

Recent developments in archaeozoological research in Slovenia

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Izvleček

Članek podaja zgoščen oris arheozooloških raziskav, ki jih je avtor izpeljal v Sloveniji. Izbrani izsledki kažejo, kako lahko s pomočjo živalskih kosti razložimo določene arheološke probleme. Da bi se izognili diahronemu vrednotenju, so izbrane teme, ki najbolj prikazujejo raznovrstnost analiziranih najdišč. Posebej je poudarjena pomembnost multidisciplinarnega dela v raziskavah.

Abstract

This paper is a concise summary of archaeozoological research carried out by the author in Slovenia. Selected research results are used to illustrate some of the archaeological problems that can be elucidated on the basis of animal remains. Rather than providing a diachronic evaluation, special topics were selected that are best represented by the great variety of sites analyzed. The importance of multidisciplinary research is emphasized.

BRIEF RESEARCH HISTORY

The first attempt to treat animal remains from *archaeological* contexts separately from *paleontological* finds was made at the 1851 meeting of the Scientific Society in Copenhagen (Forchhammer et al. 1851-1856). Ten years later, Rüttimeyer's groundbreaking, comprehensive work on the fauna of Swiss lake dwellings followed (Rüttimeyer 1861). Darwin's seminal book, "The Variation of Animals under Domestication" (Darwin 1868) clearly illustrates the concern with the culture history of animals toward the end of the 19th century. The human effect on animals whose bones were recovered from archaeological sites gradually came to be recognized. Such *animal remains are artifacts, carrying important culture historical information beyond zoological meaning.*

Archaeologists across Europe, including the newly formed Austro-Hungarian Monarchy, clearly realized the importance of archaeozoological studies in the reconstruction of ancient cultures. By 1867, refreshingly modern views were voiced in Hungary, where the Academy of Sciences encouraged the cooperation between its Archaeological Committee and The Zoological and Anatomical Collections of the Hungarian Royal University (Báthory 1867).

In Slovenia, Dežman's zoological identifications in the inventory books of the archaeological excavations in the Ig area of the Ljubljana Moor (Deschmann 1875; 1876), attest to the zoological precision of this work. The following one hundred years were spent in the identification of animal bone finds from archaeological sites with varying degrees of intensity, most characteristically carried out by paleontologists and veterinarians in our region. It was only after World War II, that a new, systematic approach toward archaeozoology developed in Central Europe. In Slovenia, the professional treatment of animal bone finds in general was carried out within the framework of quarterpaleontology (cfr. Rakovec 1975).

In 1971, the Third International Congress of Agricultural Museums was organized in Budapest. Session IV, with its 75 participants from 18 countries (Matolcsi 1972, 95) was to become the first meeting of the *International Council for Archaeozoology* (ICAZ), a global organization devoted to this type of research. Curiously enough, Hungarian involvement with the identification of animal bones from the territory of present-day Slovenia started in the United States, where Sándor Bökönyi of the Hungarian National Museum studied the Iron Age horse remains from

Magdalenska gora. This body of data was used regularly in his subsequent works on horse domestication (Bökönyi 1968; 1974; 1993). Subsequently, Bökönyi cooperated with Stane Gabrovec in the analysis of faunal remains from the excavations at Stična (Bökönyi 1994).

My first visit to Ljubljana took place in 1980 within the framework of the exchange program between Slovenian Academy of Sciences and Arts and the Hungarian Academy of Sciences. Since then, my host institution has been the Palaeontological Institute, where I had the good fortune of still being able to meet the late Ivan Rakovec, whose name the Institute bears today. My long term working plan was determined by the need to help Katica Drobne, who was gradually shifting her own field of interest from vertebrate paleontology based archaeozoology to Foraminifera research at the time. Through this working contact, however, I had access to a great variety of bone assemblages from Slovenia which represent almost all critical aspects of faunal analysis. The single week working visits have spanned almost two decades during which Slovenian archaeology, the field of archaeozoology and my personal views on bone identification have changed.

Within the limitations of this paper, I would like to summarize a few conclusions regarding

my own work on some archaeozoological finds from Slovenia. It must be emphasized that I am in no position to comment on research by other colleagues who have occasionally helped archaeologists with animal bone identifications. Some of my long-term observations, however, may offer insights and help in future investigations.

MATERIALS STUDIED

The sites from which animal remains were available for study are heterogeneous in many respects. The broad range of chronological affiliations is expressed by the list of sites summarized in *table 1*. This table also contains a reference to the state of analysis of individual sites.

From this list, it is apparent that Early Iron Age settlements are best represented among the materials and their state of at least partial publication is also most advanced. It must be noted, however, that many of the publications are preliminary in nature: detailed studies will form an integral part of individual site reports, as is the case with three major manuscripts. Hopes for additional detailed accounts are also best for the Iron Age, whose faunal material will have to be reviewed in the near future.

Ajdovski gradec above Vranje	Late Roman, AD 4-6 th c.	<i>ms</i>
Bled - Pod Gradom	Early Iron Age, 8-6 th c. BC	<i>p</i>
Cvinger above Korita	Early Iron Age	<i>p</i>
Godič	Roman, 3 rd -4 th c.	
Gradec near Mirna	Ljubljansko barje I-III, Neolithic	
Gradec near Vinkov Vrh	Hallstatt and La Tène	<i>p</i>
Gradišče above Bašelj	Late Roman/Early Middle Ages, 4-5 th and 9-10 th c.	
Brezce	Early Middle Ages, 9-10 th c.	
Hrušica - Ad Pirum	Roman/Middle Ages, AD 1 st -5 th and post 12 th c.	
Ivančna Gorica / Mrzlo polje "B"	Roman and Middle Ages	
Kučar above Podzemelj	Early Iron Age/Late Roman, 8-4 th c. BC and AD 5-6 th c.	<i>p</i>
Kunkel near Vrhtrebnje	Early Iron Age	<i>p</i>
Libna	Early Iron Age	<i>p</i>
Ljubljanica River	mixed	
Most na Soči	Early Iron Age/Late Roman, 8-4 th c. BC and AD 5-6 th c.	<i>p</i>
Moste, Jama pod hribom Žičica	Roman, 3 rd -4 th c.	
Nanos, Lončena jama	Bronze Age	
Ormož	Late Bronze Age	<i>p, ms</i>
Otok at Dobrava - Gutenwerth	High and Late Middle Age, until 15 th c.	<i>ms</i>
Parte near Ig	Bronze Age	<i>ms</i>
Vače	Early Iron Age, 8-4 th c. BC	<i>p</i>
Veliki Vinji vrh	Early Iron Age and La Tène, 7 th to 1 st c. BC	
Vesela gora v Brinju	Early Iron Age and Middle Ages	<i>p</i>

Table 1: The origins and chronological position of animal bone assemblages (*p* = published, *ms* = unpublished manuscript, unmarked items = analysis in progress).

Tab. 1: Najdišče in časovna opredelitev koščenih skupkov (*p* = objavljeno, *ms* = neobjavljen rokopis, neoznačeno = analiza v teku).

While the different stages of analysis reflect the natural continuity of research work, the at least 25 years time span represented by the times of excavation resulted in early materials whose animal bones were collected selectively (concentrating on large, measurable and impressive pieces) or with little regard to the chronostratigraphic position of animal remains.¹ For these reasons, the evaluation of materials from Hrušica - Ad Pirum and Otok at Dobrava - Gutenwerth are limited to the most evident observations, and animal remains recently recovered from the Ljubljanica river are impossible to interpret. At the other extreme, well stratified, archaeozoological assemblages from the Roman Period votive cave sites of Godič and Moste (Jama pod hribom Žičica), recovered using water sieving, look very promising in terms of reconstructing the cultural roles played by a variety of animals at these two locations. Awareness concerning the cultural meaning of animal bone finds has progressed significantly among archaeologists and will undoubtedly have a positive impact on future multidisciplinary analyses.

SOME CHARACTERISTIC RESULTS

Given the aforementioned great variety of assemblages, a broad-range, comparative evaluation of all sites would be possible at best on the level of species lists within the framework of this short article. A comparison between such "menus", however, would be of little interest in and of itself. In fact it would blur important taphonomic and cultural differences between many of the animal bone materials studied.

On the other hand, some important features in the history of animal exploitation in Slovenia can be highlighted on the basis of a few sites singled out from the two dozen assemblages so far studied. The examples listed below also serve to illustrate basic questions that could be addressed on the basis of the broad spectrum of settlements summarized in *table 1*.

1. The dwindling role of subsistence hunting

While only insignificant numbers of Neolithic bones have been available for study, the roles of



Fig. 1: Neurocranium of Bronze Age roe deer buck hunted during the spring with remains of the antler pedicle (lateral aspect, right side; photo: Tomaž Lauko, National Museum of Slovenia, Ljubljana).

Sl. 1: Neurocranium spomladi ulovljenega bronastodobnega srnjaka z ostanki nastavka rogovja (desno, lateralno; foto: Tomaž Lauko, Narodni muzej Slovenije, Ljubljana).

hunting vs. animal husbandry could be studied at the Bronze Age pile dwelling settlements in the Ljubljana Moor which have been systematically analysed since the early 1960s (Drobne 1964). Faunal remains recently studied from Parte in Ig can be classified with Maharski prekop of the known sites (Drobne 1975), where the bone remains of domesticates dominated. Faunal materials brought to light at Resnikov prekop and during previous excavations at Ig are characteristic of the relatively greater importance of hunting.

In light of the quantities of beef consumed by the settlement's inhabitants at Parte by Ig in Ljubljana Moor, even meat from large game animals such as aurochs, red deer and wild pig, seems to have played a secondary role in the diet. While antler working was widespread at this site, it did not necessarily have to rely on deer hunting. Shed antler can be gathered during the early spring. On the other hand, the settlement's inhabitants definitely practiced hunting during the early spring as well, as is proven by a neurocranium of a roe deer buck killed during the spring with remains of the pedicle from which the antler had just separated (*fig. 1*). It may be hypothesized that hunting was seasonally more important at that time, after winter food stocks had been depleted and the year's new crop has not yet been available. Aside from this form

¹ As opposed to classical archaeological artifacts such as ceramics or metal, animal bones cannot be *a priori* assigned to archaeological periods on a morphological basis without risking circular argument. The proper question in archaeozoology is not how old a certain zoological find is, but what animals were exploited by the human population of a known culture. Therefore, short of AMS dating each and every bone fragment, the material of mixed provenances cannot be evaluated.

of complementary meat provisioning, defensive hunting (Uerpmann 1977) may also be considered in the case of brown bear or even red deer. These two species are known to damage animal stocks and crops respectively.

As far as domestic animals are concerned, the percentual contributions of cattle and sheep and/or goat vary from site to site in the Ljubljana area during the Bronze Age (Drobne 1975). Similarly to Resnikov prekop and Notranje Gorice, Parte belongs to a group of sites where more cattle bones were found compared to remains from small Ruminants (Drobne, Bartosiewicz n. d.). Although the percentual proportion of pig bones is highest at Parte relative to all the sites compared in this study, this species is still rather underrepresented in the faunal assemblage. The effect of erroneous identifications (wild/domestic pig) may be largely discounted in this respect since wild pig also seems to have been insignificant at Parte.

Two fine, transversal cutmarks, discovered distally of the *trochanter minor* on the diaphysis of the left femur from a dog may be attributed to defleshing the thigh, since its robust musculature would have protected the bone if the animal was simply skinned. It is noteworthy, that according to Bökönyi (1974, 320), the consumption of dog meat was abandoned in Central Europe during the Bronze Age. One of the last pieces of evidence comes from the site of Tószeg - Laposhalom in eastern Hungary, in the form of a dog skull cracked open as a sign that the brain was possibly consumed (Bökönyi 1974, 321, Fig. 137). A similar find occurred in the Bronze Age material identified by Katica Drobne from the site of Maharski prekop (fig. 2). The open neurocranium of this Bronze Age dog offers additional evidence of prehistoric dog-eating that may have complemented less predictable wild animal resources (Bartosiewicz 1994) and was gradually given up as animal keeping became increasingly established.

Small stock (sheep/goat and pig) are comparable to each other in terms of meat output (Bartosiewicz 1991a). On the other hand, their habitat preferences, forage and ultimately exploitation differ radically from each other. It is suggested here that the natural environment of the Ljubljana Moor was more favorable for pig husbandry than sheep keeping. However, as long as hunting maintained some of its significance, regional specialization in sheep vs. pig keeping was probably not as pronounced as in the Bronze Age of western Hungary, where game was apparently of little importance in buffering the differential environmental adequacy of small



Fig. 2: Neurocranium of Bronze Age dog with open brain case from Maharski prekop identified by Katica Drobne (frontal aspect; photo: Tomaž Lauko, National Museum of Slovenia, Ljubljana).

Sl. 2: Lobanja bronastodobnega psa z razbitim možganskim delom z Maharskega prekopa, ki jo je identificirala Katica Drobne (frontalno; foto: Tomaž Lauko, Narodni muzej Slovenije, Ljubljana).

ruminants (drier, hilly areas) and pig (river valleys and dense woodland). This phenomenon could be observed during the better studied Hallstatt Period of Slovenia, although signs of specialized animal keeping are evident at the Late Bronze Age site of Ormož, outside the Ljubljana Moor area (Bartosiewicz 1987, 59, Fig. 36).

2. Early Iron Age: established animal keeping

Archaeozoological research into the Hallstatt Period, one of the more intensively studied times in Slovenian archaeology is, in a way, the continu-

ation of Bökönyi's groundbreaking work at Stična. An important difference, however, lies in the fact that with the notable exception of Most na Soči, a settlement associated with the Sv. Lucija culture cemetery in western Slovenia, most faunal assemblages originate from both large and small sondages related to topographical research. This means that, as opposed to the settlement structure which is reasonably well represented in the material of Most na Soči, many other Hallstatt Period animal remains originate from close to wall remains, i.e. test excavations aimed at the discovery and verification of architectural features.

In spite of this sampling bias and the relatively small size of individual assemblages (Bartosiewicz 1996a, Fig. 2), a rather coherent picture has begun to emerge owing to the great number of sites available for study. On the level of species identifications, the overwhelming dominance of domesticates could be ascertained. Within this general phenomenon, sites located in the proximity of river valleys in the east of the country seem to have been more dependent on pork than on mutton, while the consumption of meat from sheep and goat seems to have been of more importance in the hillier, northwestern region (this difference seems also apparent in the use of wood vs. stone in construction).

The unquestionable significance of beef is more difficult to appraise, since the omnipresent bones of cattle are more prone to both natural and butchery-related fragmentation (Coy 1972) and thus the quantification of their sometimes small splinters is less comparable between sites (Bartosiewicz 1991a). The sporadic remains of wild animals often include red deer antler, an important raw material that, as mentioned before, could have been gathered during the early spring without actually hunting. It is therefore of special interest that among the household refuse indicative of sedentary agriculturalists at the settlement of Most na Soči two massive red deer antler bases with the attached fragments of frontal bones were found (Bartosiewicz 1985, 115, Pl. 3: 1,2).

Reviewing the few measurable bones it can be seen quite clearly, that most Iron Age domestic animals in Slovenia were of small size, indicative of unimproved methods probably both in breeding and keeping, a trend already observed during the Late Bronze Age (Bartosiewicz 1987, 60). For the time being, however, it is impossible to tell

to what extent this phenomenon is synchronous with a similar size diminution observed during the Iron Age of the Carpathian Basin, a situation that improved only during the subsequent Roman Period (Bökönyi 1974).

3. Meat distribution and social status

Another aspect of faunal analysis is exemplified by an AD 4-6th century assemblage post-dating the heyday of the Roman Period. Over the last 180 years several excavations have been organized in the area of Ajdovski gradec above Vranje (Knific, 1994, 211). Of these, the 15 years long campaign carried out by the National Museum in Ljubljana between 1970 and 1983 is of most relevance to this study. For the first time, animal bones were systematically collected at this site.² Renewed excavations after 1985 not only uncovered a fortified settlement on this elevation, but also brought to light additional animal bones (Bartosiewicz, Choyke n. d.).

Ajdovski gradec is interesting from two points of view. The historical-economic uncertainty of the times is reflected in the animal remains which suggest autochthonous animal keeping: the relatively small proportion of cattle remains is in marked contrast with the unusually great number of chicken bones which may be a sign of an emphasis on local meat production. In addition, there is evidence for hierarchical differences between the center and periphery of the settlement in terms of quality of the meat consumed.

The bones of several species have a differential spatial distribution at this site as well. The better quality of meat and higher proportion of pig and fish bones in the settlement's central area may reflect differential access to selected cuts as well as secondary butchering for culinary purposes. Peripheral deposits contain a greater quantity of bones associated with poor quality meat cuts as well as bones of larger animals. Of these, sporadic horse remains probably should not be considered food refuse, but rather by-products of skinning as was often the case with old working animals (Wing 1989). It is possible that beef for the settlement's inhabitants also originated from draft cattle (Bartosiewicz 1993).

High species diversity was interpreted as a sign of increasing reliance on the local environment at

² The late Professor Joachim Boessneck identified part of this material on behalf of the Institut für Vor- und Frühgeschichte (München), which participated in the project until 1974.

late Roman Period military settlements in Hungary (Bartosiewicz 1990-1991). In the samples from Ajdovski gradec, however, relative taxonomic abundance in the bone assemblage often increased due to the sporadic occurrence of bones from non-food purpose animal species (dog, polecat, badger, rat). The site's natural topography probably most favored sheep husbandry by the local romanized population. The high elevation was less of an ideal pig habitat and with more effort required to keep them, swine exploitation may have been considered more of a luxury. Changes between Roman, Ostrogothic and Langobard rule during the AD 5th-6th tumultuous centuries (Knific 1986, 107) probably made chicken a cheap, flexible and easily mobilized alternative source of animal protein, no trouble to procure within the framework of a largely subsistence oriented economy.

4. The reconstruction of domestic animals

Excavations were carried out at two sites in the medieval settlement of Otok at Dobrava - Gutenwerth in southern Slovenia between 1971 and 1975. With no archaeozoological analysis in sight a quarter of a century ago, animal bones at Otok at Dobrava - Gutenwerth were collected concentrating on the pieces that were considered most interesting by the excavators. Thanks to the fact that at least well-preserved bones were collected, the size of animals represented at this site may be estimated both in absolute (cattle, horse) and relative terms. Six undated cattle metapodia yielded a mean withers height of 1082.5 mm (standard deviation = 26.4 mm). Four 12th century withers height estimates averaged a similar 1064.6 mm (standard deviation = 42.5 mm). The smallest withers height was less than 1 m (959.8 mm; 13th century), while the tallest individual had an estimated withers height of 1169.3 mm (14th century). Even the extremes of withers height, however, fit within the overall picture of small medieval cattle in Central and Southeastern Europe (Bökönyi 1974, 136).

Morphologically, the form of cattle identified at Otok at Dobrava - Gutenwerth is characterized by short and gracile horns representing the traditional "brachyceros" cranial type (Matolesi 1975, 30). The average length of 12 non-dated horn cores was 82.6 mm (standard deviation = 17.2 mm) and only a 13th century specimen attained a length of 135 mm. Three of the characteristically short medieval cow horn cores from Otok at Dobrava - Gutenwerth are shown in *figure 3*. The small, traditional buša cattle may be considered analogous (even if not



Fig. 3: Three of the characteristically short medieval cow horn cores from Otok at Dobrava - Gutenwerth (top: frontal aspect, left side; middle and bottom: basilar aspect, right side; photo: Tomaž Lauko, National Museum of Slovenia, Ljubljana).
Sl. 3: Tri rožnice goveda z Otoka pri Dobravi - Gutenwerth (na vrhu: levo, frontalno; sredina in spodaj: desno, bazalno; foto: Tomaž Lauko, Narodni muzej Slovenije, Ljubljana).

directly related) to such medieval animals identified at Otok at Dobrava - Gutenwerth.

An almost complete horse front limb, including a fragmented scapula, a humerus, radius and a metacarpus were found at Site 2. The greatest lengths of these bones yielded an estimated withers height of 1336.5 mm (algorithm: Bartosiewicz 1991b, 304). This stature may be considered average for the Middle Ages.

Both sites were littered with horn cores and well preserved metapodium fragments also commonly occurred at the settlement. Site 1 had been identified as a tanning area on the basis of specialized metal artifacts and large pits characteristic of this activity. Numerous complete goat horn cores were discovered as well. Goat horn core deposits occur relatively frequently in urban deposits and are usually

associated with tanning activities (e. g. Prummel 1982; Serjeantson 1989). A typical, triangular sheep horn core base fragment with cutmarks was found in the 12th century deposit of Square 67 at Site 1, southwest of Tanning Pit 1 (Vida Stare, personal communication). In general, however, the great proportion of metatarsal bones is most characteristic of Site 1 (especially during the 12th-13th centuries) that includes the tannery. The lack of associated phalanges, especially from small artiodactyls, within the tannery refuse from Otok at Dobrava - Gutenwerth may be due to recovery bias.

5. "Kleinfunde"

A minor part of animal remains has always been included among the "proper" archaeological artifacts, and is usually described using the Central European generic term "*Kleinfunde*". In contrast to mundane food refuse, these finds are evidently turned into utilitarian or decorative objects. Although the precise identification of various raw materials is of basic importance in the reconstruction of any craft activity, until recently relatively little zoological information has been included in traditional typologies of bone and antler artifacts (Bartosiewicz, Choyke 1994). The impressive osteological variability of such finds from Bronze Age pile dwellings in the Ljubljana Moor (e. g. P. Korošec, J. Korošec 1969, Pl. 82-101) carries a plethora of zoological information that may be of help in interpreting ancient cultural behavior. Such conclusions can be best drawn when both zoological and archaeological information is available from a settlement studied (Choyke 1998).

Bone and antler tools from Dežman's aforementioned excavations at Ig, kept in the National Museum in Ljubljana, offer a very good example how such information can be exploited. *Figure 4* shows the medial side of a Bronze Age red deer metatarsus with signs of initial grooving on the convex medial surface of the bone. While this find does not look spectacular in and of itself, it shows the attitude toward an appreciated raw material whose supplies may have been dwindling as hunting gradually lost significance. Our reasoning is as follows: The preparation of slender bone points by separating the fused IIIth and IVth metapodia of Ruminants may be regarded the archetypal form of using the groove and splinter technique (Clark, Thompson 1953, 148), which has been one of the most patterned ways of preparing some highly planned tool types within the manufacturing continuum (Choyke 1997, 67).



Fig. 4: Medial side of a Bronze Age red deer metatarsus Dežman's excavation with signs of initial grooving on the convex medial surface from (medial aspect, left side; photo: Tomaž Lauko, National Museum of Slovenia, Ljubljana).

Sl. 4: Nartna kost bronastodobnega jelena iz Dežmanovih izkopavanj z umetnim žlebom na izbočeni medialni strani kosti (levo, medialno; foto: Tomaž Lauko, Narodni muzej Slovenije, Ljubljana).

The special feature of blank shown in *figure 4* is the marks of flint grooving also occurring on the bone's convex lateral and medial sides, where grooving the surface is neither evident nor easy in the absence of supporting anatomical features. This additional form of grooving directly supports the hypothesis that many of the so-called 1/6 type (Schibler 1981) red deer "massive metapodium points" from the site of St. Blaise-Bains de Dames on Lake Neuchâtel (Bartosiewicz, Choyke 1997) may actually originate from such bones quartered longitudinally extending the groove and splinter technique to create a slender point. The technique helped maximizing the number of points made from a single metapodium.

Red deer antler is a raw material that seems to have been more commonly available for manufacturing than high quality deer bone. Antler debitage can be found on almost all Bronze/Iron Age sites in Slovenia. Several fragments, illustrating the entire manufacturing sequence were brought to light at the Bronze Age settlement of Ormož. They include a piece of shed antler with the rose still attached (P 30591), an incised tine fragment that looks like a half-product ready to be cut to size (P 5995), and the end product, a carefully cut and polished straight piece of antler with circular decoration (P 5890).

An even more special artifact, an Iron Age fibula fragment decorated with segments of antler was chosen for illustrating how theoretical/biometric information can be applied in archaeological practice. This late 7th/early 6th century BC (Mihovilić 1995, 288) specimen was found at the site of Vače (Inv. no. P 188, National Museum of Slovenia, Ljubljana) in an inhumation grave at the location called Klenik on August 29th 1878, during the course of excavations directed by Dežman and Schulz (Deschmann, Hochstetter 1879, Pl. 10: 3). It consists of an arched bronze wire on which various antler segments of truncated cone shapes were strung. The general form of the object is thus most reminiscent to a croissant, and in fact its size, with a diameter of 198.3 mm, is close to that highly appreciated delicacy as well. This decorative object almost weighs a quarter of a kilogram (235 g). The largest, centrally located cylindrical antler segment of this fibula can be used in the estimation of the antler's original size. At its most slender transversal section its diameters are 38.6 and 35.8 mm respectively. The relatively small difference between these two diameters is indicative of a moderately elliptical shape (Teržan 1995, Fig. 37: 6), which is characteristic of the antler's upper beam segment (Suter

1981, 20, Fig. 19). The circumference of this segment is 117 mm which is somewhat smaller than the 135 mm mean circumference obtained for a sample of 17,999 modern red deer trophies (Bán, Fatalin 1986). Thus the fibula decoration must have originated from an approximately 87.6 cm long antler (Bartosiewicz 1998). This means that this high status item carrying important stylistic information was, in fact, manufactured from a relatively "cheap" raw material, red deer antler that could even be gathered in the forest, and the piece itself originated from an individual of average size. It must have been craftsmanship and design that made this piece of jewellery special. Actually, much more modest specimens of the same type are also kept in the Collections of the National Museum in Ljubljana.

6. Special zoological finds

Almost all archaeozoological assemblages contain individual specimens that are of utmost interest to the specialist. It happens relatively infrequently, however, that the appearance of animal remains looks so out of place that it is evidently of interest to the broader public.

The small assemblage of re-stratified and mixed animal remains from the mountain road post at Hrušica - Ad Pirum would be difficult to interpret in overall terms since it contains an inseparable admixture of Roman Period and medieval animal bones. Never-the-less the unusual significance of this site lies in the presence of several camel bones that may originate from the same individual: they include a lower canine tooth (*fig. 5*), the



Fig. 5: Canine tooth of Roman Period (?) camel (possibly dromedary) from the road station at Hrušica - Ad Pirum (buccal aspect, right side; photo: Tomaž Lauko, National Museum of Slovenia, Ljubljana).

Sl. 5: Kamelji (morda dromedarjev) podočnik iz rimske dobe (?) s cestne postaje na Hrušici - Ad Pirum (desno, bukalno; foto: Tomaž Lauko, Narodni muzej Slovenije, Ljubljana).

proximal end of a radiocubitus (the bone forming the elbow joint), and a first phalanx from the animal's front leg.

Occurrences of camel bones in Hungary have recently been summarized (Bartosiewicz 1996b), in relation to the recovery of dromedary remains from Ottoman Turkish Period (16th century) deposits. Since the Hrušica finds predate this time, they may be attributed with greater probability to the Roman Period than to the Middle Ages. In the absence of direct dating, it may be considered that Bökönyi (1974, 227) also mentioned a jawbone fragment from the Roman villa site of TÁC - Fövenypuszta. It seems likely that the rare camel bone belonged to the Roman Period of that mixed assemblage, since it was several orders of magnitude larger than a subsequent contamination by a medieval animal bones. In addition, Bökönyi (1989) reported on two large, Roman Period (2nd-3rd century AD) camel skulls from Dunaújváros - Intercisa. Camel imports to the province of Pannonia (the western, Transdanubian section of modern-day Hungary) must have been associated with the stationing of Syrian military units in the local *castrum*. While the large size of these bones would be indicative of two-humped Bactrian camels, owing to their most likely geographical origins they may just as well represent dromedaries, a form that was used by the Roman military both in North Africa and the Balkans (Benecke 1994, 328). Roman Period camel bone finds from Hungary are paralleled by remains from Vienna (Berger, Thenius 1951, 20), southern Germany and Switzerland where several camel remains were found (Benecke 1994, 328) as well as Iberian finds discussed by Morales Muñoz et al. (1995, 369). A recent discovery of a distal tibia fragment from another dromedary in the Roman Period Barbaricum, outside the Danubian *limes* of Pannonia Provincia confirms that these rare animals, never acclimated to the Carpathian Basin either ecologically or culturally, probably played an important role in Roman military operations or even commercial transport.

Since Hrušica - Ad Pirum lay at the intersection of the important main road that connected Aquileia and Emona and the line of fortifications known as *Claustra Alpium Iularium* (Šašel 1988), the presence of animal remains originating from pack animals used in army movements or long-distance trade is understandable. On the other hand, the location of this site over 900 m asl makes it clear that camels crossed this alpine pass only in transit - if they survived the trip at all. Wares of African origin among the archaeological finds is consonant with

the hypothesis that camels may have been used to carry material goods between various provinces of the Roman Empire (Ulbert 1981).

CONCLUSIONS

Animal bones recovered from archaeological sites in Slovenia have attracted attention for over a century. Since the end of World War II at least, archaeozoology has become an increasingly important discipline in Europe: animal bones are recognized as true archaeological finds. The culture historical interpretation of animal remains has also attained significance in *lato sensu* archaeological analyses in Hungary and Slovenia.

Beyond the zoological identification of remains, research over the last two decades has been aimed at understanding ancient human behavior as reflected by animal bones. Important economic and cultural questions, such as the procurement of meat supplies, the emergence of animal breeds, the use of zoological raw materials in manufacturing various utilitarian and decorative objects as well as the roles of rare animals cannot be studied without the systematic, zoological analysis of animal remains.

The emergence of multidisciplinary archaeology makes archaeozoologists especially indispensable in projects where animal remains form a considerable part of archaeological finds. Animal remains are archaeological finds, illustrating the history of relationships between people and animals. The archaeological study of this culturally idiosyncratic phenomenon cannot be neglected. This work, however, can be consistently carried out only by full-time specialists, who may be few in number but can participate in archaeological research on a regular basis both in the field and in the laboratory.

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Novi izsledki arheozooloških raziskav v Sloveniji

Povzetek

Študija zajema šest skupin pojavov na gradivu s 23 arheoloških najdišč v Sloveniji (tab. 1), odkritih v zadnjih dveh desetletjih. Ker so najdišča različnih tipov in iz različnih obdobj, ter geografskih regij, jih lahko uporabimo za pojasnitev širokega spektra problemov, ki presegajo zgolj kronološke okvire.

1. Izginjajoča vloga lovsko-nabiralskega načina življenja

Vloga lova v primerjavi z živinorejo bi lahko analizirali v bronastodobnih koliščarskih naselbinah na Ljubljanskem barju, saj raziskave segajo že v zgodnja šestdeseta leta. Živalske kosti s Part pri Igu, lahko primerjamo s tistimi z Maharskega prekopa, kjer prevladujejo kosti udomačenih živali. Zgleda, da je imelo celo meso večje divjadi, kot so zobri, jeleni in divje svinje, sekundarno vlogo v takratni prehrani. Tako lahko sklepamo, da je bil lov pomembnejši spomladi, ko so bile zimske zaloge že izčrpane in čas letne žetve še ni nastopil.

2. Starejša železna doba - uveljavljena živinoreja

Arheozoološke raziskave halštatskega obdobja, ki je nasploh najbolj raziskano obdobje v slovenski arheologiji, so neke nadaljevanje Bökönyijevega dela v Stični. Vendar pa je tukaj pomembna razlika. Razen svetle izjeme, t. j. Mosta na Soči, naselbine s pripadajočim grobiščem svetolucijske skupine, izvirajo vse živalske kosti iz večjih in manjših sond, ki so bile narejene med topografskimi raziskavami in poskusnimi izkopavanji, le-te pa so bile usmerjene v odkrivanje in potrditev arhitekturnih ostankov. Nedvomno pomembnost goveda je težko oceniti, saj so kosti povsod naravno ali umetno fragmentirane in je zato določanje velikosti samo po drobcih kosti in primerjanje med različnimi najdišči oteženo. Po pregledu majhnega števila merljivih kosti je očitno, da je bila večina domačih živali v slovenski železni dobi majhnih, z izrazitimi znaki slabih metod vzrejanja in hranjenja, kar je moč opaziti že v pozni bronasti dobi.

3. Razporeditev mesa in družbeni položaj

Zanimiva je analiza živalskih ostankov z Ajdovskega gradca, iz 4.-6. st. Kostni so zanimive z dveh vidikov. Zgodovinsko-ekonomska nestabilnost se odraža na živalskih ostankih, ki kažejo na avtohtono vzrejo; delež kosti goveda je dosti manjši od deleža kosti perutnine, kar morda kaže na spodbujanje lokalne proizvodnje mesa. Poleg tega se jasno kaže razlika med središčem in okolico naselbine glede na vrsto zaužitega mesa. Svinjina je bila najbrž pravo razkošje, saj je svinje težje vzrejati, sploh v višjih predelih. Spremembe med rimskimi, ostrogotskimi in langobardskimi zakoni v burnih letih 5. in 6. stoletja so vplivale na to, da je perutnina postala poceni in preprost alternativni vir živalskih beljakovin.

4. Rekonstrukcija domačih živali

V srednjeveški naselbini Otok pri Dobravi - Gutenwerth, v južni Sloveniji, so izkopavanja potekala na dveh mestih. Velikost živali na tem najdišču lahko ocenimo v absolutnem (govedo, konji) in relativnem smislu. Morfološko gledano je imelo govedo na Otoku kratke in vitke rogove. Povprečna dolžina dvanajstih nedatiranih rožnic je bila 82,6 mm in šele primerek iz 13. stoletja je meril 135 mm. Majhno tradicionalno govedo, buša, je podobno (čeprav ni v sorodu) takim srednjeveškim živalim, kot so jih odkrili na Otoku. Skoraj popolno konjsko sprednjo okončino, ki ima fragmentirano lopatico, nadlahtnico, koželjnico in zapestje, so našli na mestu 2. Največja dolžina teh kosti dopušča plečno višino 1336,5 mm in nam lahko služi kot povprečje za srednji vek.

5. "Kleinfunde"

Manjši del živalskih kosti so vedno uvrščali med "prave" arheološke artefakte in jih poimenovali s srednjeevropskim splošnim izrazom "Kleinfunde". Čeprav je ugotavljanje surovine zelo pomembno pri rekonstrukciji izdelkov domače obrti, so

bili, do nedavnega, v tradicionalnih tipologijah koščenenih in roženih artefaktov zoološki podatki redki. Orodja za obdelavo kosti in rogovja, ki so jih našli med Dežmanovimi izkopavanji pri Igu in jih hranijo v Narodnem muzeju v Ljubljani, so dober primer, kako lahko uporabimo tovrstne podatke. Nartna kost jelena iz bronaste dobe, s sledovi obdelave na izbočeni površini osrednjega dela kosti, kaže na naklonjenost tovrstnim materialom, ki so počasi izginjali, ko je lov začel izgubljati pomen. Jelenovo rogovje je surovina, ki je bila na voljo v večji meri, kot visoko kakovostne jelenove kosti. Poseben artefakt, fragment železnodobne fibule z roženo oblogo, smo izbrali kot ilustracijo, kako lahko teoretično-biometrične podatke uporabimo v arheološki praksi. Ta primerek iz 7. ali začetka 6. stol. pr. n. š. je bil izkopen na Vačah, v grobu na Kleniku (inv. št. P 188, Narodni muzej Slovenije, Ljubljana). Obloga na fibuli je izdelana iz približno 87,6 cm dolgega roga. To pomeni, da je bil ta pomemben predmet pravzaprav narejen iz dokaj "poceni" surovine, t. j. jelenovega rogovja, ki so ga lahko našli kar v gozdu.

6. Posebne zoološke najdbe

Skoraj vse arheozoološke najdbe vsebujejo kak primerek, ki je še posebej zanimiv za strokovnjake. Majhno zbirko raznesenih

in pomešanih živalskih ostankov s cestne postaje pri Hrušici - Ad Pirum je težko interpretirati, saj vsebuje neločljivo mešanico rimskodobnih in srednjeveških kosti. Kljub temu je to najdišče pomembno zato, ker so na njem tudi številne kamelje kosti, ki morda pripadajo eni živali; med njimi je spod-nji podočnik, proksimalni del radiokubitusa (kost sestavlja komolčni sklep) in prvi prstni člen sprednje okončine.

V zadnjih dveh desetletjih so imele raziskave, poleg zoološkega določevanja živalskih ostankov, za cilj razumeti starodavno človekovo vedenje, kot ga odražajo živalske kosti. Pomembnejših ekonomskih in kulturnih vprašanj namreč ne moremo proučevati brez sistematične, zoološke analize živalskih kosti. Pojav multidisciplinarnosti v arheologiji je vplival na to, da so postali arheozoologi nepogrešljivi pri projektih, kjer so živalski ostanki upoštevanja vreden del arheoloških najdb. Živalske kosti so arheološke najdbe, ki ponazarjajo zgodovinski pogled na odnose med ljudmi in živalmi. Arheološke študije tega kulturološko posebnega pojava vsekakor ne smejo zanemariti.

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