CHOICE AND CONSTRAINT BUTCHERY PRACTICES ON CATTLE RIBS FROM A ROMAN SANCTUARY AT CARNUNTUM (LOWER AUSTRIA)

A VÁLASZTÁS LEHETŐSÉGE ÉS KORLÁTAI RÓMAI KORI DARABOLÁSI NYOMOK ÉRTELMEZÉSE SZARVASMARHA BORDÁKON EGY CARNUNTUMI (ALSÓ-AUSZTRIA) SZENTÉLYBŐL

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Abstract

A sample of over 2,000 fragments of cattle ribs forms part of a large animal bone assemblage collected from a pit situated inside a Roman sanctuary at Carnuntum (Lower Austria). For each rib fragment, the approximate anatomical position (1st to 13th rib) and completeness were recorded. For the latter objective, ribs were divided into fragment zones running from the joint area to the ventral end. The whole rib cage was found to be present, although lowermost parts of the rib bodies and the anterior and posterior ribs were under-represented. An analysis of the butchery marks showed that (1) the majority of the fragments bear marks and that (2) these follow a uniform pattern. Chop-marks, largely prevailing over cut-marks and usually inflicted from the medial side, mostly segment the bodies of ribs transversally, or detached the ribs from the vertebrae through the head or neck. It is thought that both the anatomical distribution of fragments and the pattern of anthropogenic marks indicate the butchery and immediate consumption of, at least, the thoracic part of the carcass. This is also compatible with the idea of a feasting event being responsible for the accumulation of the bone assemblage.

Kivonat

A vizsgált minta 2000 bordatöredéket tartalmaz, amelyek kizárólag szarvasmarhákból származnak. Valamennyiüket az alsó-ausztriai Carnuntumban feltárt római kori szentély egyik gödrében találták egyetlen óriási leletegyüttes részeként. Minden egyes bordamaradványról feljegyeztük annak megközelítő anatómiai helyzetét (1.-13. sorszámmal) és töredezettségének mértékét. Ez utóbbi célból a csontot a dorzális ízületi és a ventrális vég között harántirányú törési zónákra osztottuk. A leletanyagban a mellkas valamennyi bordájából voltak darabok, noha a ventrális végdarabokat illetve a sorban első és utolsó helyzetű bordákat aránylag kevesebb töredék képviselte. A vágásnyomok elemzése azt mutatta, hogy (1) azok a töredékek csaknem mindegyikén előfordultak és (2) egységes mintázatot követtek. A durva bárdnyomok gyakoribbak voltak a finomabb vágásoknál, és elsősorban a bordák belső, mediális oldalán figyelhetők meg. Részben a bordák harántirányú hasítását célozták, részben pedig a bordák nyak- és fejrészének elválasztását a gerincoszloptól. Az emberi beavatkozások nyomainak anatómiai helyzete arra utal, hogy a levágott állatoknak legalábbis a bordák által képviselt mellkasi és háti részét azonnali fogyasztás céljából darabolták fel. Ez a megfigyelés összeegyeztethető avval a feltevéssel, hogy a gödörben felgyülemlett csontanyag valamiféle nagyszabású lakoma maradványa.

KEYWORDS: ROMAN PERIOD, SANCTUARY, BUTCHERING, CATTLE RIBS, ARCHAEOZOOLOGY

KULCSSZAVAK: RÓMAI KOR, SZENTÉLY, SZARVASMARHA BORDA, DARABOLÁS, ARCHEOZOOLÓGIA

Introduction

The bone material presented in this paper results from the fill of the large pit G11, situated within the area of the sanctuary of Jupiter Heliopolitanus in Carnuntum–Mühläcker (Lower Austria; Gassner et al. 2011). The archaeological features, the chronology and parts of the material culture of this site are the object of the present FWF-Project 22903. The faunal studies focus on the samples retrieved from several pits located to the south of a central courtyard and from one pit just outside the sanctuary wall. The aforementioned pit G11, measuring about 5 m in width and 2 m in depth, produced an extraordinarily large amount of animal bones and pottery fragments. Detailed maps indicating the location of Carnuntum in general and of the Mühläcker area in special are given in Gál 2013 and in the homepage of the project: http://www.oeaw.ac.at/antike/index.php?id=201. To this date, over 10,000 animal remains were identified from it, although only half of the fill was collected during the excavation in 1981. Apparently, the pit was filled up in the course of a

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reconstruction phase of the sanctuary around the end of the 2nd and the beginning of the 3rd century. According to features of both the pottery association and the bone assemblage, the majority of the fill may have been accumulated in the course of one single or several related events, which were possibly connected to common meals involving a large group of people (Gassner et al. 2011). Domestic cattle and chicken are the dominant species among the animal remains from pit G11. The overall number of bones that cannot be related to butchery or consumption is low, and most of the assemblage may indeed result from a single source. The skeletal element pattern of cattle indicates an over-representation of mandibles and distal limb parts, but also of meat-bearing elements like ribs and long bones. This indicates the butchery and processing of complete animals and the subsequent consumption of major cuts within the sanctuary. Due to the good preservation conditions, surface modifications are clearly visible. In this paper, an evaluation of the butchery marks identified on one anatomical group of cattle remains from pit G11, the ribs, will be given. The aims of this paper are to present butchery data of one anatomical group from a context where, apparently, (1) complete animals were processed and (2) fresh beef was consumed, and to compare it with assemblages where skeletal part distributions are more selective and the distribution of mark types is different. This may contribute to the better understanding of the butchery process as a whole.

Material and methods

So far, over 2000 fragments from pit G11 have been identified as resulting from cattle ribs.

Ribs, especially fragments of the rib bodies, are generally considered to be of low diagnostic value, and few papers are devoted to their taxonomic and anatomical attribution (Wolsan 1982). Here, due to the large number of rib fragments and the interpretive potential of the butchered specimens, a pragmatic stance was adopted in order to maximize the amount of data. *Bos taurus* is, by far, the dominant species of its size group in G11. Equids are only occasionally represented, mostly by articulated units. Therefore, all ungulate rib fragments corresponding to the shape of the comparative specimens of cattle and not exhibiting explicit equine features were identified as belonging to this species. The ribs from the skeletons from two adult individuals, a recent Simmental cow and an archaeological specimen, probably an ox, were used for comparison. For classifying younger specimens, ribs from a neonate individual and from a calf of about 6 months of age were used. In the skeleton of *Bos*, normally 13 pairs of ribs, corresponding to the same number of thoracic vertebrae, are present (Wolsan 1982, Budras & Habel 2003).

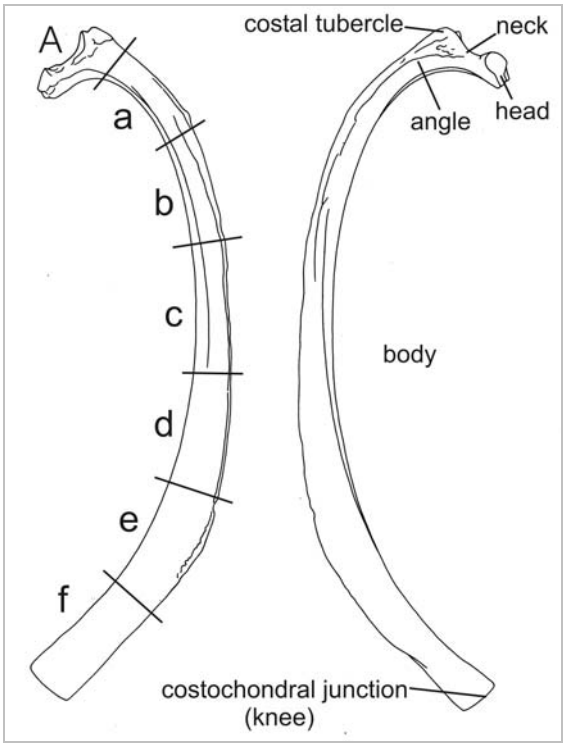

Fig. 1.: Schematic drawing of right 7th rib of cattle; left, medial aspect with approximate positions of fragment zones; right, lateral aspect with anatomical features

1. ábra: Szarvasmarha 7. bordájának vázlata. Balra: mediális nézet a törési zónák megközelítő helyével; jobbra: laterális nézet az anatómiai jegyek megjelölésével

For each specimen, the anatomical position was specified as far as possible. This included the body side and the origin from the rib pairs 1 to 13. Apart from the 1st rib which exhibits a clearly identifiable morphology, the shape of the ribs changes gradually along the rib cage. Therefore, the rib cage behind rib 1 was divided into four quarters I – IV comprising ribs 2-4 (section I), 5-7 (II), 8-10 (III) and 11-13 (IV).

Fragments were attributed either to the 1st rib or to one of these four sections, after the closest match with ribs 2-13 of the comparative skeletons had been specified. With few exceptions, exclusively pertaining to the robust 1st rib, ribs were always preserved as fragments. The completeness of each rib specimen was recorded in the following manner: a fragment could contain the joint area comprising head, neck and tubercle, and parts of the body of rib. Owing to the general morphology and the mechanic properties of mammal ribs, and also due to butchery considerations, most fractures occurred in a direction running, roughly, transversally to the dorso-ventral extension of the body of rib. Therefore, a classification scheme was developed in a dorso-ventral direction (**Fig. 1.**). It is inspired by the recording scheme of fragment zones for long

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bones presented by O'Connor (2003:147): The rib bone, *Os costale*, was divided into the joint area, reaching from the head, *Caput costae*, to the angle of rib, *Angulus costae*, and into the body of rib, *Corpus costae*, which was further divided into six sections of about equal length, running from the angle of rib dorsally to the costo-chondral junction ventrally. The joint area includes head, neck and tubercle with all articular surfaces down to the curvature of the angle. Zones a-c comprise the upper (dorsal) half of the body divided into three thirds of about equal length, zones d-f comprise the lower (ventral) half divided the same way. A complete rib would contain the joint area (A) and zones (a-f) of the rib body. If a fragment comprised most of the joint area and approximately the adjacent upper half of the body of rib, the corresponding loadings in the dataset would be A – a – b – c (for the preserved parts of the body). A fragment consisting of the two lowermost thirds of the ventral half of the body of rib was recorded, accordingly, as e –f. Clearly, this is a rough method prone to estimation errors and not applicable to all fragments with the same accuracy. It can only yield tentative results. Unless comprising complete, undamaged anatomical dorsal or ventral ends, the fragments exhibited fracture edges both on their dorsal and ventral limits. These fracture edges can be classified as (1) old, pre-depositional breakages, as (2) manipulated, chopped edges resulting from butchery, or as (3) modern, post-depositional breakages inflicted during excavation or later, and were recorded in all specimens. Of special interest here are artificial breakages caused by butchery, testified by chop-marks on cortical bone tissue, and plane surfaces on spongy tissue. Of course, unspecific fractures (breakages) may also have been generated during butchery, but unequivocal evidence for human activity is only presented by marks related to the intervention of a metal blade. Roughly, anthropogenic butchery marks generated by metal tools can be divided into cut-marks, involving pressure, and chop-marks, involving momentum. Usually, the former are related to the use of a knife, the latter to the use of a chopper or axe. However, a mark type is not strictly related to a specific kind of tool, rather to its use. On the cattle remains from G11, both cut- and chop-marks of different size, strength and extension are present, to very varying degrees. In cattle, due to cortical thickness, only chop-marks are involved in the segmentation of ribs. In the butchery mark code presented by Lauwerier (1988), three codes refer to the dissection of ribs: 3 – *collum costae* cut off; 4 – epiphysial part (=joint area) cut off; 7 – corpus costae cut through. Although the term "cut" is used, all codes refer to chop-marks. In the case of Carnuntum, code 3 was used also in cases involving a manipulation of the rib head only. Further, especially for codes 4 and 7, the direction of the blow was recorded. Normally, it can be identified easily: the invading blade produces a clear-cut edge on the side attacked, and often an irregular, jagged outline on the opposing fracture edge, where the blade went out. Accompanying chop-marks not completely penetrating the rib were frequently observed on the attacked side. Rib bodies were found to be chopped through from all directions, although to very differing quantities. In addition, all other chop and cut-marks not causing breakages were documented according to the code system by Lauwerier (1988) and also described verbally. The placement of chops and other breakages on the different areas of the rib bodies was automatically recorded by the fragment scheme outlined above. Ageing data of the ribs was easily defined in cases when the head of rib was preserved. If it was lacking, it had to be estimated by size criteria and the texture of the bone. For each specimen, the maximum fragment length was recorded.

Results and discussion

Including anatomical and taphonomic parameters, nine or more variables were collected for each rib fragment, offering a great potential for comparative analyses with other samples. Only a few results will be presented here.

Anatomical distribution and completeness: In **Fig. 2.** and **Table 1.**, the absolute figures for all 2082 cattle ribs assigned to an anatomical position, are given. The representation of 1st ribs is poor and lies clearly below the expected value of one third of each remaining group. Numbers increase from quarter I (2nd to 4th ribs) to II (5th to 7th), reaching a maximum in III (8th to 10th), then decreasing again in IV (11th to 13th ribs). This distribution may somehow be linked to the absolute lengths of ribs, which steadily increase from the 1st to the 10th pair, then decreases to the 13th (Budras & Habel 2003): longer ribs could produce more fragments if reduced to sections of the same length. A more intensive fragmentation in the central area would be another explanation. However, the average ratio of zones per fragment, being high in the 1st rib (2.7), varies between 1.8 (group II), 1.9 (groups III and IV) and 2.1 (group II). That is, 1st ribs tend to be more completely preserved.

This variation is certainly too low to be solely responsible for the different representation. Due to estimation inaccuracies, identical zones of the same specimens may have been counted twice, especially in the longer ribs of the central and posterior areas.

In **Figs. 3-4.** and **Table 2.**, the absolute and relative representation of the fragment zones across the anatomical regions is indicated. All zones from each anatomical section are represented, though to different degrees.

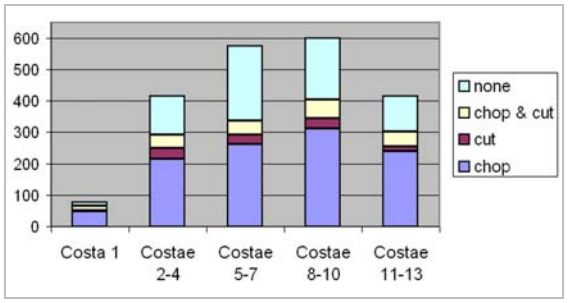

Fig. 2.: Anatomical distribution of cattle rib fragments from pit G11, Carnuntum-Mühläcker; amounts of specimens with categories of butchery marks

2. ábra: A szarvasmarha bordatöredékek anatómiai eloszlása Carnuntum-Mühläcker G11-es gödréből a különböző vágásnyomok szerint

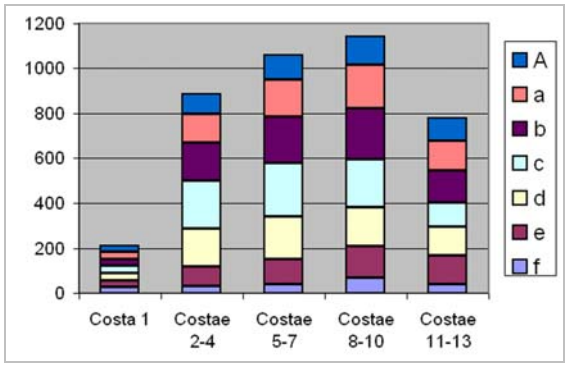

Fig. 3.: Cattle rib fragments from pit G11, Carnuntum-Mühläcker; distribution of recorded fragment zones across anatomical regions

3. ábra: Szarvasmarha bordatöredékek Carnuntum-Mühläcker G11-es gödréből; anatómiai eloszlás a törési zónák szerint

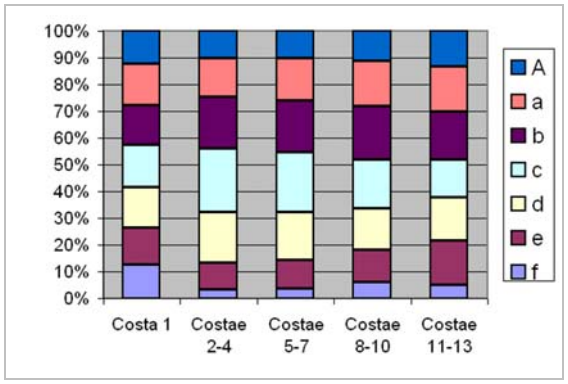

Fig. 4.: Cattle rib fragments from pit G11, Carnuntum-Mühläcker; relative distribution of fragment zones across anatomical regions

4. ábra: Szarvasmarha bordatöredékek Carnuntum-Mühläcker G11-es gödréből; relatív eloszlás (%) a törési zónák szerint

The overall frequency trend across anatomical groups, in cranio-caudal direction, resembles the fragment counts: low representation of 1st ribs, then a steady increase from group I to III, followed by a marked drop in group IV. The representation of zone A, the joint area, exhibits a similar trend, but here the drop for group IV is less marked, it surpasses group I. Joint areas of 1st ribs are better represented than fragments of this element in general, but still below the "expected" value of one third of each remaining group. Another gradient of representation can be recognized in a dorso-ventral direction (**Fig. 4.**). The joint areas are easily identified and can be used for the calculation of minimum numbers of elements. They usually account for 10% of all identified zones, being more frequent in the 1st ribs and section IV. Only in the 1st ribs, all zones are equally represented. This situation is compatible with the complete disposal, retrieval and identification of the whole element, without taphonomic or analytic loss. In the remaining parts of the rib cage, the representation of the zones is less balanced. The upper half of the body of rib is always better represented than the lower half, and here it is the ventrally situated zones e and, especially, f which are in deficit. Mostly, the upper-central zones of the body b-d are best represented. Some trends for the anatomical groups I-IV as indicated by **Fig. 4.** (decreasing: zone c, d; increasing: e, a) may in fact be related to analytic biases. The variable morphology of the bodies of rib may be tempting to locate certain fragments more ventrally or dorsally than they actually are. However, the bad representation of the ventral areas, lying close to the costochondral junction, is certainly not caused by misidentification. It seems rather related to either butchery considerations, implying that the lowest parts and the sternum may have been deposited elsewhere, or to other taphonomic effects: the lower ends, with a thin cortex layer and a concentration of spongy tissue, appear more prone to destruction than upper areas. This effect can even be observed in comparative collections, where these lower parts are frequently damaged. The taphonomic properties, namely the resilience, of the rib cage vary both along the anatomical areas (cranial-caudal) and the fragment zones (dorsal-ventral). These alone cannot be held responsible for all disparities apparent from **Figs. 3-4**. It must be kept in mind that the bodies of the anterior ribs, which are under-represented, are rather robust structures, sustaining loadings from the scapula. If the bone assemblage from pit G11 results from a consumption event, it is quite likely that it exhibits certain disparities. The most cranial, caudal and ventral parts may have suffered more taphonomic loss or may have entered different pathways of consumption and disposal. This is also evidenced by the poor representation of the sternum.

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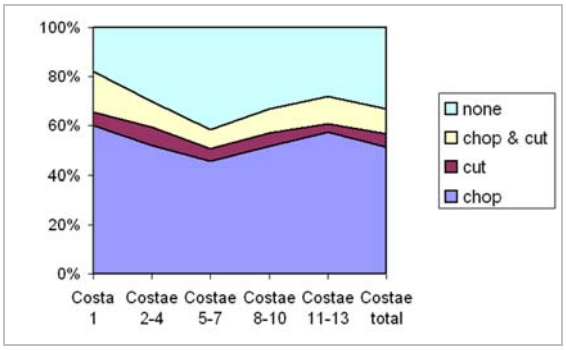

Fig. 5.: Cattle rib fragments from pit G11, Carnuntum-Mühläcker; relative portions of specimens with categories of butchery marks across anatomical regions and for total assemblage

5. ábra: Szarvasmarha bordatöredékek Carnuntum-Mühläcker G11-es gödréből; a vágásnyomok kategóriáinak aránya (%) anatómiai helyzet szerint a teljes leletegyüttesben

Butchery evidence

The impact of butchery on the rib assemblage will be demonstrated here by two types of quantitative evidence: the distribution of mark types and the representation of fragment groups.

Distribution of mark types: **Figs. 2., 5.,** and **Tables 1., 3.** indicate the absolute and relative proportions of ribs with butchery marks. Exactly two thirds of the whole anatomically identified sample bore signs of intentional modification. Over 50% were chopped, 5.4% bear cut-marks and 10% exhibit both types of marks. These relations show some variation across the rib cage. The 1st rib and the caudal group IV are the regions most intensively butchered and with the highest incidence of remains with both cut- and chop-marks. As a general trend, the percentage of butchered specimens decreases from the 1st rib to group II, and then goes up again. Butchery marks of all types were lowest in group II. Possibly, the cranial and caudal parts of the rib cage were more exposed to a different butchery regime than the ribs of the central area. The first and last ribs often exhibit marks indicating a cranio-caudal direction in the use of the chopping tool, only rarely to be observed in the central parts. Still, even in the least concerned 5th to 7th ribs, almost 60% of the specimens were visibly butchered.

Representation of fragment groups

641 Specimens (30.8%) exhibited fresh breakages dorsally, ventrally or on both ends. These bones were integrated into the quantification of mark types (**Figs. 2., 5.,** and **Tables 1., 3.**), but contributed only limited evidence otherwise: they could not be properly integrated into the scheme of fragment types defined by the state of dorsal and ventral ends. Among the undamaged 1441 specimens, natural, undefined and artificial breakages and anatomically complete ends produced a wide array of potential combinations, and most were indeed found to be present within the material. Among the groups defined by breakage or mark type on their dorsal and ventral ends, only six combinations were represented by more than 100 specimens (**Fig. 6.** and **Tables 4.**). Together, they account for 77.5% of all specimens categorized. Fragments of bodies of rib with unspecific fractures are the most frequent type (275), followed by corporal parts chopped from the medial side dorsally or ventrally, combined with breakages on the opposing end, or chopped medially on both ends (ca. 200 each; **Fig. 7.**). The average length of this latter type, the most frequent fully manipulated fragment, is 107.5mm (spread 43-193mm). Next frequent categories, with 100-150 observations, involve joint areas with adjacent parts of the body, with breakages or medial chops on the ventral end.

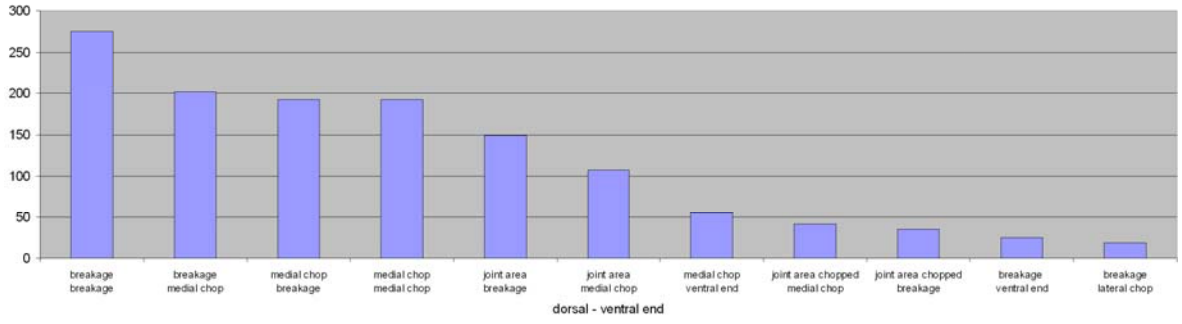

Fig. 6.: Cattle rib fragments from pit G11, Carnuntum-Mühläcker; distribution of fragment types, defined by state of dorsal and ventral end. Upper row of category axis indicates the state of the upper (dorsal) end, lower row indicates the state of the lower (ventral) end of fragment; only the 11 most frequent types shown.

6. ábra: Szarvasmarha bordatöredékek Carnuntum-Mühläcker G11-es gödréből; töredékszámok a dorzális és a ventrális végdarab állapota szerint. A kategória tengely felső sorai az ízületi vég, az alsó sorai a ventrális végdarab állapotát jelzik; az ábrán csak a 11 leggyakoribb változat látható.

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Table 1.: Specimen counts (n) of rib fragments attributed to anatomical sections; number of fragments with or without specific mark types (**Fig. 2.**)

1. táblázat: A töredékszámok (n) anatómiai helyzete az egyes vágásnyom típusok megléte vagy hiánya szerint (**2. ábra**)

	n	chop	cut	chop & cut	none
Costa 1	78	47	4	13	14
Costae 2-4	415	216	31	43	125
Costae 5-7	574	261	30	44	239
Costae 8-10	600	310	32	60	198
Costae 11-13	415	238	15	46	116
Costae total	2082	1072	112	206	692

Table 2.: Representation of fragment zones (A and a-f) according to anatomical sections (Costa 1-13; **Figs. 3.** and **4.**); indicated are counts (loadings) for observed zones, not individual fragments (compare **Table 1.**)

2. táblázat: A törési zónák (A és a-f) anatómiai helyzete (az 1.-13. bordán; **3.** és **4. ábra**); a számok a megfigyelt zónák, nem a töredékek számát mutatják (ld. **1. táblázat**)

	f	e	d	c	b	a	A
Costa 1	26	29	32	33	31	33	26
Costae 2-4	28	88	169	211	171	129	91
Costae 5-7	38	113	189	237	205	165	111
Costae 8-10	68	138	175	209	228	196	128
Costae 11-13	38	128	127	110	139	132	104

Table 3.: Relative proportions of specimens with categories of butchery marks by anatomical position

3. táblázat: A vágásnyomok relatív gyakorisága anatómiai helyzet szerint

	mark category			
	chop	cut	chop & cut	none
Costa 1	60.3	5.1	16.7	17.9
Costae 2-4	52.0	7.5	10.4	30.1
Costae 5-7	45.5	5.2	7.7	41.6
Costae 8-10	51.7	5.3	10.0	33.0
Costae 11-13	57.3	3.6	11.1	28.0
Costae total	51.5	5.4	9.9	33.2

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Fig. 7.: Pit G11, Carnuntum-Mühläcker: fragments of bodies of cattle ribs, with chop-marks on dorsal and ventral ends, medial aspect. Note accompanying chop-marks on two specimens.

7. ábra: Carnuntum-Mühläcker G11 gödör: szarvasmarha bordatest töredékek dorzális és ventrális végükön ejtett vágásnyomokkal, mediális nézet. Az egyidejűleg ejtett bárdnyomok jól láthatók.

Table 4.: Specimen counts (n) of the most common fragment types, defined by the state of the dorsal (upper) and ventral (lower) end (**Fig. 6.**)

4. táblázat: A leggyakoribb töredéktípusok száma (n) a felső (dorzális) és alsó (ventrális) vég állapota szerint (**6. ábra**)

dorsal end	ventral end	n
breakage	breakage	275
breakage	medial chop	202
medial chop	breakage	192
medial chop	medial chop	192
joint area	breakage	149
joint area	medial chop	107
medial chop	ventral end	55
joint area chopped	medial chop	41
joint area chopped	breakage	35
breakage	ventral end	25
breakage	lateral chop	19

Fragments comprising either manipulated joint areas, or ventral ends, number about 50 or less. The only fragment type chopped through from the lateral side (ventrally), takes the 11th position (19 specimens).

Of the 1292 specimens shown in **Fig. 6.**, 61% (789 observations) exhibit a medial chop-mark on one end at least. Segmentation of the bodies of rib from the medial side using a cleaver is therefore, by far, the most frequently documented butchering action. About one quarter of the specimens in **Fig. 6.** (332) comprises the joint areas. However, only 76 of these fragments provide evidence for a separation from the vertebral column. All in all, a very structured butchery waste is documented in pit G11, indicating a highly systematized procedure when cattle carcasses were butchered in the area of the sanctuary. The joint areas were separated from the vertebral column, if at all, close to the head or

through the neck. Chops through the angle, separating the joint area from the body, are very rare: the joint areas mostly remained with the adjacent parts of the bodies. These were segmented almost exclusively from the medial side. This direction appears logic for most of the thorax for mechanical (concave curvature medially) and pragmatic reasons (mainly lateral distribution of meat). The butchery of cattle ribs in Roman contexts is discussed by Lauwerier (1988), Morel (1991), Deschler-Erb (1991, 2006, 2007), Berke (1995), Lignereux & Peters (1996) and Lepetz (1996, 2007).

The segmentation of the body of rib with a chopping tool as standard procedure is mentioned by several authors. It is usually interpreted as the portioning of meat cuts (chops) with the meat still attached to the bone. It was, by far, the mark most commonly observed in the Roman Netherlands (Lauwerier 1988:155). Berke (1995:361) and Lignereux & Peters (1996) indicate that blows were always directed from the medial side. The reported average lengths of body fragments, chopped on both ends, are 80 to 130mm (Lignereux & Peters 1996:60) and 118mm for a site at Köln (Berke 1995:361). These figures are compatible with the results from Carnuntum. For other contexts, which are thought to be related to a smokehouse at Xanten, Berke (1995:361) mentions average lengths of 192mm and 132mm. Deschler-Erb (1991, 2007) reports cattle rib assemblages from several contexts at Augst, which strongly differ from G11 by their taphonomic pattern. At a public bath, the sample consisted almost entirely of body fragments, the joint areas made up only 1.3% of all finds (1991:147). Half of the body fragments exhibit longitudinal, continuous cut-lines on their medial aspects. Similar assemblages and fragments were also reported from other areas at Augst and are thought to refer to the boning of smoked meat (Deschler-Erb 2007). No transversal chops are mentioned from Augst, but average lengths of body fragments vary between 70 and 100mm. Longitudinal cut-marks on the medial aspect of the bodies, preferably on their ventral parts, observed by several authors (e.g. Morel 1991). According to Lignereux & Peters (1996:60) and Lepetz (1996:16, 141), these cut-marks belong to ordinary filleting procedure of the lower rib parts, whereas the upper parts remain with the vertebrae. In a later paper, Lepetz (2007:81f.) defines longitudinal medial cuts on the lower cattle ribs as a signature feature of Roman butchery, whereas transversal chops are restricted to the upper parts. The resultant body parts may attain length of up to 400-500mm and represent primary waste accumulated at butcher's shops. The multiple transversal segmentation of the body of rib, producing rib chops of about 100mm length, is rather seen as an Iron-Age heritage (Lepetz 2007:82).

Conclusions

At G11, the aforementioned longitudinal cut-marks were observed on eight specimens only, whereas medial chop-marks may occur at any position along the body. Most of the cut-marks recorded here are short, very fine and positioned at the joint area, or they occur as transversal striations on both sides of the bodies. They may be related to skinning or consumption proper. However, in pit G11, chop-marks, mostly segmenting body fragments, form the overwhelming majority of the types observed. The anatomical record of the rib remains and the pattern of marks observed at G11 is compatible with the idea of the processing of complete, fresh rib cages and the subsequent consumption of larger parts of the adherent meat, which may in turn corroborate the hypothesis of communal meal(s) being the source of the bone assemblage. Although the first and last ribs may have been treated in a slightly different manner than the remaining sections, the same butchery procedure can be assumed for the whole rib cage. The uniformity in butchery procedure, the representation of anatomical parts and of the fragment types is compatible with the idea of the processing of cattle carcasses involved in some ritual inside the sanctuary and, at least partly, consumed at the spot. Further, the study of fragment and mark types may reveal differences among bone assemblages not necessarily indicated by species and skeletal part distribution alone. In the case of cattle remains from Roman contexts, the processing and consumption of either fresh or dried beef may be one of the main dividing lines responsible for consistent differences in fragment and mark patterns. Of course, the analysis of butchery marks has to be extended to other parts of the skeleton as well, above all to the vertebrate column.

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