98	5	3/5	sin	yes	380-440	230	79	61		77,2
<i>Bos primigenius</i> f. <i>taurus</i>	1997/98	5	3/5		admix.?			53,3	42,4		79,5
<i>Bos primigenius</i> f. <i>taurus</i>	1997/98	5	?		admix.?				58,2		

(values in brackets are not completely precise)

\* individual with unattached loose horns !

Tab. 7. Dimensions of cattle horncores from Hostivice (Funnel beaker culture) — Tab. 7. Rozměry rohových výběžků turů z Hostivice (kultura nálevkovitých pohárů).

	pits	total number
pig ( <i>Sus scrofa</i> f. <i>domestica</i> ):		
9-12 months	p4, p6	2
adolescent (1-2 years)	p4, p6	2
older individual	p4	1
cattle ( <i>Bos primigenius</i> f. <i>taurus</i> ):		
juvenile (around two years or less)	p3, p5	2
adolescent (2,5-3,5 years)	p3, p5, p6, p14	5
adult (mostly between 5-7 years)	p3, p5, p6	4
old	p4	1

Tab. 8. Hostivice - ages of cattle and pig individuals from the pits in the 1997-98 excavation — Tab. 8. Hostivice - stáří jedinců skotu a prasat z jam z výzkumu 1997-98.

from pit 3 has got well developed muscle insertions. The burials show, that cattle had not only been animals raised for meat, but had also had a sacrificial, cultic, ritual, religious or other function (see chap. 4).

**Domestic pigs** were present in pits 4, 5, 6 and maybe 3 and represent the third most frequent species in Hostivice after cattle and dog. They are of different age, with young individuals, as it is usual with pigs, occurring frequently here (table 8). For example in pit 4 there are at least three individuals: younger than one year, somewhat older than 17 months and old; one individual of just 9-12 months originates from pit 6.

Small domestic ruminants (**sheep/goat**) are only securely documented in the form of one metapodium fragment from pit 6. Rib fragments which maybe belong to this/these species originate from pits 3, 5 and 6.

The skull of an adult **dog** found in the burial from pit 5 belongs to a medium-sized to small breed. The skull does not show any extreme deviations in shape, from the side the facial part is wedge-shaped and has an only insignificantly bent forehead (see description in *chap. 2* and the reconstruction in *fig. 3*). The dog was not an exceptional pet in Hostivice, the bones of at least four puppies from pit 6 originating from at least three litters by different females provide proof of this (see *chap. 2*). Almost all the puppy bones were found on the bottom of pit 6 (most of them were together in one place), their age does not exceed five months. The bite marks on some bones which were obviously caused by a dog also provide proof of this animal's presence.

**Horse** was not found in Hostivice (1997-98) within the framework of the material from the Funnel beaker culture period (It is, however, present in the Moucha excavation material from 1972. It has not been determined whether the remains belong to a domestic or wild form).

The only hunted species present in Hostivice (1997-98) are **red deer, roe deer and catfish**. Red deer was found in a number of pits (pit 4, 6 and 15), in pit 4 there are even 2 individuals: a young one and an old one. The antlers served as material for the production of tools, as cut marks on them show (pit 6). The fact, that red deer had been hunted, is testified to by finds of other anatomical parts than antlers (which could have originated in shedding). Nevertheless all the red deer parts found come from the head (teeth, antlers). The catfish (pit 6), whose length is about 100 cm, must have been caught in a bigger river (Vltava?). (An artefact made from the ulna of a wild boar also originates from the 1977 excavation).

The **hedgehog** whose humerus has been found in pit 5, inhabited the region together with the people. (In the 1972 excavation a fox was also documented.)

**Cut marks** appear sporadically (pit 4 - fragment, pit 6 - antler), chop marks (pit 6 - on the neck of a cattle rib) and maybe cutting off (pit 6 - artefact, pit 6 - antler). It seems, that at least in some cases a comparatively sharp instrument with a straight cutting edge had been used. **Burnt** fragments are exceptional (pit 3 - fragment of a cattle scapula, pit 5 - teeth and zygomaticum of a dog, pit 6 - unidentified fragment). Artefacts are also present (pit 4 and 6, see *Pleinerová 2002*). Bite marks, probably from a dog, are attested in 5 and 6. The bite mark on the diaphysis of a pig humerus, which was maybe caused by a pig, is interesting (pit 4). These signs, together with erosion and the stage of fragmentation indicate, that this is waste, which could be part of the fill (pit 3 and 5) or make up the actual content of the pits (other pits).

Finds of petrified rhinoceros bones in pit 6 clearly show, that people in the postglacial period also encountered the bones of large extinct mammals during various activities. So the basis for the origin of various legends (about giants and so on) already existed.

#### *Other sites in Bohemia and Moravia – Funnel beaker culture*

The finds from Hostivice have not only been compared with analogous ritual burials in Central Europe (*chap. 5*), but also with all published Funnel beaker culture animal assemblages on the territory of our republic. **The representation of the animal species** at the individual sites is illustrated on *table 2*, where it is possible to compare the situation in Hostivice (pits 3 and 5 are not included, because the number of bones is influenced here by the presence of skeletons and thus it is clear that cattle would thoroughly dominate here) with the other sites. The data for *table 2* is drawn from the following publications: Praha-Baba (*Havel 1986*), Stránská skála (*Svoboda - Šmíd 1994*), Makotřasy (*Clason 1985*), Evaň, Lhotka, Křesín (all three *Kruk 1980*), Vikletice (*Kyselý - in press*), Cimburk (*Zápotocký 2000* - here mixed Funnel beaker and Badener culture material); further (with Dr. Peške's agreement) from unpublished finds reports of the Archeological Institute in Prague: Lumbeho zahrada, Dobroměřice, Hořany, Malé Březno, Hostivice (older excavation from 1972) - all prepared by *Peške*. Mostly it is a matter of smaller collections, only Makotřasy (4085 fragments altogether), Cimburk (4821 fragments altogether- but only part of the material belongs to the Funnel beaker period which is why the data from this site is presented below with a question mark) and Stránská skála (1853 identifiable fragments) produced larger assemblages. (The data about the individual sites presented below is drawn from the sources cited above.)

**Hostivice 1997/98****pit 3****cattle 1 (*Bos primigenius f. taurus 1*)***maxilla sin.*P<sup>4</sup>: Hc=23,2, M<sup>1</sup>: Hc=20*mandibula sin.*+ 2xI, P3-M1, P2 wasn't present in its lifetime

gonion caudale-infradentale (1)=(358,2), aboral border of the condyl process-infradentale (2)=(375,2),  
gonion caudale-aboral border of M3 alveolus (3)=113,7, aboral border of M3 alveolus-infradentale  
(4)=(240), gonion caudale-oral border of P3 alveolus (5)=232,5 (bez P2), gonion caudale-foramen mentale  
(6)=300,2, oral border of P3 alveolus-aboral border of C alveolus (11)=109, gonion ventrale-highest point  
of the condyl proces (12)=155,1, gonion ventrale-deepest point of the mandibular notch ( 13)=156, gonion  
ventrale-coronion (14)=213,7, height of the mandibulae behind M3 (15a)=72,5, height of the mandibulae  
behind M1 (15b)=50, height of the mandibulae behind P2 (15c)=38,9, M1-M3=87,1, P3-P4=36,4,  
P3-M3=122, Hmin=27,3, Bmin=14,2, Lfa=46,2, M3: L=37,4, B=14,7

*atlas*

GL=92,8, GLF=84,3, LAd=49,3, GB=145,4, BFcd=92,1, BFcr=101,5, H=80

*axis*

Lcde=114,4, LAPa=82,5, BFcr=93,9, BFcd=46,3, BPtr=46,1, Bpacd=59,6, SBV=47,1

*sacrum*

GL=232,7, PL=219,7, GB=184, BFcr=64,8, BFcd=23,7

*scapula sin.* - pronounced modelling, attached cartilago scapulae

SLC=55, GLP=51,7, LG=58,6, BG=51,7, DHA=338,8

*humerus sin.* - pronounced linea deltoidea

GL=290, GLC=246, Bp=104,4, BpF= 72,1, Dp=101, B=39,6, D=43,8, Bd=82, Dd=75, BT=77,8

*radius sin.*GL=267,5, Pl=249,3, Bp=83,7, BpF=(76,9), Dp=42,8, B=41,8, D=25,3, BdF(also with ulna)=62,6, Dd(also  
with ulna)=74,6,*ulna sin.* (grown together with the radius)

GI=337, GLI=326,5, SDO=53,2, DPA=68,3, BPC=49,5, LO=103,6

*metacarpus sin.* - on the prox. end sesamoid attached to the palm surface

B=32,1, D=22,2, Bd=62,3

*metacarpus dex.*

GL=191,8, Ll=180,7, Bp=60,8, Dp=38,4, B=31,3, D=22,7, Bd=62,3, Dd=33,1

*pelvis dex.*

SH=46,5, SB=24,8, LA=68,3, D(pubis)=26, B(pubis)=15,2, H(ischii)=56, B(ischii)=13,9

*pelvis dex.*

SH=45,4, SB=23,8, B(Ischii)=52,9, H(Ischii)=13,9

*femur sin.*GL=367, GLC=333, Bp=(114,8), DpF=DC=46,8, B=38,3, D=38,5, Bd=111, Dd=125, L-lat.condyl= 62,  
L-med.condyl=55*tibia sin.*GL=329,5, Ll=290,9, Bp=99,3, BpF=98,4, Dp=(84), B=40,4, D=26,4, Bd=64,4, BdF=45, Dd=47,2, max.  
dia. of lat. f. articularis=(57,8), max. diameter of med. f. articularis=(49,2)*patela dex.*

GL=68, GB=57, LF=51,7, BF=44,3, D=37

*calacaneus sin.*

GL=132, B=16,1, D=32,1

*talus sin.*

Ll=67,1, Lm=60,9, B?=40,4

*centroquartale sin*

GB=57,3, GD=53,2

*metatarsus sin.*

GL=218,5, Ll=205, Bp=51, BpF=47, Dp=47,2, B=27, D=24,7, Bd=56,7, Dd=32,7,

*phalanx I ant. med. dex.*

Ll=59,8, Lm=59,2, Bp=32,8, Dp=32,3, DpF=29,6, B=26,1, D=19,3, Bd=29,8, Dd=22,5

<p><i>phalanx I ant. lat. dex.</i> Ll=59,8, Lm=58,4, Bp=33,4, Dp=33,8, DpF=31, B=26,9, D=19,6, Bd=30, Dd=22,5</p> <p><i>phalanx I ant. med. sin.</i> B=26,3, D=19,2, Bd=30,7, BdF=28,8, Dd=22,3</p> <p><i>phalanx I ant. lat. sin.</i> Ll=59,2, Lm=59,4, Bp=31,8, Dp=34,1, DpF=22,4, B=23,9, D=22,7, Bd=(27,2), Dd=29,4</p> <p><i>phalanx I post. med. sin.</i> Ll=62,4, Lm=62,4, Bp=30,8, Dp=34,5, DFp=31,2, B=25,5, D=18,9, Bd=28,7, Dd=21,5</p> <p><i>phalanx I</i> Ll=40,3, Lm=40,4, Bp=30,9, Dp=32,5, DFp=23,4, B=23,5, D=21,6, Bd=25,2, Dd=21,5</p> <p><i>phalanx I</i> Ll=62,1, Lm=63,4, Bp=30,7, Dp=34,2, BFp=25,9, DFp=29,8, B=23,7, D=17,9, Bd=26,8, Dd=21,3</p> <p><i>phalanx II ant. med. dex.</i> Ll=39,6, Lm=40,6, Bp=31,4, Dp=35, DpF=26,4, B=23,5, D=22,7, Bd=25,1, Dd=29,9</p> <p><i>phalanx II ant. lat. dex.</i> Ll=39,7, Lm=39,9, Bp=31,6, Dp=33,7, B=23,8, D=22,7, Dd=30</p> <p><i>phalanx III med. dex.</i> max. length of the f. articularis=34,6</p> <p><i>phalanx III lat. dex.</i> max. length of the f. articularis=33,7, DLS=(64,4), Ld=(50,3)</p> <p><i>phalanx III - erosion</i> DLS=70,7, Ld=52,8,</p> <p><i>phalanx III</i> max. length of the f. articularis(29,5)</p> <p><i>phalanx III</i> max. length of the f. articularis=34,1, MBS=(24,4)</p>
<p><b>cattle 2 (<i>Bos primigenius f. taurus 2</i>)</b> <i>humerus sin.</i> BT=61,6</p>
<p><b>cattle 3? (<i>Bos primigenius f. taurus 3?</i>)</b> <i>phalanx I - prox.epiph. not fused</i> B=15, D=14,9, Bd=18,5</p>
<p><b>cattle 2 or 3 (<i>Bos primigenius f. taurus 2 or 3</i>)</b> M3 sin: L=38,4, Hc=57,1</p>
<p><b>pit 4</b></p>
<p><b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>radius sin.</i> Dp=37,5</p>
<p><b>roe deer (<i>Capreolus capreolus</i>)</b> <i>tibia dex.</i> Bd=26,6, BdF=20,5, Dd=21,2</p>
<p><b>pit 5</b></p>
<p><b>cattle 1 (<i>Bos primigenius f. taurus 1</i>)</b> <i>calva</i> akrokranium-prosthion (1)=asi 543, akrokranium-nasion (8)=(270), nasion-rhinion (12)=189, infraorbitale-prosthion (16)=159,5, nasointermaxillare-prosthion (19)=156,2, otion-otion (25)=237, greatest breadth of occipital condyles (26)=106, greatest breadth at the the bases of the paraoccipital processes (27)=163,7, least breadth between the the bases of the horncores (31)=(195), least frontal breadth (32)=203,3, ectorbitale-ectorbitale (33)=240,5, greatest breadth across the nasals (36)=61,8, max.diameter of the base of processus cornualis=103, diameter of the base of processus cornualis (anteroposterior)=(96,6), akrokranium-the most aboral point of orbita=227,2, M1-M3=82,5, P2-M3=134,9, P2-P4=52,8, M3sin.: L=29,9, B=21,6, M1: Hc=25</p> <p><i>atlas</i> GL=(99,5), GLF=91,4, GB=168,2, BFcr=104,8, Lad=52,6, H=(84,5)</p>



*axis*

BFcr=102,3, Bpacd=73,7, SBV=59,4, LCDe=137,6, BFcd=48,4, BPtr=(103), LAPa=98,3, H=(124), dens: breadth=45,6

*pelvis dex.*

LA=71,2, SB=26,7, SH=49,2, LFo=101,4, Hbo=asi61,6, B(pubis)=18,5, D(pubis)=32,2, SBI=174,3, GBA=251,7, GL(sin)=463

**cattle 2 - skull and right hind leg (*Bos primigenius f. taurus 2*)**

*calva dex.*

ectorbitale-entorbitale (23)=68,5, greatest inner height of the orbit (24)=54, greatest breadth of the occipital condyles (26)=91,6, P2-M3=140, M1-M3=82,2, P2-P4=58,3, P2: Hc=30, M1: Hc=33, M3: Hc=48

*mandibula sin.*

gonion caudale-infradentale (1)=346, aboral border of the condyl process-infradentale (2)=366,2, gonion caudale-aboral border of M3 alveolus (3)=86, aboral border of M3 alveolus-infradentale (4)=258, gonion caudale-oral border of P3 alveolus (5)=237, gonion caudale-foramen mentale (6)=292, oral border of P3 alveolus-aboral border of C alveolus (11)=95, gonion ventrale-highest point of the condyl proces (12)=140, gonion ventrale-deepest point of the mandibular notch (13)=138, gonion ventrale-co ronion (14)=195, height of the mandibulae behind M3 (15a)=(68), height of the mandibulae behind M1 (15b)=50, height of the mandibulae behind P2 (15c)=34,2, Hmin=28,6, Bmin=16, LFa=(42), M1-M3=(90,5), P2-M3=(148), M3: B=14,1, d3: Hc=9,6

*processus cornualis sin.*

length of the outer curvature (47)= 157(originally probably 10mm longer), max.diameter of the base= 57,1, min.diameter of the base=44,3, circumference of the base=160

*processus cornualis dex.*

length of the outer curvature (47)=148(originally probably 10mm longer), max.diameter of the base=57, min.diameter of the base=43,6, circumference of the base=161

*frontale dex.*

diameter of face for processus cornualis: anterioposterior=52,3, dorsoventral=44,7

*femur dex.* - dist. epiphysis not fused or just fused

GL=345, GLF=325, DC=44,6, Bp=114, Bd=96,

*tibia dex.* - prox. epiphysis not fused, dist. epiphysis just fused

GL=334,5, Ll=(275,3), Bp=96,4, B=37,7, D=25,8, Bd=63,2, BdF=45, Dd=47,2

*calcaneus dex.*

GL=127,8, GB=(43,3), GD=54, B=16,8, D=31,3

*talus dex.*

Ll=67,8, Lm=60,9

*metatarsus dex.*

Bp=48,4, Dp=45,4

**probably cattle 2 (probably *Bos primigenius f. taurus 2*)**

*atlas*

GLF=78,6, GB=(123,4), BFcd=94,2, BFcr=88,1, Lad=48,4, H=(74,5)

*axis*

LCDe=96,6, GB=(92,8), BFcd=43,1, SBV=49,7, Bpacd=(64,4), BPtr=(79,4), dens: breadth=40,5

*pelvis dex.*

GL=around375 (without attached peripheral centres), SH=42,9, SB=24,7, LFo=75, Hfo=51,5, LA=65,2, B(pubis)=17,6, D(pubis)=27,2

**cattle 3 (*Bos primigenius f. taurus 3*)**

*maxilla sin.*

postdentale-prosthion (17)=237,5, greatest breadth across the nasals (36)=54,8, M1-M3=76,6, P2: Hc=17, M1: Hc=19

**probably cattle 3 (probably *Bos primigenius f. taurus 3*)**

*pelvis*

LA=64,2, SH=43,1, SB=27, B(pubis)=13,8, D(pubis)=29,5, LFo=(91,7), GL=(421)

**cattle 2 or 3? (*Bos primigenius f. taurus 2 or 3?*)**

*sacrum*

GB=(181,4), PL=(222,4), BFcr=61,3, BFcd=28,9

<p><b>cattle 3 or 5? (<i>Bos primigenius f. taurus</i> - 3 or 5?)</b>  <i>processus cornualis sin.</i> - lay by the head of cattle 1  length of the outer curvature (47)=300 (without tip, original length around 380-440), max. diameter of the base=79, min. diameter of the base=61, circumference of the base=230mm  <i>processus cornualis</i> (sachet 38)  max. diameter of the base=53,3, min. diameter of the base=42,4</p>
<p><b>cattle ? (<i>Bos primigenius f. taurus</i> ?)</b>  <i>processus cornualis</i>  min. diameter of the the base=58,2  <i>axis</i>  BFcr=(88,2), SBV=(44,8), Bpacd=59,4, dens: breadth=35,1  <i>femur sin.</i> - dist. epiph. just grown together  DC=49,1, B=37,6, D=42,6, Bd=(108)  <i>tibia dex.</i>  Bp=102,9, Dp=(98)</p>
<p><b>pig (<i>Sus scrofa f. domestica</i>)</b>  <i>fibula</i>  Dd=16,4, DdF=14,2</p>
<p><b>dog (<i>Canis lupus f. familiaris</i>)</b>  <i>calva dex.</i> - teeth and zygomaticum charred  akrokranion-prosthion (1)=(143), condylobasal length (2)=141,3, basal length: basion-prosthion (3)=(136,3), nasion-prosthion (8)=73,1, frontal midpoint-prosthion (9)=86,6, staphylion-prosthion (13)=(77,7), palatal length (13a)=76,7, greatest palatal breadth (34)=51,8, staphylion-palatinoorale (14)=(26,5), length of the horizontal part of the palatine (14a)=25,5, P1-M1 (15)=44,4, M1-M2 (16)=16,5, P1-P4 (17)=56,4, greatest breadth of the occipitale condyles (25)=30,6, greatest breadth of the fora men magnum (27)=14,9, ectorbitale-ectorbitale (32)=44,9, entorbitale-entorbitale (33)=29,2, breadth at the canin alveoli (36)=29,8, skull height (38)=42,1, akrokranion-basion (40)=38,7, max. diameter of canine alveoli=9,2, P4: L=16,7, B=8,9, M1: L=11,5, M2: B=8,8  <i>axis</i>  LCDe=(37,6), SBV=15,9, BFcr=23,1, BFcd=14, H=31  <i>humerus sin.</i>  Bd=28,2, BT=19  <i>tibia sin.</i>  B=11,4, D=10,6, Bd=18,7, BdF=15,7, Dd=13,7  <i>fibula sin.</i>  Dd=9,7</p>
<p><b>pit 6</b></p>
<p><b>cattle (<i>Bos primigenius f. taurus</i>)</b>  <i>talus sin.</i> - very severe erosion  Ll=69  <i>calcaneus dex.</i>  B=17,5, D=33,6, GD=(52,5)  <i>phalanx I</i>  Ll=60,2, Lm=59,4, Bp=26,9, Dp=31,5, DpF=27,7, B=23, D=17,3, Bd=27, Dd=20,4</p>
<p><b>pig (<i>Sus scrofa f. domestica</i>)</b>  <i>metatarsus 5 sin.</i>  GL=61,5  <i>maxila sin.</i>  M1: L=18,5, d3: L=(13,7)</p>
<p><b>pit 8</b></p>
<p><b>cattle (<i>Bos primigenius f. taurus</i>)</b>  <i>metacarpus</i>  Bp=66,6, Dp=40,7</p>

<b>(pit 10 - Hallstatt !)</b>
<b>horse (<i>Equus sp.</i>)</b> <i>P<sub>2</sub> sin.</i> L=33, Hc=20,9)
<b>pit 14</b>
<b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>mandibula sin.</i> d1-d3=57,7, Hmin=24,2
<b>pit 15</b>
<b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>scapula dex.</i> SLC=54,1, BG=54,1
<b>Hostivice 1972</b>
<b>2/72</b>
<b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>scapula sin.</i> SLC=54,5
<b>3/72</b>
<b>cattle (<i>Bos primigenius f. ?</i>)</b> <i>4x processus cornualis</i> max.diameter of the base=78,5, 83, 89,7, 92,3, min. diameter of the base=56,7, 74, 73,5, 74, circumference of the base=215, 260, 262, 260, length of the outer curvature (47)=215, 350, 340, min.350 (originally around 60 more)
<b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>scapula dex.</i> SLC=54,5, B=24,8, LG=61,7, BG=51,8 <i>d<sub>3</sub> sin.</i> L=35,9, B=12,7 <i>mandibula sin.</i> LFA=44,8 <i>scapula dex.</i> SLC=42,5, GLP=58, LG=49,8, BG=39,7 <i>mandibula dex.</i> P2-M3=148,4, M1-M3=94,2 <i>scapula dex.</i> SLC=38,2, B=15,7
<b>fox (<i>Vulpes vulpes</i>)</b> <i>radius sin.</i> Bp=11,1, Dp=7,4
<b>3/72</b>
<b>cattle (<i>Bos primigenius f. taurus</i>)</b> <i>mandibula sin.</i> d1-d3=55,2, d3: L=26,6, B=13,7 <i>mandibula dex.</i> d1-d3=59,6, d3: L=28,1, B=14 <i>scapula dex.</i> SLC=52,2, B=20,8, GLP=63,9, LG=50,7, BG=45,2 <i>ulna sin.</i> LO=88,1, BPC=48,7, DPA=60, SDO=50,2 <i>talus dex.</i> Ll=75,6, Lm=67,9, Bd=46,3, Dm=42,5, Dl=42,6 <i>metatarsus sin.</i> Dd=31

<p><b>dog (<i>Canis lupus f. familiaris</i>)</b>  <i>mandibula sin.</i>  total length (1)=124,3, length from indentation between the condyle process and the angular process-infradentale (3)=117, the condyle process-aboral border of the canine alveolus (4)=105,5, length from indentation between the condyle process and the angular process-aboral border of the canine alveolus (5)=100, length from aboral border of the M3 alveolus-aboral border of the canine alveolus (7)=72,5, P1-M3 (8)=70, P2-M3 (9)=66,2, M1-M3 (10)=36,9, P1-P4 (11)=35,8, P2-P4 (12)=31,9, length of the M1 alveolus (14)=22,1, M1: L=22,7, B=8,8, M2: L=9,6, B=6,9, M3: L=5,4, B=4,3  <i>atlas</i>  BFcd=30,2, BFcr=š(39,8), Lad=11,7, GL=34,6</p>
<p><b>pig (<i>Sus scrofa f. domestica</i>)</b>  <i>scapula dex.</i>  SLC=26,2, B=11,5, GLP=38,2, LG=31,4, BG=23,8, DHA=190,9  <i>humerus dex.</i>  B=18,3, D=23,3, Bd=41,5</p>
<p><b>red deer (<i>Cervus elaphus</i>)</b>  <i>maxilla sin.</i>  M1-M3=66,6  <i>maxilla sin.</i>  P2-P4=48,2  <i>scapula dex.</i>  SLC=32,2, B=16,8, LG=41,5, BG=38,6  <i>scapula dex.</i>  GLP=61,4, LG=47, BG=45,2  <i>humerus sin.</i>  Bd=53,4, BT=(50,2)  <i>tibia dex.</i>  Bd=47,3, BdF=35,5, Dd=37,2</p>
<p><b>4/72</b></p>
<p><b>cattle (<i>Bos primigenius f. taurus</i>)</b>  <i>axis</i>  BFcr=(99,4)  <i>metatarsus sin.</i>  Bd=61,2, D=25,9</p>
<p><b>red deer (<i>Cervus elaphus</i>)</b>  <i>metacarpus dex.</i>  Bp=43,6, Dp=32,9</p>

(values in brackets are not completely precise)

(numbers in brackets after the dimension specifications are dimension codes according to von den Driesch)

Hmin and Bmin at the mandibulae are the min. height and breadth of the pars diastema

Lfa=length of the facies articularis mandibulae

Hc=max. height of the crown of the tooth in question

B, D= min. breadth and depth (of the diaphysis)

Bp, Dp= max. prox. breadth and depth

Bd, Dd= max. dist. breadth and depth

Tab. 9. Dimensions of the bones from Hostivice (Funnel beaker culture), in mm — Tab. 9. Rozměry na kostech z Hostivic (kultura nálevkovitých pohárů), v milimetrech.

According to *table 2* the Funnel beaker culture complexes do not differ from Hostivice in principle. Cattle is always the most represented of the **domestic species**. It is on the whole the most frequent species in absolute terms (with the exception of Vikletice, where the hare dominates, and perhaps Malé Březno, where only a small assemblage was available - possibly more red deer is represented here). The domestic pig or sheep/goat is in second place (usually far behind the cattle) (pig: for example Makotřasy and Lumbeho zahrada, sheep/goat: for example Dobroměřice and Stránská skála). Both sheep (Dobroměřice, Makotřasy) and goats (Dobroměřice, Makotřasy, Vikletice) have been attested. In the case of the larger collections [Makotřasy, Cimburk (?), Stránská skála, Dobroměřice] cattle is always represented by at least 60 % of the fragments of the domestic species. With regard to the number of fragments and the size of the cattle bodies it is clear, that this species had the greatest economic significance in the observed culture.

Some skull fragments bear evidence of a remitted intercornual mound in the cattle (Dobroměřice). Long and short horncores are found, whereby longhorned cattle (the *primigenius* type) predominate in Makotřasy. Loose horns as in Hostivice in the case of individual 2 from pit 5, or hornless cattle, are not recorded from any other site in the Czech Republic. On the basis of the finds from Hostivice (1972) *Peške* suggested a large variability in the size of domestic cattle: the cattle there are comparatively small, medium-sized and large - almost the size of an aurochs. In addition bones of an aurochs and unidentified forms are present, which could also belong to crossbreeds of domestic and wild cattle. The category of cattle of transient size is a regular phenomenon for the neolithic and eneolithic and is described in Cimburk and Vikletice too, but also abroad (for example *Bökönyi - Kubasiewicz 1961* concede the existence of half-wild cattle). The withers height found in two cases in Makotřasy was 123 and 124 cm (using the Boessneck index in *Driesch - Boessneck 1974*), but other immeasurable fragments here belonged to larger individuals. A height of 122.5 cm was detected in Vikletice. This also corresponds with the data from *Peške (1994)*, who discovered overall withers heights of 113-136 cm for the eneolithic in the Czech Republic. These eneolithic cattle were bigger than Hallstatt, La Tene and medieval cattle. They approach the large neolithic cattle in size (see also *Peške 1994*).

Data from surrounding countries leads to the same conclusions. According to a comprehensive article by *Benecke (1994)* the average length of a metacarpus from various Central European middle- and late-neolithic sites (includes the eneolithic according to our conception) is between 185.7 and 205.8 mm - which the metrical details from the burials roughly correspond with (see *graph 1*). Early neolithic cattle were somewhat bigger, according to *Benecke's* data. *Benecke* also indicates the existence of some regional races of Central European neolithic and eneolithic cattle, which mainly differ in size. On the other hand an older article by *Nobis (1954)* regards the differences in size of the neolithic-eneolithic cattle as a manifestation of gender dimorphism and castration and all cattle could, according to *Nobis* and other authors, belong to an uniform, albeit variable, form. The presence of a uniform breed in the whole eneolithic is not suggested by the body disproportions discovered in the case of the buried individuals in *chapter 5*, for example the differences found for cattle 1 from pit 3 (see *chap. 5 - table 4, 5 and 6, graph 5 and 6*).

In the assemblages adult individuals usually predominate over juvenile ones. In Makotřasy, on the other hand, there are twice as many individuals that are younger than two years than those that are older than two years, and only two out of 19 mandibulas are older than three years. Therefore non-adult individuals thoroughly predominate here and calves of a few weeks old have also been attested. The castration of cattle (though not as yet described in Bohemia) is possible in the Funnel beaker period, because castration in the early neolithic and Funnel beaker periods has already been mentioned by *Müller (1964)* in Germany. Castrates are also recorded from the Funnel beaker culture period from Weissenfels (*Nobis 1954*) and the presence of oxen is described in the same period from Poland (Ćmielow site) by *Krysiak (1951/52)*. The presence of oxen may be connected with the use of teams which is known in Europe precisely from the Funnel beaker period onwards (*Beranová 1980; Benecke 1994*). Castrates are mentioned more frequently from later periods (Globular amphora culture) (see *graph 1*).

According to the Makotřasy finds of adult **sheep/goats** prevailed over non-adult ones (the relationship between younger and older than two years is 5:13). The goat horncores here are lentil-shaped in cross-section with a flatter inner wall, bent sabre-shaped and untwisted. The sheep horns ran slightly backwards and twisted outwardly. The goat horncore from Vikletice corresponds in shape with the Makotřasy find.

Juvenile individuals occur frequently amongst the **pigs** (for example Lumbeho zahrada - several finds of less than 1.5 years of age, Hostivice 1972 - about 1 year, in Vikletice 2 out of 3 individuals are younger than 17 months), but fully adult individuals are also commonly found. A larger number of finds originates from Makotřasy, where 16 out of 18 cases are younger than two years and 7 younger than 1 year, but the killing of half-year-old piglets for the winter was not documented here. The gender relationship was roughly balanced, according to nine jaws from Makotřasy.

The estimated withers height of the **dogs** are, according to two finds from Hostivice 1972 and Peške 42 and 50 cm and according to two finds from Makotřasy and Clason 44.5 and 40.4 cm. The dog from Hostivice (1997/98 - pit 5) must have been smaller than stated. The large number of puppy bones found in Hostivice in pit 6 (1997-98) is a sporadic phenomenon. The dogs from Praha-Baba (4 individuals) are young but adult. In Ambros's opinion (ex: *Clason 1985*) the dog could have served as food in the period under discussion.

**Horse** has been found in Hostivice (1972), Dobroměřice, Prague-Baba, Stránská skála, Makotřasy and Cimburk (?), but it is never represented in any great quantity. There is a mandibula angle with pronounced muscle tendrills amongst the finds from Dobroměřice. At Stránská skála the whole quite robust skull of a male horse was found and the horses from Cimburk show great variability and do not belong to a uniform population. The horse, it is assumed, first served as food, and it was not until later, in the bronze age, that it was harnessed and used for riding (see *Clason 1985*). Generally it isn't clear, which of the horse finds in the period under discussion belong to domestic and which to the wild form.

The most represented **wild species** in the Funnel beaker settlements is **red deer** and in addition there are **aurochs, hare, wild boar and roe deer** while hamster, water vole, common squirrel (?), beaver, fox, wolf, bear, badger (?), pine marten (?) and western polecat (?) are more or less sporadically present.

The site of Vikletice, where the most frequent and only safely attested wild species is the **hare** is exceptional. Generally a high percentage of **wild species** are represented in Vikletice itself and also in Hostivice (1972), in Malé Březno (?) and in Cimburk (?).

Documented **birds** consist of quail, capercaillie (?), swan (?) and goose while fish is represented by the catfish. The find of a European pond turtle (*Emys orbicularis*) in Dobroměřice - indicating a warmer climate - is entirely exceptional. The river mussel (*Unio*) obviously also served as food. The presence of two bones from the Lumbeho zahrada (Prague castle) which were identified as domestic fowl is puzzling, because the appearance of this species is excluded in the eneolithic.

On the whole all **anatomical parts** are represented evenly. Only in some cases is a particular anatomical part represented to a greater or lesser extent (in Cimburk there were 27 teeth amongst the 46 sheep/goat fragments, not one domestic cattle atlas was found amongst 371 fragments and not one cattle phalanx II amongst 27 cattle phalanges. There are no skull bones represented amongst the numerous hare bones in Vikletice).

As the great fragmentariness of even the relatively robust bones shows, the bones were usually **broken** in order to be cut into portions and to get at the marrow. **Cut and chop marks and sawing of bones** have been recorded. There is frequent evidence of the cutting off of cattle and goat horncores from Makotřasy. Evidence was also found in Makotřasy of the cutting of cattle bodies into portions (cutting the humerus off the blade bone, cut marks on the mandibula), according to Clason the cutting off of the ulna with a metal instrument was also recorded there. Further evidence was also recorded for other species: for red deer (cut marks on the diaphysis of the metatarsus) and horse (cut off dist. humerus). The majority of bones are broken to pieces and there are **bite marks** from dogs (in Makotřasy for example on horse, cattle and pig bones) and **charring** occurs frequently (in Makotřasy on pig bones, while in Vikletice about 1/3 of the material is charred or burnt). The artefacts found are usually made of long cattle bones and the antlers of red deer. Makotřasy in particular produced a varied collection of **artefacts** (*Clason 1985*).

Although the inventory of wild species in Hostivice (1997-1998) is not as rich as in the Funnel beaker culture as a whole, the **Hostivice** finds do not depart from the overall situation in the Funnel beaker culture in the Czech Republic as regards the other characteristics (percentual representation of domestic species, age structure of the population of the domestic species and character of the animals). **The peculiarities**, such as the clear dominance of cattle in pits 3 and 5, the absence of horns and other anatomical parts, the charring of the dog teeth in pit 5, or the presence of a larger number of dog puppies in pit 6, can be explained by the ritual character, **which makes Hostivice different from the other sites under comparison.**

## 7. CONCLUSION

The aim of the submitted work has been to describe in detail the animal bone material (in particular the skeletons or their parts) from the 1997-1998 excavation of Dr. I. Pleinerová at Hostivice-Litovice and to compare the results with other sites that are analogous to Hostivice in the character of their finds or culturally.

The analysis indicated, amongst other things, that the finds showed signs of ritual handling of the buried bodies of cattle and dog, which could be an expression of a cult. The Hostivice finds thus complement the picture sketched by a number of animal burials from neolithic and eneolithic Central Europe and at the same time they bring new knowledge hitherto not presented from elsewhere. An example is the finding of loose horns on one of the cattle and the singeing of the dogs teeth from pit 5. The site ranks among the most important of its type in the extent and character of the osteological material on the territory of the Czech Republic. Unfortunately this country lacks a detailed osteological analysis of other, similar finds, which could be used for comparison. Nevertheless a number of our sites from the Funnel beaker culture period with non-ritual animal finds were compared with Hostivice. Thus it was possible to clarify some questions of breeding and hunting during the described period.

Unlike many neighbouring countries (Poland, Germany, Hungary), eneolithic cattle burials in the Czech Republic have only been uncovered on rather exceptional occasions. The finds from Hostivice suggest, that our country is no exception in Central Europe and that interment procedures of cattle, accompanied by complicated rites, existed here, too. This cattle must have had a religious or cultic function as well as an economic one. Let us hope that further finds will widen our knowledge about animal burials.

### SUMMARY

In Hostivice-Litovice (district Prague-West) a large quantity of Funnel beaker culture features were uncovered by Dr. I. Pleinerová in 1997-98. Animal bones were also found in nine pits. Most material from them, comes from pits 3, 4 and 6 (*tab. 1*). Pits 3 and 5 contained animal skeletons or parts of them, which were deliberately deposited here. Less copious older finds from 1972 and 1977 also came from an adjacent area.

Pit 3 contained a cattle skeleton of about 5-7 years old - probably a female with well developed muscles and a withers height of 114 to 123 cm (*plates 1 and 2*). Her second lower praemolar was missing when alive. From the skull only her lower jaw was found in its anatomical position whereas some other parts of the skull were deposited in another place. The horncores were completely missing. The bones of other cattle individuals from this pit represent an admixture.

In pit 5 parts of the skeletons of at least three cattle and fragments of the bones of other individuals were present. Of these the first was relatively massive. It was evidently a male and the horncores were broken and the limbs and lower jaw had been removed and are absent in pit 5. His age was estimated at 5-7 years. The skull has an almost flat forehead, without a significant intercornual rampart. Originally it carried bulky horns, however they were not found in the pit (*plate 4*). The spine was completely preserved including the tail part (*plate 5*). It had a hole from a blow from above in the forehead, which may have originated through slaughtering (reconstruction - *fig. 1*). The left horncore (type "*primigenius*") of another individual was placed by the head in place of the right horncore (*plate 9*). A second individual was sub-adult of between 2.5 to 3.5 years of age. His right praemolars had come through, in the order P3>P2>P4 (*plate 6*). The withers height was calculated as 113 cm. Only part of the right hind limb was preserved of the limbs. The horns of this individual must have been loose or hanging on the head during its lifetime because they are not fused to the skull. They are a unique find (*plate 11*; reconstruction - *fig. 2*). This pathological condition could be the result of an inherited mutation, breaking at a young age or developmental fault. If it was the result of heredity, then it would be a matter of recessive inheritance, therefore this type of horn could be found quite unexpectedly and fortuitously in a population. The horns had been cut off and placed in another place than the skull in pit 5. The third individual was 5-7 years of age, obviously somewhat older than the first individual. Its limbs were again missing. There were also some bones of a small to medium-sized dog in pit 5, the front teeth of which were burnt (*plates 7 and 8*; *fig. 3*).

In pit 6 amongst other bones at least four puppies of up to five months in age, which came from the litters of at least three females were found. The bones of a rhinoceros from this pit are palaeolithic contamination. Apart from cattle and dog domestic pig, sheep/goat, red deer, deer, hedgehog and catfish are documented from the site and from the older excavations horse, wild boar and fox as well. The bones of these species represent an admixture and do not have any connection with the buried individuals.

Cattle and dog were deliberately sacrificed and were the object of ritual practices. This is indicated by the separating and transferring of the horns, skulls, lower jaws and limbs and the burning of the dog's teeth (as was ascertained in pits 3 and 5) and perhaps the presence of puppies in pit 6 as well and maybe the presence of massive horns in a pit from the 1972 excavation. This all indicates, that cattle and dog fulfilled other roles than economic during the period under discussion. It is possible, that the cattle burials are connected with the bull and virility cult which existed in Europe from the beginning of the neolithic. This is indicated, for example, by finds of actual isolated horns and heads of cattle, similar to finds of their ceramic likenesses. It is necessary to bear in mind, that there was not a greater sacrifice than cattle for eneolithic man from an economic point of view. It was the biggest source of meat, leather, bones and so on, a supplier of milk and served as a working animal.

The burials in Hostivice were compared with other neolithic and eneolithic burials from Central Europe and many parallels were found which show that the Hostivice finds are not exceptional. Not a single one of the compared finds, however, precisely corresponded

in the number of individuals of the relevant species and in the representation of the anatomical parts to the Hostivice find from pit 5. The Hostivice cattle find from pit 3 resembles well enough a find from Šarovec in Slovakia, where the head had also been separated. Cattle and dog are usually the most common species in the pits. Burials of cattle started to appear in Europe from the beginning of the eneolithic and became a phenomenon of this period in Central Europe. Pairs (or threesomes) of cattle are very regularly buried in the Globular amphora culture and the separation and transferring of heads of cattle is known in the Funnel beaker culture, however separating cattle limbs like in Hostivice occurs more sporadically. No uniform rule was found either for the combination of age and sex of more cattle individuals nor for the combination of animal species in eneolithic graves. The cattle buried in Hostivice roughly correspond in size to the individuals from other compared eneolithic sites (*tab. 4; graph 1-4*). During comparative analysis a disproportion in the relationship of the length of tibia and metatarsus, the radius and metacarpus (up to 20 %, *tab. 4; graph 5 and 6*) and furthermore in the robustness of the long bones (*tab. 5*) and in the dental dimensions was ascertained (*tab. 6*). On the other hand no basic differences in the length of the front and back limbs (metacarpus and metatarsus) were ascertained in the case of the Central European eneolithic cattle from the pits (only 6 %, *tab. 4; graph 7*). Even if this disproportion could have been partially influenced by the sex and age of the individuals, it seems, that the eneolithic cattle from the burials did not belong to a uniform breed. A relatively wide variation was ascertained in the size as a whole as well (*graph 1-4*). The cattle burials roughly correspond size-wise to the cattle from settlement finds. Individuals from Germany are larger than the cattle burials from more eastern parts of Central Europe (*graph 1-4*). It was probably not exceptional to bury cattle according to their zoological measurements (size, breed, sex, age). This could be otherwise in the case of the cattle with the loose horns from Hostivice from pit 5, which could be a peculiarity for its time.

The Hostivice bone assemblage was compared with other analysed sites of the Funnel beaker culture from the Czech Republic (*tab. 3*). All the sites demonstrate, that the most important domestic species was cattle. The second most common species was the domestic pig or sheep/goat. In the case of all these species young to old individuals (were recorded *tab. 8*). The cattle was mostly long-horned (*primigenius*), of medium-size - bigger than the La Tène and medieval cattle, but smaller than the aurochs and neolithic cattle. The variation in size of the horns from Hostivice was marked (*tab. 7*), much greater than the variability in the size of the body. Some of the horns from the 1972 excavation could have belonged to the aurochs (*tab. 7; plate 12*). As far as it was possible to ascertain, the horncores were simply bent in an arch-shape with the tips in dorsal and rostral direction (*plates 9 and 12*). Amongst the other domestic species belonging to the Funnel beaker culture period are dog and horse. Of the hunted species in the Funnel beaker culture period within the area of the present-day Czech Republic red deer are most commonly found, in addition to aurochs, hare, wild boar, roe deer, fox and sporadically other species (*tab. 3*). On some sites a high representation of wild species was discovered. Dog bite marks, charring, chop marks and further human intervention have been attested and artefacts of bone and antler are copious.

From an economic point of view Hostivice does not essentially deviate from the situation as a whole during the Funnel beaker culture period within the area of the present-day Czech Republic. The peculiarities of the site are the result of ritual manipulation and the ritual character of the finds. From a zoological point of view the discovery of the loose horns of a cattle individual from pit 5 (*plate 11; fig. 2*), which no author has mentioned until now, is significant.<sup>3</sup>

#### SOUHRN

V Hostivicích-Litovicích (okr. Praha-západ) bylo v letech 1997-98 Dr. I. Pleinerovou odhaleno větší množství objektů kultury nálevkovitých pohárů. V devíti jamách byly nalezeny i zvířecí kosti. Mezi nimi, nejvíce materiálu pochází z jam 3, 4 a 6 (*tab. 1*). Jámy 3 a 5 obsahovaly zvířecí skelety nebo jejich části, které zde byly položeny záměrně. Z přílehlého místa pocházejí i méně hojně starší nálezy z roku 1972 a 1977.

Jáma 3 obsahovala skelet skotu starého asi 5-7 let, asi samice s dobře vyvinutým svalstvem s kohoutkovou výškou 114 až 123 cm (*foto 1 a 2*). Její druhý spodní premolár za živa chyběl. Z lebky byly v anatomické poloze nalezeny pouze její spodní čelisti, některé ostatní části lebky byly položeny na jiné místo. Rohové výběžky chybí zcela. Kosti dalších jedinců skotu z této jámy představují příměs.

V jámě 5 byly přítomny části skeletů minimálně tří turů a fragmenty kostí dalších jedinců. Z nich první byl relativně mohutný - zřejmě samec, rohové výběžky byly ulomeny, končetiny a spodní čelisti odstraněny. Jeho věk byl odhadnut na 5-7 let. Lebka má téměř ploché čelo, bez výrazného mezírožního valu, původně nesla mohutné rohy, ty se však v jámě nenalezly (*foto 4*). Páteř se zachovala celá včetně ocasní části (*foto 5*). V čele měl díru po úderu shora, která mohla vzniknout při porážení (rekonstrukce - *obr. 1*). Na místo pravého rohového výběžku byl k hlavě položen levý rohový výběžek (typu "*primigenius*") jiného jedince (*foto 9*). Druhý jedinec byl subadultní ve věku 2,5 až 3,5 roků. Jeho premoláry právě prořezávají, a to v pořadí P3 P2 P4 (*foto 6*). Kohoutková výška byla vypočítána na 113 cm. Z končetin se zachovala jen část pravé zadní. Unikátním nálezem jsou rohy tohoto jedince, které byly za jeho života na hlavě pohyblivé nebo visuté - nejsou totiž přirostlé k lebce (*foto 11; rekonstrukce - obr. 2*). Tento patologický stav může být výsledkem dědičné mutace, zlomení v mladém věku nebo vývojové vady. Pokud jde o dědičnost, pak je tato dědičnost recesivní a popisovaný typ rohů se tak mohl objevit v populaci zcela neočekávaně a náhodně. Tyto rohy byly uřezány a položeny v téže jámě na jiné místo než lebka. Třetí jedinec byl starý 5-7 let, patrně o něco starší než jedinec první. Jeho končetiny opět chybí. V jámě 5 bylo i několik kostí malého až středně velkého psa, přední zuby jeho lebky byly opáleny (*foto 7 a 8; obr. 3*).

V jámě 6 byly mimo jiné nalezeny kosti minimálně čtyř štěňat ve věku do pěti měsíců, pocházejících z vrhů minimálně tří samic. Kostí nosorožce z této jámy jsou paleolitickou kontaminací. Vedle skotu a psa jsou z lokality doloženi prase domácí, ovce/koza, jelen,

3 Here I would like to particularly thank Dr. I. Pleinerová for supplying material, information about the context of the finds and valuable comments to the text. I would also like to thank Dr. M. Dobeš for supplying information about the finds contexts of some sites. I thank Dr. L. Peške for supplying finds information from several sites. I thank MUDr. J. Likovský and H. Toušková for preparing the plates.



srnec, ježek a sumec a ve starším výzkumu i kuň, prase divoké a liška. Kostí těchto druhů představují příměs a nemají souvislost s pohřbenými jedinci.

Skot a pes byli záměrně obětováni a byli předmětem rituálních praktik. Naznačuje to oddělování a přemistování rohů, lebek, dolních čelistí i končetin a opalování zubů psa (tak jak to bylo zjištěno v jámách 3 a 5) a snad i přítomnost šteňat v jámě 6 a možná také přítomnost mohutných rohů v jámě z výzkumu roku 1972. To vše naznačuje, že skot i pes měli v popisované době i jinou úlohu než ekonomickou. Je možné, že pohřby skotu souvisí s kultem býka a plodivé síly, existujícího v Evropě od počátku neolitu. Naznačují to např. nálezy skutečných izolovaných rohů a hlav turů, podobně jako nálezy jejich keramických napodobenin. Je nutno si uvědomit, že pro eneolitického člověka nebylo z ekonomického hlediska větší obětí než skot, který byl největším zdrojem masa, kůže, kostí atd., dodával mléko a sloužil jako pracovní zvíře.

Pohřby v Hostivicích byly porovnávány s jinými neolitickými a eneolitickými pohřby ze střední Evropy a byly zjištěny mnohé paralely, které ukazují, že hostivické nálezy nejsou výjimečné. Ani jeden z porovnávaných nálezů však počtem jedinců příslušných druhů a zastoupením anatomických částí přesně hostivickému nálezu z jámy 5 neodpovídá. Hostivickému nálezu skotu z jámy 3 se dostí podobá nález z Šarovců na Slovensku, kde byla taky oddělena hlava. Obecně jsou v hrobech nejběžnější skot a pes. Pohřby skotu se v Evropě začínají objevovat až od počátku eneolitu a staly se ve střední Evropě fenoménem tohoto období. Velmi pravidelné jsou pohřby dvojce (popřípadě trojce) turů v kultuře kulovitých amfor a oddělování a přemistování hlav skotu v kultuře nálevkovitých pohárů, oddělování končetin skotu tak jako v Hostivicích je nalézáno spíše ojediněle. Jednotné pravidlo pro kombinaci stáří a pohlaví více jedinců skotu ani pro kombinaci zvířecích druhů v eneolitických hrobech nebylo zjištěno. Skot pohřbený v Hostivicích zhruba velikostně odpovídá jedincům z jiných porovnávaných eneolitických lokalit (tab. 4; graf 1-4). Při srovnávací analýze byly zjištěny disproporce v poměru délky tibie a metatarsu, radiu a metakarpu (až o 20 %, tab. 4; graf 5 a 6) a dále v robustnosti dlouhých kostí (tab. 5) a na dentálních rozměrech (tab. 6). Naopak v délce přední a zadní končetiny (metakarpu a metatarsu) zásadní rozdíly u středoevropského eneolitického skotu z pohřbů zjištěny nebyly (jen o 6 %, tab. 4; graf 7). I když tyto disproporce mohou být částečně ovlivněny pohlavím a stářím jedinců, zdá se, že eneolitický skot pocházející z pohřbů nepatřil k uniformnímu plemenu. Relativně velká variabilita byla zjištěna i v celkové velikosti (graf 1-4). Velikostně zhruba odpovídá pohřbený skot turům ze sídlištních nálezů. Mezi pohřbenými tury mají větší rozměry jedinci z Německa než z východnějších částí střední Evropy (graf 1-4). Nebyl pravděpodobně pohřbíván skot dle zoologických měřítek (velikost, plemeno, pohlaví, stáří) výjimečný. Jinak tomu může být u skotu s pohyblivými rohy z Hostivic z jámy 5, který mohl být ve své době zvláštností.

Hostivický soubor kostí byl porovnáván s ostatními zpracovanými lokalitami kultury nálevkovitých pohárů z ČR (tab. 3). Všechny lokality ukazují, že nejdůležitějším domácím druhem byl skot. Druhým nejběžnějším druhem bylo prase domácí nebo ovce/koza. U všech těchto druhů byli zaznamenáni mladí až staří jedinci (tab. 8). Skot byl většinou dlouhorohý (*primigenius*), střední velikosti - větší než skot laténský a středověký, ale menší než pratur a skot neolitický. Velikostní variabilita rohů z Hostivic byla značná (tab. 7), mnohem větší než variabilita ve velikosti těla. Některé z rohů z výzkumu roku 1972 mohly patřit praturu (tab. 7; foto 12). Pokud bylo možno zjistit, jsou rohové výběžky jednoduše obloukovitě prohnuté s hroty směřujícími dorzálně a rostrálně (foto 9 a 12). Mezi další domácí druhy patřil v době kultury nálevkovitých pohárů pes a kuň. Z lovených druhů jsou v době kultury nálevkovitých pohárů na území ČR nejběžněji nalézáni jelen, dále pratur, zajíc, divočák, srnec, liška a ojediněle další (tab. 3). Na některých lokalitách bylo zjištěno vysoké zastoupení divokých druhů. Doložen je okus psy, opálení, záseky a další lidské zásahy a hojně jsou artefakty z kostí a parohu.

Z hospodářského pohledu Hostovice nevybočují zásadně z celkové situace v době kultury nálevkovitých pohárů na území ČR. Zvláštnosti lokality jsou výsledkem rituálních manipulací a rituálního charakteru nálezů. Ze zoologického hlediska je významný objev pohyblivých rohů u skotu z jámy 5 (foto 11; obr. 2), které žádný autor dosud neuvádí.

#### REFERENCES

- Ambros, C. 1952: Psí lebka ze sídliště únětické kultury v Brně-Černých polích, Archeologické rozhledy 4, 450-451. ARÚ, Praha.  
— 1955: Nález kostí psa z Nitrianského Hrádku, okr. Šurany. Slovenská archeologia 3, 107-109. Slovenská akadémia vied. Nitra.  
— 1958: Kultový zvířecí hrob z období kanelované keramiky v Šarovciach, Archeologické rozhledy 10, 476-481. ARÚ, Prague.  
— 1988: Funde homloser Hauswiederkauer aus urgeschichtlichen Siedlungen in der Slowakei. Weimarer Monographien zur Ur- und Frühgeschichte 22. Museum für Ur- und Frühgeschichte Thüringens. Weimar.
- Ambros, C. - Müller, H.-H. 1980: Frühgeschichtliche Pferdeskelettfunde aus dem Gebiet der Tschechoslowakei. Vydavatel'stvo Slovenskej Akademie vied. Bratislava.
- Ambros, C. - Novotný, B. 1953: Nález kostry psa z období volutové keramiky v Hurbanovce na Slovensku, Archeologické rozhledy 5, ARÚ, Praha, 447-450.
- Andralojć, M. 1986: Pochówki psów u pradziejowych społeczeństw Europy środkowej. Uniwersytet im. Adama Mickiewicza w Poznaniu. Wrocław.
- Behrens, H. 1953: Ein Siedlungs- und Begräbnisplatz der Trichterbecherkultur bei Weißenfels an der Saale, Jahresschrift Halle 37. Halle, 67-89.  
— 1964: Die Neolithisch-frühmetallzeitlichen Tierskelettfunde der Alten Welt. Veröffentlichungen des Landesmuseums für Vorgeschichte in Halle 19. Veb Deutscher Verlag der Wissenschaften. Berlin.
- Benecke, N. 1994: Archäozoologische Studien zur Entwicklung der Haustierhaltung in Mitteleuropa und Südkandinavien von den Anfängen bis zum ausgehenden Mittelalter. Schriften für Ur- und Frühgeschichte 46.
- Beranová, M. 1980: Zemědělství starých Slovanů. Academia Praha.
- Bökönyi, S. 1951: Untersuchung der Haustierfunde aus dem Gräberfeld von Alsónémedi. Acta Archeologica Academiae Scientiarum Hungaricae, 1, 72-79. Magyar Tudományos Akadémia. Budapest.

- Bökönyi, S. - Kubasiewicz, M. 1961: Neolithische Tiere Polens und Ungarns in Ausgrabungen (Teil 1. Das Hausrind). Societas scientiarum Stetinensis 8.
- Clason, A. T. 1985: Pp. 137-161. In: Pleslová-Štiková, E. 1985: Makotřasy: A TRB site in Bohemia. Fontes Archaeologici Pragenses 17. Museum Nationale Pragae.
- Černý, V. - Gauthier, J. - Brůžek, J. - Gronenborn, D. - Velemínský, P. - Budil, I. T. 2001: Mezi Saharou a tropickými pralesy: lidé z po-  
hoří Mandara. SetOut. Praha.
- Červený, Č. - Komárek, V. - Štěrba, O. 1999: Koldův atlas veterinární anatomie. Avicenum, GRADA Publishing.
- Davis, S. - Payne, S. 1993: A barrow full of cattle skulls. Antiquity 67, 254. Antiquity publications. London, 12-22.
- Dombay, J. 1960: Die Siedlung und das Gräberfeld in Zengövárkony. Archeologia Hungarica, Series nova 37. Budapest - Bonn.
- Döhle, H.-J. 1988: Die neolithischen Rinderskelette von Zauschwitz, Kr. Borna, aus archäozoologischer Sicht. Weimarer Monographien zur Ur- und Frühgeschichte 22, 28-36.
- Döhle, H.-J. - Schlenker, B. 1998: Ein Tiergrab der Kugelamphorenkultur von Oschersleben, Ldkr. Bördekreis. Jahresschrift für mittel-  
deutsche Vorgeschichte 80, 13-42.
- Döhle, H.-J. - Stahlhofen, H. 1985: Die neolithischen Rindergräber auf dem Löwenberg bei Derenburg, Kr. Wernigerode. Jschr. mitteldt.  
Vorgesch. 68, 157-177.
- Driesch, A. von den 1976: A guide to the measurement of animal bones from archeological sites I. Harvard, U.S.A.
- Driesch, A. von den - Boessneck, J. 1974: Kritische Anmerkungen zur Widerristhöhenberechnung aus Längenmassen vor- und frühge-  
schichtlicher Tierknochen. Sonderdruck aus: Säugetierkundliche Mitteilungen. Ročník 22. Díl 4. BLV-Verlagsgesellschaft. Mün-  
chen, 325-348.
- Dušek, M. 1961: K otázkám pravekého vývoja juhozápadného Slovenska. Študijné zvesti 6, 59-82.
- Fischer, H. 1958: Loose horns in a zebu cow in East-Java. Hemera Zoa 65, 81-83.
- 1958-1959: Neue Erkenntnisse über einige morphologische und physiologische Merkmale des Wasserbüffels in Indonesien. Zeit-  
schrift für Tierzüchtung und Züchtungsbiologie 72, 88-95.
- Fischer, H. - Richards, B. G. 1965: A Polled Water Buffalo. Zeitschrift für Tierzüchtung und Züchtungsbiologie 81, 355-357.
- Gabalówna, L. 1958: Pochówki bydłace kultury amfor kulistych ze stanowiska 4 w Brześciu Kujawskim w świetle podobnych znalezisk  
kultur środkowoeuropejskich. Prace i materiały. Muzeum archeologicznego i etnograficznego w Łodzi. Seria archeologiczna 3.  
Łódź, 63-108.
- Götze, W. 1936: Jungsteinzeitliche Doppelbestattung von Mutter und Kind mit zwei Rindern bei Biendorf, Kr. Köthen. Jahresschrift für  
die Vorgeschichte der sächsisch-thüringischen Länder 24. Landesanstalt für Volkheitskunde. Halle, 91-100.
- Havel, J. 1986: Baba - výšinné sídliště kultury nálevkovitých pohárů v Praze 6-Dejvicích. Acta Musei Pragensis 82.
- Horiňanský, J. - Skutil, J. 1950: Hromadný grave kultury s keramikou malovanou ve Džbánicích u Moravského Krumlova. Obzor prehi-  
storický 14, 333-336.
- Hrubý, V. 1958: Kultovní objekty lidstva středodunajské kultury mohylové na Moravě, Památky archeologické 49 (1), 40-57, ARÚ, Pra-  
ha.
- Kalicz, N. - Raczyk, P. 1981: The Precursors to the "Horns of Consecration" in the Southeast European Neolithic, AAASH 33.
- Kolda, J. 1936: Srovnávací anatomie zvířat domácích. Vlastním nákladem. Brno.
- Komárek, V. 1993: Odhad věku domácích přežvýkavců. Institut výchovy a vzdělávání MZ v Praze, Praha, 1-30.
- Koštuřík, P. - Šebela, L. 1992: Eneolitická sídliště v Dolních Věstonicích, okr. Břeclav, Pravěk - NŘ 2.
- Kruk, J. 1980: Gospodarka w Polsce południowo-wschodniej w V-III tysiącleciu p.n.e. Wydawnictwo polskiej akademii nauk. Wrocław -  
Warszawa - Kraków - Gdańsk.
- Krysiak, K. 1951/52: Czczątki zwierzęce z osady neolitycznej Ćmielowie, cześć II., Wiadomości Archeologiczne 18, 251-290.
- Kyselý, R. - v tisku: Zvířecí kosti ze sídliště kultury nálevkovitých pohárů ve Vikleticích (okr. Chomutov). Sborník Drahomíru Koutecké-  
mu k narozeninám. ÚAPP, Most.
- Lasota, A. 1972: Neolityczny pochówek zwirzęcy na stanowisku XV w Klementowicach, pow. Puławy, Wiadomości Archeologiczne  
37/3, Zakład narodowy Im. Ossolińskich. Warszawa, 293-298.
- 1975: Grób zwierzęcy kultury amfor kulistych w Klementowicach, Pow. Puławy. Wiadomości Archeologiczne 40/2, 205-208. Za-  
kład narodowy Im. Ossolińskich, Warszawa.
- Lehmkuhl, U. - Nagel, E. 1991: Ein neolithischer Kultplatz in Falkenwalde, Kreis Prenzlau. Bodendenkmalpflege in Mecklenburg, 7-51.
- Lichardus, J. - Šiška, S. 1970: Záchranný výzkum pohrebiska a sídliska lengyelskej kultury vo Svodíne roku 1965. Slovenská archeologia  
18, 311-314.
- Lichardus, J. - Vladár, J. 1968: Erforschung der frühaeolithischen Siedlungen in Branč. Slovenská archeologia 16, 263-352.
- Makkay, J. 1986: Bauopfer in der Lengyel-Kultur und seine Beziehungen zu den Bauopferformen der Körös-Kultur und der Linienband-  
keramik. In: Internationales Symposium über die Lengyel-Kultur, Nové Vozokany 1984. Nitra - Vienna, 169-175.
- Matolsci, J. 1970: Historische Erforschung der Körpergröße des Rindes auf Grund von ungarischen Knochenmaterial. Zeitschrift für Tier-  
züchtung und Züchtungsbiologie, 87, 89-137.
- Müller, H.-H. 1963: Hornlose Rinder aus der Salzmünder Höhensiedlung von Halle-Mötzlich. Jschr. mitteldt. Vorgesch. 47, 149-155.
- 1964: Die Haustierte der Mitteldeutschen Bandkeramik. Naturwissenschaftliche Beiträge zur Vor- und Frühgeschichte 17, 6-181.
- Němejcová-Pavůvková, V. 1982: Výsledky výzkumu vo Svodíně. In: AVANS z roku 1981, 200-205.
- Neustupný, J. 1950: Opevněné neolitické sídliště v Hlubokých Mašůvkách na Moravě, Archeologické rozhledy 2, 52-56. ARÚ, Praha.
- Nobis, G. 1954: Zur Kenntnis der ur- und frühgeschichtlichen Rinder Nord- und Mitteldeutschlands. Zeitschrift für Tierzüchtung und  
Züchtungsbiologie 63, 155-194.
- Nosek, S. 1967: Kultura amfor kulistych w Polsce. Wrocław - Warszawa - Kraków.
- Novotný, A. 1966: Osteologický materiál domácích zvířat ze sídlišť IX. - poč. XV. století. Diplomová práce, katedra systematické zoolo-  
gie PFF UK v Praze.
- Novotný, B. 1958: Nové nálezy kanelované keramiky na dolním Pohroní, Archeologické rozhledy 10, 605-611.

- Pavitt, N. 1997: Turkana. Les Nomades de la mer Jade. The Harvill Press. London.
- Pavúk, J. 1980: Výzkum neolitického sídliska v Blatnom. In: AVANS v roku 1979, 206-211.
- Peške, L. 1994: The History of Natural Scientific Methods in the Archaeological Institute and Their Present Objectives, Památky archeologické - Supplementum 1: 25 Years of Archaeological Research in Bohemia, 259-278.
- Hostivice 1972 - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 416/73.
- Litovice (Hostivice 1977) - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 6506/78.
- Dobroměřice - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 7567/78.
- Hořany - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 727/87.
- Malé Březno - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 730/87.
- Lumbeho zahrady - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 5689/73.
- Praha-Baba - unpublished osteological specialist report Archivu nálezových zpráv Archeologického ústavu AV ČR, č.j. 1664/85.
- Petříčková, J. 1997: Osteologické nálezy ze Sedlčan, okr. Příbram. In: Archeologie ve středních Čechách 1, 407-410.
- Pleinerová, I. 1999: Hostivice 1998 - sborník o přírodě, památkách a historii města: 12-20. Český svaz ochránců přírody. Hostivice.
- 2002: Hostivice: Animal and human skeletons from an Early Eneolithic settlement. Památky archeologické 93, 1/50.
- Podborský, V. 1988: Těšetice-Kyjovice 4. Rondel osady lidu s malovanou keramikou. Brno.
- Pollex, A. 1999: Comments on the interpretation of the so-called cattle burials of Neolithic Central Europe. Antiquity 73, 542-550.
- Seger, H. 1906: Die Steinzeit in Schlesien, Archiv für Anthropologie, 5 (33). Organ der deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. Braunschweig.
- Siegert, M. 1955: Eine Studie über das Horn des Rindes und seine Genese mit eigenen Untersuchungen über den Bau und die Vererbung des Wackelhornes. Universität Berlin.
- Silver, I. A. 1969: The Ageing of Domestic Animals. In: Brothwell, D. - Higgs, E. 1969: Science in archaeology - survey of progress and research. Thames and Hudson, London, 283-302.
- Sklenář, K. 1973: Památky pravěku na území ČSSR. Orbis, Praha.
- Struhala, B. 1951: Pohřebiště ze starší doby bronzové u Holešova na Moravě, Archeologické rozhledy 3. Praha, 33-34.
- Svoboda, J. - Šmíd, M. 1994: Dílenský objekt kultury nálevkovitých pohárů na Stránské skále. Pravěk NŘ 4, 79-12.
- Świeżyński, K. 1958: Analiza szczatków kostnych neolitycznych i grobów zwierzecych z Brześca Kujawskiego. Prace i materiały Muzeum archeologicznego i etnograficznego w Łodzi. Seria archeologiczna 3, 109-126. Łódź.
- Vízdal, J. 1980: Neskoroeneolitické nálezy z Oborína. Slovenská archeológia 18, 219-234.
- Teichert, L. 1984: Neolithische Tierknochenfunde von zwei Kultplätzen bei Buchow-Karpzow, Kr. Nauen. Veröffentlichungen des Museums für Ur- und Frühgeschichte Postdam 18, 65-7.
- 1990: Tierknochenreste von einem Kultplatz der Waltemienburger Kultur bei Zachow, Kr. Nauen. Veröffentlichungen des Museums für Ur- und Frühgeschichte Postdam 24, 45.
- Točák, A. 1980a: Pokračování záchranného výzkumu v poloze Kňazova jama v Komjaticích. In: AVANS z roku 1979, 215-229.
- 1980b: Záchranný výzkum na lokalitě Tomášovce v Komjaticích. In: AVANS z roku 1979, 229-232.
- Zalai-Gaál, I. 1994: Kultische Bedeutung des Hundes im Neolithikum, Acta Archaeologica (Academiae scientiarum Hungaricae), 46/1-4, Akadémiai Kiadó. Budapest, 33-57.
- Zápotocký, M. 2000: Cimburk und die Höhensiedlungen des frühen und älteren Äneolithikums in Böhmen. Památky archeologické - Supplementum 12. AÚ ČSAV. Praha.
- Zikmundová, E. 1960: Osteologické nálezy z pohřebiště v Brandýsku. Památky archeologické 51 (2), 484-486. ARÚ, Praha.
- Žid, J. 2000: Zvířecí pohřby v neolitu a v eneolitu ve Střední Evropě. Ročníková seminární práce katedry pro pravěk a ranou dobu dějinnou FFUK. Praha.