An offprint from

ANTHROPOLOGICAL APPROACHES TO ZOOARCHAEOLOGY

COMPLEXITY, COLONIALISM, AND ANIMAL TRANSFORMATIONS

edited by
D. Campana, P. Crabtree, S. D. deFrance,
J. Lev-Tov and A. Choyke

ISBN 978-1-84217-390-9

Contents

Animals and Complexity: How Zooarchaeologists Contribute to the Study of Complex Society in the New and Old Worlds

Justin Lev-Tov and Susan D. deFrance

Animals in complex human societies are often both meal and symbol, related to everyday practice and ritual. People in such societies may be characterized as having unequal access to such resources, or else the meaning of animals may differ for component groups. Here, in this book, 28 peer-reviewed papers that span 4 continents and the Caribbean islands explore in different ways in which animals were incorporated into the diets and religions of many unique societies. The temporal range is from the Neolithic to the Spanish colonization of the New World as well as to modern tourist trade in indigenous animal art. The first section is the most general, containing a variety of studies on the interaction of foodways with complex societies via themes such as status, stratification, feasting, and economics. The second section springs from the first, and in it authors all address one theme in particular, the interaction between diet and colonialism. Our final section explores the complex role that animals, and parts of animals, play in all human societies as religious, identity markers, or other types of symbols. Animals are not only passive actors but, as creatures living intimately with their human counterparts, are actively used by people to express beliefs about human interactions and beliefs.

This volume is organized according to these themes rather than according to geographic location or time period. We believe that – clearly – these issues crosscut both such divisions. In so doing, we hope that this book will present an opportunity for scholars divided by geography especially, but also by temporal period, to read about each other's research and perhaps to bring these ideas into their own research, even if it is regionally and temporally divergent from the examples offered here. In other words, different archaeological settings can perhaps address the same problems cross-culturally.

Because the volume is arranged not along the lines of time and space demarcation, but rather as a series of case studies of revelations of diet for the study of social complexities, what follows are some general remarks about themes the essays address. Just as the papers presented here cover many of the subjects traditionally focused on within the study of complex societies (cf. Crabtree 1990), it is also interesting that they address their subject matters in distinct ways.

Research themes that emerged prominently in this realm of zooarchaeology include the origin of state societies and the development of centralized control over agriculture and specifically meat distribution to urban, presumably non-food producing, residents. Other subjects treated quite a bit in the literature concern the internally divided populations that typify and even define complex civilizations. Populations in such societies are divided by group origin or identification, that is to say ethnicity, by access to power and wealth, in other words status and class, as well as gender roles. Arguably, an offshoot from the study of status and wealth relations through diet has been the employment of zooarchaeology in the study of colonialism. Colonialism, since it is ultimately about relations of power and the negotiation of identity between intrusive and indigenous groups, or even two intrusive groups, lends itself well to the study of animal use and diet. Food is a locus of culture at once public and private, shared at the community level and held private within the family. As well, food has often been a means by which dominating groups have tried to complete their cultural conquests, consciously or not. Building on the theoretical chapter by Campana, the case studies by De Nigris et al. examine the role of hunger in a Spanish colonial setting in Tierra del Fuego. Elsewhere in the Spanish Empire, studies by Tarcan and Driver and Pavao-Zuckerman address the indigenous response to Spanish colonization of the American Southwest and northern Mexico. The paper by Gifford-Gonzalez provides an interesting critique of the questions being addressed by zooarchaeologists researching the American Southwest.

At times, the processes that shape diet in complex societies are woven closely together. Within the archaeology of colonialism, Dietler (2007) has argued that "goods, and especially foods, have not only been appropriated and indigenized, but they have also been used by both parties in colonial situations to attempt to control the other." Several

authors in this volume examine ancient Roman colonialism in Europe and North Africa, seeking to separate indigenous from native carnivory. Crabtree as well as Lyublyanovics set out to study the effects of Roman colonialism on diet in different parts of Europe, but along the way wind up considering questions of identity, what is native and what is Roman, rather than purely economic and political questions. MacKinnon demonstrates the remarkable dietary changes which took place in ancient Carthage at the time of the Roman conquest, and how those trends waned as the Roman hold on the city weakened. In these colonial situations, subordinate groups may resist such actions by retaining pre-existing foodways or even cooking up a creole of traditions.

Other papers in this volume examine the intersection of diet and empires from alternative perspectives. Lev-Tov's paper examines the effects the Neo-Assyrian Empire's conquest of the Levant had on the diet of Philistines there, wherein the local people's diet was changed to accommodate the commercial interests of the colonizers. A similar issue of the role of empire expansion on the local use of animals is addressed in the paper by Capriles *et al.* in their examination faunal remains in pre and post-Inka contexts from the site of Yoroma in Bolivia. Despite evidence from surrounding sites to the contrary, the latter authors demonstrate that Inka political dominance at this site did not lead to dietary changes. DeNigris *et al.* present the sole study of a failed colonial adventure, this one in southern Argentina, where a Spanish settlement failed after only a few years, despite – or because – the colonists out of necessity had taken to hunting some of the wild animals that native hunter-gatherers had also pursued.

The animal link between many societies that were colonized, and the colonizers, has been, more than the dietary staples brought with them on the hoof and consciously, the commensal fauna that sometimes preceded but always accompanied such efforts. O'Connor discusses commensal animals, their importance and their categorization. These fauna occupy a gray zone between the wild and domestic, and therefore, escape our attention despite the key role such animals have played. Vretemark and Sten address another sort of companion to humans, dogs. They study how that animal played multiple societal roles, as pets, actual and symbolic guardians, and ritual food in their study of Neolithic canid remains from a Hungarian Bronze age fortified site.

While our conceptions of some animals are almost nonexistent, with others we entertain nearly uniformly negative views. In this volume Gonzalez demonstrates how sharks in Brazil formerly held special status, as seen in the frequency of different species' skeletal elements as they occur in settlements vs. burial mounds. The implication, of course, is that rather than feared and loathed, certain shark and other elasmobranch species were instead sacred. If human societies of all kinds have complex and non-economic relationships with various species, certain animal body parts also have special status outside of food considerations. Similarly, Cooke and Jiménez address the cultural attitudes that ancient Panamanians had toward varied tropical animals and how animals and their products were used to establish hierarchy and status.

Clearly, one such arena of belief would be animal sacrifice, whether the custom involved is the selection of species to ritually slaughter and how to preserve the magic of the act, or which portions of the body might have more power than others. Two papers in this volume touch on these subjects, as Daróczi-Szabó examines a pagan Hungarian practice, continued into the Christian era, of burying sacrificed animals in upside down pots, while MacKinnon's examination of side preference in ancient sacrificial portions focuses on ancient Greece. In the latter paper, the author draws an interesting parallel to human handedness that may have influenced sacrificial preferences. Morris addresses the ways people used Associated Bone Groups (ABGs) in distinct contexts in Neolithic to medieval period sites in southern Great Britain to create meaning including changes in animal use following "Romanization" of the region.

Gumerman (1997, 106, 114, 116) pointed out that food is intrinsically social, in that people choose to eat or avoid certain foods and base their decisions on concerns such as the status or identity values it connotes. Part of the reasons for this has to do with the fact that consumers are not always, the producers in such societies. Here, contributing scholars use different case studies from Europe to assess the extent to which studies of animal bones may help us understand the identity of the Celts in Europe. Stallibrass draws on evidence of articulated and burned bones deposited within pits at a Hellenistic period site in Bulgaria, to argue that the Celts were at least one component of the city's population. In another study of identity and animal bones, Bartosiewicz and Gál draw on both unworked and worked bone data from multiple sites in a border area of Hungary to attempt to sort out which ethnic groups inhabited certain sites. The relative abundance of steppe animals within an earlier sample suggests that so-called Scythian peoples occupied the area at least in part, while the later collection, with higher amounts of pig bones, has more of a settled, Celtic character to them. The authors nonetheless argue that the assemblages do not provide profiles completely compatible with either group showing that the frontier area was typified by interaction rather than rigid cultural borders.

Other papers in the volume tread more familiar, but no less intriguing, ground, covering the important themes of provisioning, how urban residents obtained their food, whether through independent means or via governing officials, often elites, who distributed animals or meat to non-food producing classes of workers. The development of these types of distributive hierarchies is one of the general defining characteristics of the state, and it is therefore interesting that the two papers that explore that theme, both using datasets from the Near East, come to opposing conclusions regarding their sites. Redding examines the diet of the workers who built one of the pyramids of Egypt, and argues that the status of different workers is

visible in the types of meats they were provided. Status is not only visible in the (zoo)archaeological record, the state identified certain peoples' statuses by prescribing a diet for them. Allentuck and Greenfield, however, found no visible link between status and diet based on their study of faunal remains from a similarly early state-level site, this in Turkey. While these two papers come to different conclusions, they both take a bottom-up approach to the study of diet.

The archaeological delineation of status has long occupied archaeologists and zooarchaeologists studying the sites of complex societies, deFrance's recent (2009) review of zooarchaeological approaches to status highlights the challenges of the subject, perhaps the most critical being that class-based dietary choices vary highly from one time and place to another. In Mid-Continental North America Kelly examines how birds, or parts of them, were transformed from beasts to powerful symbols as a part of communal feasts that involved many segments of society at Cahokia. In the present volume, deFrance illustrates the difficulty in discerning high status food and animals that might have been used in feasts by an emerging Puerto Rican chiefly society. Although it is widely recognized that a stratified society existed in that study area, social differentiation evidently was not symbolized via access to different animals incorporated into the population's diet.

State religion(s) and elaborate rituals are of course a hallmark of societies throughout time, so it is only natural that such worldviews would extend also to the realm of animals in culture. Not only what people ate, and sacrificed, but certain animals or even skeletal elements can themselves become ritual objects derived from cultural beliefs about the biological animals in which they originated.

Taking up these themes, a number of papers in this volume address the transformation of animals, and bones, into objects of special interest and/or devotion for past peoples. Choyke presents an overview of the topic, demonstrating how societies past and present have imbued various animals with magical properties. In addition, Choyke discusses bone amulets found in Hungarian early medieval graves as examples of the transformative process, from living animal, to bone, to carved object with prophylactic powers. Other examples presented here include the significance of the quetzal bird to the former state societies of central Mexico (Aguilermo) and the transformation of bird feathers and skeletal elements into powerful material symbols for Mississippian elites (Kelly). Using artwork from Bronze Age Armenian sites as a basis for discussion, Manaseryan demonstrates that the depiction of animals using metal and other materials was done in such a way as to emphasize certain species' behavioural or physical characteristics esteemed by ancient societies there.

The material and symbolic transformations through time of tupilaks, that is, items carved from whale ivory by the native population of Greenland (Sims and Yates) has relevance both to understanding the indigenous Inuit but also modern economics of trade in endangered animals. Thus, during the Neolithic period of southeastern Europe, as Trantalidou's paper details, it was the skulls of cattle, both real and imitated in clay that held some kind of special, symbolic significance for those peoples.

The chapters that follow take up the above and other diverse themes, all in the pursuit of the ways in which past societies manipulated animals, meat, and the products derived from animals as raw materials, to give expression to a number of social processes. Zooarchaeology, however, is not an end in itself, but rather a subfield that contributes to the overall picture of past lives and societies unravelled through archaeological study. These essays demonstrate the utility of animal bone studies in aiding the understanding of past hierarchical and multiethnic social systems.

References

Crabtree, P. J. (1990) Zooarchaeology and complex societies: some uses of faunal analysis for the study of trade, social status, and ethnicity. In M. B. Schiffer (ed.) *Archaeological Method and Theory, Volume 2,* 155–205. Tucson, The University of Arizona Press.

deFrance, S. D. (2009) Zooarchaeology in complex societies: political economy, status, and ideology. *Journal of Archaeological Research* 17: 105–168.

Dietler, M. (2007) Culinary Encounters: food, identity, and colonialism. In K. Twiss (ed.) *The Archaeology of Food and Identity,* 218–242. Occasional Paper No. 34, Center for Archaeological Investigations. Carbondale, Southern Illinois University.

Gumerman, G., IV (1997) Food and complex societies. *Journal of Archaeological Research* 4, 105–139.

9. Living on the Frontier: "Scythian" and "Celtic" Animal Exploitation in Iron Age Northeastern Hungary

László Bartosiewicz and Erika Gál

By the 5th–3rd c. BC, present-day Hungary fell under the influence of three distinct cultural formations. While Scythian Period pastoralists still occupied the Great Hungarian Plain, the eastward expansion of Celts reached the northern border of this area as the Eastern Hallstatt culture withdrew from Western Hungary. Animal remains from five settlements were used in characterising Iron Age lifeways in the zone between the Great Hungarian Plain and the Northern Mountains. "Steppe elements" of the domestic fauna, sheep/goat and horse tend to dominate and were important even at the "Celtic" settlement of Sajópetri, distinguished by hunting from previous "Prescythian"/Scythian Period settlements. Grave goods from coeval Celtic cemeteries in the region, however, show Celtic tradition in the dominance of pig remains.

Keywords: Iron Age animal exploitation, Scythian Period, Celtic Period, Carpathian Basin

Introduction

In Hungary, the first evidence of iron use dates to the 8th c. BC. The Iron Age lasts until the establishment of the Roman province of Pannonia during the AD 1st c. in Transdanubia, west of the Danube. It is characterised by tumultuous events that differed between the southeastern and western sections of the Carpathian Basin. In this paper the term frontier is used for a zone of transition that lies between political and administrative units of varying complexity or, more importantly, between such a unit and its hinterland where no matching entity exists (Prescott 1987, 36–37). Three areas may be defined along the courses of two principal rivers:

- the Tisza river Valley, forming the core area of the Great Hungarian Plain in the southeast,
- the Danube marking the border of hilly Transdanubia towards the west,
- the foreland of the Northern Mountains, north of the Danube–Tisza interfluve in the Great Hungarian Plain.

A rigid view of "natural boundaries" (Ratzel 1895, Curzon 1907, Pounds 1951) imposes a modern *topos* on ancient frontiers, presuming that human occupation was largely defined by geographic barriers (Prescott 1987), a concept also applied for prehistoric Hungary (Sümegi *et al*. 2002). The situation, however, has been more complex, even in the case of most unambiguously defined rivers, efficient barriers in a transversal sense (*cf.* the Danubian *limes*), but passages and means of communication lengthwise, *e.g.* during the Celtic advancement into the Carpathian Basin along the Danube Valley (Szabó 2005, 15). Ecotones, *i.e.* interfaces between different natural habitats also serve as areas of increased contact, with access to resources from either side of a zone that combines advantages of both. During the Iron Age the foothill area focal to this paper was peripheral relative to both the Great Hungarian Plain and Transdanubia. However, it was near resources of iron ore. Its complex role as a valuable zone of transactions is indicated by the distribution of Iron Age archaeological sites in Fig. 9.1. Animal bone assemblages from five sites in this section represent three major groups, the widely debated "Prescythians", Scythians and Celts. These terms are used not to describe intangible ethnic affiliations, but assemblages distinguished on the basis of artefactual evidence for their respective material cultures.

Iron Age in the study area

"Prescythian" is a contradictory term, applied to a vaguely defined group of equestrian people (Gallus and Horváth 1939), who supposedly arrived from southeast into the area of the Late Bronze Age Gáva and Kyjatice cultures in eastern Hungary. Additional southeastern contacts in the 7th c. are indicated by the occurrence of luxury artefacts (weapons, horse tacks and jewellery) in the Great

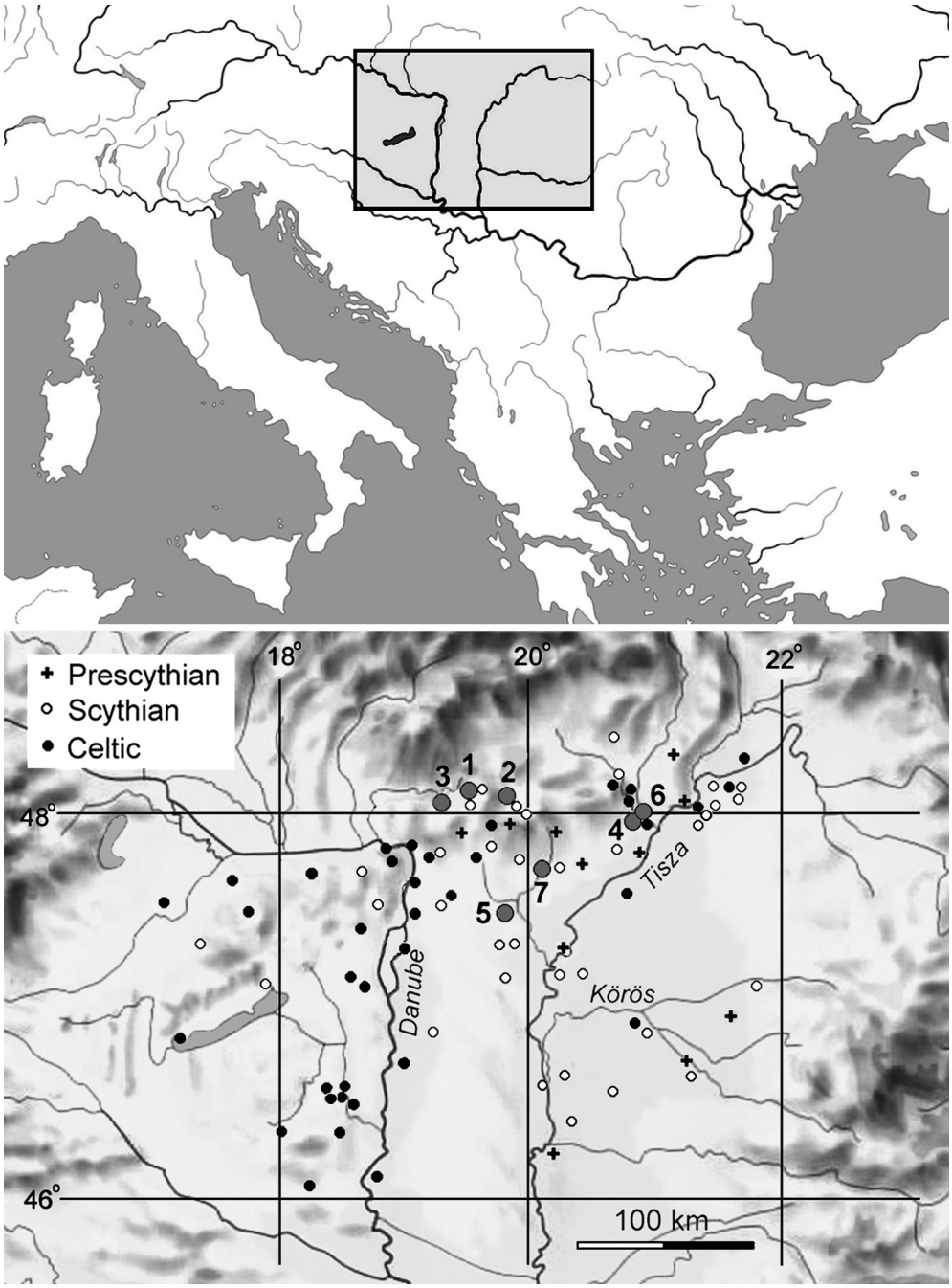

Figure 9.1. Top: The location of the study area in east Central Europe. Bottom: The geographical distribution of Prescythian,,Prescythian"/Scythian and Celtic Period sites in Hungary and the settlements discussed. Legend: 1=Ludányhalászi, 2= Salgótarján, 3=Balassagyarmat, 4=Hejőkeresztúr, 5=Jászfelsőszentgyörgy, 6=Sajópetri, 7=Ludas.

Hungarian Plain, in *Thraco-Cimmerian* style. Recently, frontier research has offered a conceptual framework within which attention turned from core polities to such peripheral zones (*e.g.*, Chase-Dunn and Hall 1991). Possibly, fundamental changes in the discussed area during the 9th c. BC resulted from shifts in the environment, forcing local populations to develop a pastoralist lifestyle with contacts across the Carpathians toward the east: the hypothesised immigration of populations could not be reconfirmed (Metzner-Nebelsick 2000, 165).

Importantly, Gallus and Horváth (1939) clearly distinguished between "culture" and "race", in that culture can develop with changing ethnic characteristics of people sharing it and that a group of continuous characteristics may change almost completely its culture. This was a significant step forward, considering that, in the absence of written data, allegoric migrations, invasions of and even feuds between "cultures" represented by artefact styles, have dominated historical theories in prehistoric archaeology. Iron Age archaeology in Hungary is the first to have at least indirect written references. Scythians and Celts were treated in numerous classical sources, as they interfered

with the Mediterranean World. The names of the northern towns in Ptolemy's list indicate Celtic origins (Vaday 2003a). Information on Scythians and Celts, however, reflect how inhabitants within major Graeco-Roman polities saw them, often representing *topoi* toward occupants of the hinterland without.

The final Early Iron Age began around 750–700 BC, when western Hungary belonged to the self-contained Hallstatt culture (Szabó 1971, 10). In "*The Histories*" (5th c. BC), Herodotus (v. 9) mentioned *Syginnae*, who dwelt beyond the Danube and are identified with the Scythians, whose culture first emerged in the Great Hungarian Plain around the turn of the 7–6th c. BC (Kemenczei 2000, 51).

Celts first appeared at the Pannonia-Noricum border in the northwest during the 5th c. BC, while material culture in the Great Hungarian Plain shows trans-Carpathian contacts, with cultures under Scythian influence in the forest steppe, along the Dniepr and Dniester rivers. By the 4th c. BC the Eastern Hallstatt culture disappeared from Hungary. Celts occupied Transdanubia, and stretches toward the northeast, the region studied here, beginning to create 'Celticized' areas with a substantial non-Celtic element. Celtic sites in the Great Hungarian Plain are first documented from the second third of the 3rd c. BC, mostly along the right bank tributaries of the Tisza. Increasing Celtic occupation suggests that late 3rd c. BC Celtic campaigns against Hellenistic centres were launched from the Carpathian Basin (Szabó 2005, 31).

Since no sources refer in detail to either Scythians or Celts in northeastern Hungary, they can only be tentatively identified using their archaeological heritage from what was the fringes of their respective distribution areas. Animal remains can elucidate differences and similarities between these major Iron Age groups. While it is erroneous to single out any category of artefacts and equate it with "culture", it may be hypothesised that food habits and basic forms of subsistence (such as pastoralism *vs*. hunting) reflect cognitive attitudes towards animals, being conservative and culturally idiosyncratic.

Archaeozoological assemblages

Iron Age archaeozoological assemblages are scarce in Hungary. Similarly to high status artefacts, the overwhelming majority of animal remains originated from burials reflecting mortuary behaviour rather than everyday life. Settlement studies, therefore, have a key role in expanding our knowledge of the Hungarian Iron Age in this complex region.

The earliest animal bones originate from the so-called "Prescythian" settlement of Ludányhalászi–Sóderbánya (Fig. 9.1: Site 1), associated with the Late Bronze Age Kyjatice culture that survied until the Hallstatt C Period inside hilly regions, but pre-dates the 6–4th c. BC Scythian Period. Ludányhalászi was located at an altitude of 130 m in a valley of the Northern Mountains. A material of pivotal importance in this paper is the large, predominantly Scythian assemblage from Salgótarján–Ipari Park II (Fig. 9.1: Site 2). It dates from approximately 650 to 450 BC, largely the Scythian Period, but its location in another valley among the mountains (300 masl) was at a distance from "proper" Scythian territories in the lowlands. Sporadic occurrences of Late Bronze Age Gáva and Kyjatice as well as Iron Age Hallstatt style ceramics at the site illustrate the Prescythian situation (Vaday 2003b: 34), Lacking absolute dates, however, the typochronological dating of Scythian Period artefacts seems to span a broad time interval.

A reasonably large assemblage of over 300 identifiable Scythian Period bones came from Balassagyarmat–Káposztások (Fig. 9.1: Site 3) in yet another valley at 130 m. Previously, animal bones had been known only from two Scythian Period settlements. One represented a single pit at Hejőkeresztúr (Bökönyi 1958; Fig. 9.1: Site 4), whose 15 bone fragments do not lend themselves to reliable interpretation. Even the material from Jászfelsőszentgyörgy–Túróczi-tanya (Bökönyi 1974; Fig. 9.1: Site 5 at 100 masl), corresponds to only 1/3 of the Balassagyarmat assemblage.

Celtic influx is represented by the Sajópetri–46 settlement (Fig. 9.1: Site 6). It covered the areas of Sajópetri–Hosszú-dűlő and Sajópetri–Hosszú-rét and yielded almost 2500 identifiable animal remains from the La Tène B2–C1 Periods, the 3rd c. BC. In addition to pottery from this period, shards from hand-thrown Scythian ceramics were also found at the site (Szabó *et al*. 2004, 27–28). The settlement was located on an alluvial terrace (120 m asl). Animal offerings from the largely contemporaneous La Tène Period cemetery at Ludas–Varjú-dűlő (Szabó and Tankó 2006; Méniel 2006; Fig. 9.1: Site **7**) have also been taken into consideration.

These settlements (Fig. 9.1) fall within the zone of overlap between the consecutive cultures concerned. They represent hypothetical intrusions, first from southeast, then from northwest. Frontiers may also be perceived between sedentary agrarian and mobile pastoral subsistence systems and their related ideologies (Eaton 1993). Differential exploitation of natural resources has contributed significantly to frontier dynamics in this region. Cultural differences, therefore, may be expected along the fringes of these peripheral power zones. The major settlement assemblages are summarised in Table 9.1.

Results

Livestock and meat consumption

Domesticates in Table 9.1 were reviewed in quantitative terms (NISP). Given the differences between sample sizes, the five sites are difficult to compare. Expected values calculated for testing the homogeneity of distribution for these animal remains are listed in Table 9.2.

The small assemblage of Late Bronze Age Ludányhalászi contained unexpectedly great numbers of pig bone. The "Prescythian"/Scythian assemblage from Salgótarján is characterised by a sheep/goat NISP greater than the

Settlement	**Ludány-halászi**	**Salgó-tarján**	**Balassa-gyarmat**	**Jászfelső-szentgyörgy**	**Sajópetri**
Code in site map (Figure 1)	**1**	**2**	**3**	**5**	**6**
Analyst (Gál=EG, Bartosiewicz=LB)	EG	EG, LB	EG	S. Bökönyi	LB, EG
Relative chronology, period	Prescythian/Scythian		Scythian		Celtic
Cattle (*Bos taurus* Linnaeus, 1758)	95	1695	88	58	995
Sheep (*Ovis aries* Linnaeus, 1758)	2	186			87
Goat (*Capra hircus* Linnaeus, 1758)	1	58			16
Sheep/goat (Caprinae Gray, 1821)	95	1425	103	17	428
Pig (*Sus domesticus* Erxleben 1777)	81	454	49	5	255
Horse (*Equus caballus* Linnaeus, 1758)	4	119	6	23	108
Horse/Ass (*Equus* sp.)		10			3
Dog (*Canis familiaris* Linnaeus, 1758)	33	92	10	1	71
Domestic hen (*Gallus domesticus* Linnaeus, 1758)			2	1	9
Aurochs (*Bos primigenius* Bojanus, 1827)		7		1	3
European bison (*Bison bonasus* Linnaeus, 1758)		20			2
Red deer (*Cervus elaphus* Linnaeus, 1758)	2	36		1	273
Roe deer (*Capreolus capreolus* Linnaeus, 1758)	2	14	2		20
Wild pig (*Sus scrofa* Linnaeus, 1758)		9		1	9
Hedgehog (*Erinaceus europaeus* Linnaeus, 1758)					1
Brown bear (*Ursus arctos* Linnaeus, 1758)		1			
Red fox (*Vulpes vulpes* Linnaeus, 1758)			2		2
Badger (*Meles meles* Linnaeus, 1758)					2
Brown hare (*Lepus europaeus* Pallas, 1778)	1	14	5		14
Beaver (*Castor fiber* Linnaeus, 1758)					42
Hamster (*Cricetus cricetus* Linnaeus, 1758)		14			
Souslik (*Citellus citellus* Linnaeus, 1758)		2			
Rodent (Rodentia Bowdich, 1821)	5	2	1		
Cormorant (*Phalacrocorax carbo* Linnaeus, 1758)					1
Greylag goose (*Anser anser* Linnaeus, 1758)			1		1
Mallard (*Anas platyrhynchos* Linnaeus, 1758)					2
Ferruginous duck (*Aythya nyroca* Güldenstadt, 1770)					1
Goshawk (*Accipiter gentilis* Linnaeus, 1758)		1			
Jackdaw (*Corvus monedula* Linnaeus, 1758)		6			
Crow (*Corvus frugilegus/C. corone*)		1			
Starling (*Sturnus vulgaris* Linnaeus, 1758)	1				
Catfish (*Silurus glanis* Linnaeus, 1758)	2				
Large ungulate	23	268	5		250
Small ungulate	23	139	5		26
Mammal indet.	5		3		
Bird indet.			2		0
Amphibian indet.	1				
Fish indet.	1				
Total	**377**	**4573**	**284**	**108**	**2620**

Note: The small Scythian assemblage from Hejőkeresztúr is not listed. It contained 14 remains of domesticates (cattle, caprine, horse and dog). The only bone of interest is a bison metatarsus (Bökönyi 1958: 75), given the rarity of this species in Holocene Hungary (Bartosiewicz 1999), and its presence at nearby Sajópetri and Salgótarján. Animal remains from the Celtic cemetery at Ludas–Varjú-dűlő will be treated during the discussion.

Table 9.1. Comparative table of the number of identifiable bone specimens (NISP).

expected value. The same holds true for the Scythian assemblage from Balassagyarmat. This trend falls in line with the "steppe" character of Scythian culture. Cattle and horse bones occur in unexpectedly great numbers at sites in open landscape, Scythian Jászfelsőszentgyörgy in the Great Hungarian Plain and Sajópetri near the Tisza valley.

The percentages of NISP values are shown in Fig. 9.2 with sites sorted by the decreasing ratio of sheep/goat NISP

	Cattle		Sheep/goat		Pig		Equid		Total
	O	E	O	E	O	E	O	E	
Ludányhalászi	95	126.6	98	104.2	***81***	36.4	5	11.8	**279**
Balassagyarmat	95	114.8	***103***	94.5	49	33.0	6	10.7	**253**
Salgótarján	1695	1803.5	***1669***	1474.1	454	514.6	129	167.0	**3947**
Jászfelsőszentgyörgy	***58***	46.7	17	38.5	5	13.4	***23***	4.4	**103**
Sajópetri	***995***	858.6	531	706.7	255	246.7	***111***	80.1	**1892**
Total	**2938**		**2418**		**844**		**274**		**6474**

A χ^2 test using these data showed heterogeneity on the P≤0.001 level of probability, indicative of statistically significant differences in the composition of settlement refuse.

Table 9.2. Data used in testing the homogeneity of contributions by domestic ungulates. O= observed value, E= expected value. Markedly high values are in ***bold italics.***

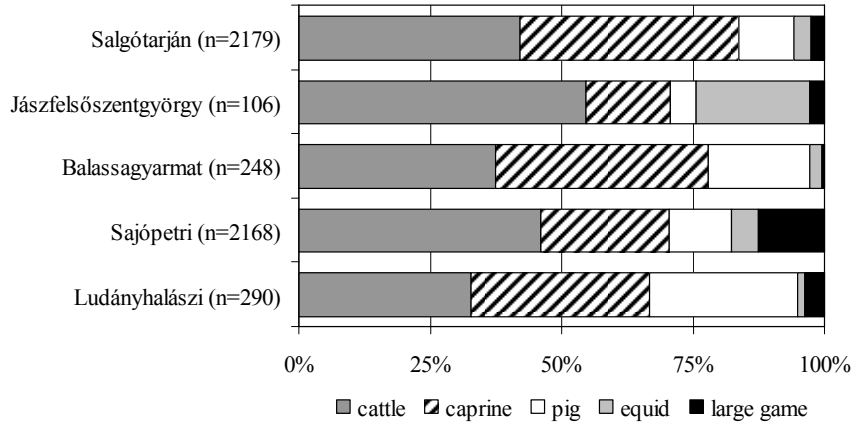

Figure 9.2. The percent contribution of major meat animals sorted by the proportion of sheep/goat to pig NISP.

	Cattle		Sheep	
Site/Period	Salgótarján	Sajópetri	Salgótarján	Sajópetri
N	9	16	8	8
Mean	98.3	109.0	59.1	59.6
Standard deviation	9.1	7.6	3.9	3.9
Minimum	84.3	93.3	55.2	55.2
Maximum	110.0	121.0	67.5	66.0
Median	98.7	109.0	58.3	58.2
t-value	-3.17		-0.244	
Degrees of freedom	23		14	
Probability	0.004		0.810	

Table 9.3: Withers height (cm) estimates for Scythian (Salgótarján) and Celtic Period (Sajópetri) cattle and sheep.

relative to those of pig. Salgótarján, Jászfelsőszentgyörgy and Balassagyarmat reflect "Scythian", mobile pastoral patterning in the exploitation of domestic ungulates. The percentage of caprine remains consistently exceeds that of pig bones. In addition to domestic ungulates, large game (pooled values for wild bovines, deer bone and wild pig) were included. Their contribution is greatest at Sajópetri, and this site also fits the decreasing trend of mobile pastoralism. Ludányhalászi at the bottom of Fig. 9.2, shows the most "sedentary" pattern of animal exploitation.

Withers height estimates for cattle (Zalkin 1960), sheep (Teichert 1969) and horse (Kiesewalter 1888) could be performed on complete long bones found in sufficiently great numbers at Salgótarján and Sajópetri. Student's t-tests comparing the significance of size differences between periods are shown in Table 9.3.

Celtic Period cattle were 10 cm taller than the early Iron Age form identified from Salgótarján. This difference reflects situations centuries apart, but seems characteristic of the respective cattle populations. Three bulls were identified at Sajópetri using the slenderness criteria by Nobis (1954), however, they were not particularly large, therefore would not have distorted the basic size distribution. The 109 cm mean withers height may be considered large compared to meagre Celtic cattle reconstructed from 1st c. BC *oppida* (Szabó 2005, 89).

On the other hand, no difference was found between the stature of sheep. Both groups fall behind even the

withers heights of unimproved modern breeds in Hungary (Bartosiewicz 2006, 38). Two goats from Salgótarján measured 108 and 114.5 cm at the withers (Schramm 1967). Fragments of relatively large goat horn cores were also identified.

Fourteen complete horse long bones from Sajópetri resulted in a mean withers height of 123 cm (113–134 cm, standard deviation=6.7 cm), smaller than the estimates for two individuals from Salgótarján (128.9 and 144.7 cm). Although this difference cannot be tested statistically, it falls in line with the frequently emphasised larger size of Scythian horses compared to their "western" kin (Bökönyi 1968, 41; Szabó 2005, 88). Fig. 9.3 includes Scythian horses from Szentes–Vekerzug (Bökönyi 1952, 1954) whose large size contradicts Herodotus (v. 9), who wrote that the horses of Syginnae were small and shaggy, too weak to bear a rider, but when yoked to chariots, they were among the swiftest.

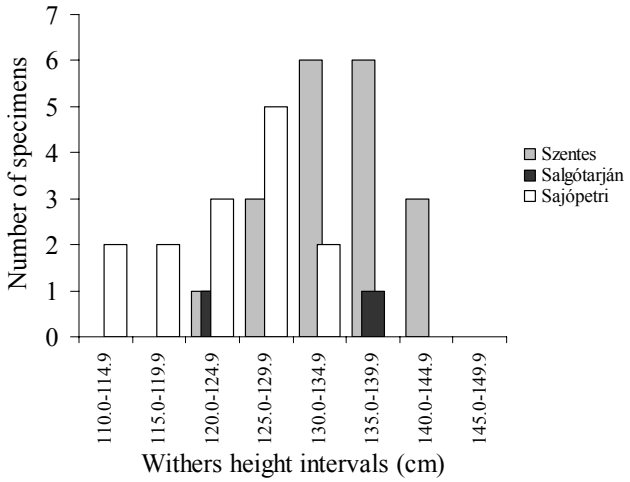

Figure 9.3. Withers height distributions for Scythian (Salgótarján and Szentes) and Celtic Period (Sajópetri) horses.

Skeletal element	Side	length, mm	age, weeks
Scapula	dex.	63.0	29.0
Humerus	sin.	54.1	25.0
Radius	sin.	71.1	26.0
Tibia	sin.	69.1	25.0
Mean Age	-	-	26.3

Table 9.4. Age estimates for the horse foetus found at Salgótarján.

Non-measurable bone fragments of small equids also surfaced both at Salgótarján and Sajópetri. They are certainly larger than the remains of donkeys. Bones of this size may originate from mules. According to Aristotle (605a, 16) donkeys withstand cold very poorly, therefore they are not kept in Pontos and Skythia. Archaeological evidence for mules/hinnies, however, has been reported from Greek colonies in the northern Pontic region (Bökönyi 1974, 306) that had contacts with both communities under discussion here.

The percentages of ageable animal bones are identical in the two largest assemblages (Fig. 9.4). They rather reflect the biological characteristics and exploitation of livestock than cultural patterning. Forms of secondary (*i.e.*, non-meat related) exploitation depend on longevity. Valuable horses, rarely eaten lead this list. Owing to exploitation for milk (bovids), draught power (cattle) and wool (sheep), domestic ruminants at both sites yielded more bones representing only slightly younger age groups. Finally, prolific, single meat purpose pigs are killed at the youngest age.

Feature 17 at Salgótarján contained bones from a foetal horse used in estimating the time of conception (Table 9.4; Prummel 1989, 75). Foaling takes place in April–May, the obtained 6.5 months of foetal age is indicative of the animal's death in the middle of the winter. It is impossible to tell whether the dam died or abortion took place, a familiar problem in the interpretation of foetal remains (Bartosiewicz 1995, 88, Plate 15).

A dog radius from Ludányhalászi yielded a withers height of 55.4 cm, while a humerus from Salgótarján resulted in an estimate of 53.7 cm (Koudelka 1885). These Scythian dogs were not only of medium size, but a skull preserved at Salgótarján is reminiscent of unimproved cranial types

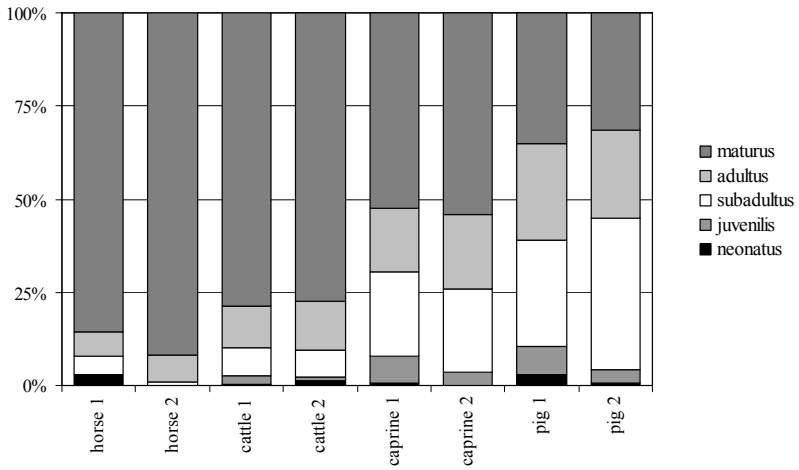

Figure 9.4. Distributions of ageable bones from domestic ungulates at Salgótarján (1; n=1931) and Sajópetri (2; n=1106).

of Skye terriers or Hungarian Pulis (Bartosiewicz *et al.* 2006). Such forms occur in prehistoric dog populations lacking conscious human selection for special breeds (Bartosiewicz 2002). Although only disarticulated dog skeletons were found, it seems unlikely that dog-eating (known from Celtic times; Szabó 2005, 89) was practised at any of these sites.

The recovery of two Scythian Period femur fragments from domestic hen at Balassagyarmat deserves special attention. While hen was domesticated in South-East Asia, its monophyletic or polyphyletic origins as well as the way(s) and time of introduction to Europe are still unclear (Stevens 1991; Boev 1995). It has been hypothesised that domestic hen was already present in some areas during the Neolithic and Early Bronze Age, although its spread dates to the Iron Age (West and Zhou 1988; Carrasquilla 1992). Data from Bulgaria suggest that this happened already at the end of the Bronze Age (Boev 1995). According to hen remains found in graves and settlements in Central Europe, the earliest evidence for this species has been dated to the Late Hallstatt Period in this region (Benecke 1993). In addition to the Scythian specimen from Jászfelsőszentgyörgy (Bökönyi 1974), the finds from Balassagyarmat offer the earliest evidence for domestic hen in the Carpathian Basin.

Celtic finds of domestic hen are more common. In addition to the nine specimens identified among the food remains in Sajópetri, remains of 5 juvenile, two subadult and an adult skeleton were reported from the La Tène cemetery of Ludas–Varjú-dűlő (Méniel 2006, 360). By this time, domestic hen occurs at Transdanubian settlements as well. For example, skeletons of a subadult chicken and a crane (*Grus grus* Linnaeus 1758) each (as well as a single bone of a juvenile crane) were found in three Celtic Period pits at Balatonkeresztúr–Réti-dűlő (Gál 2007a).

Taxonomic richness: hunting and fowling

Animal remains found in small numbers also carry valuable information. Remains of rare animals (birds, fur bearing game *etc*.) are more likely to occur in large samples. Relationships between assemblage size (NISP=x) and the number of species identified (y) are described by a degressive exponential relationship: The number of animal species increases along with the number of identifiable bone specimens, until a point where it starts lagging behind as the repertoire of animal species is exhausted. Comparisons between faunal assemblages of radically different sizes, therefore, may be heavily biased: the number of species also reflects the number of bones studied (Grayson 1984, 136–137), not only the culturally idiosyncratic number of animal taxa. The relationship between assemblage size (x) and the number of taxa (y) at the sites under discussion here is described by the following equation:

$$y = 4.691x^{0.168}$$
$$(R^2 = 0.907)$$

The 0.168 exponent in this equation is high compared to, for example, the value of 1.292, calculated for 53 Neolithic sites

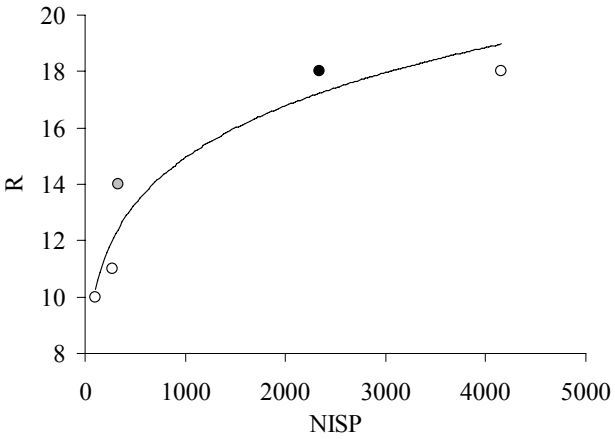

Figure 9.5. The relationship between assemblage size (NISP) and taxonmic richness (R). Legend: gray="Prescythian"-, white=Scythian-, black=Celtic Period.

(Bartosiewicz 2005, 59). The coefficient of determination (R^2) confirms that there is 90% interdependence between assemblage size and the number of taxa identified. In Fig. 9.5, Scythian Period settlements fall below the trendline representing this equation, showing a rather monotonous, "nomadic" exploitation of domesticates. It shows that although the Salgótarján assemblage contains remains from a great number of taxa, this is partly the result of sample size. "Prescythian" Ludányhalászi and Celtic Period Sajópetri have a greater inventory of species than expected on the basis their sizes. Sources of this taxonomic richness are non-domestic animals.

At Ludányhalászi, both deer species and brown hare were present. A special, Late Bronze Age, Gáva culture-style deposit of pots in Pit 4 yielded skull-, long bone- and tooth-remains from cattle and sheep or goat. Most interestingly, a mandible fragment from starling was also found in this special feature. It is likely that the head of the bird was buried and the fragile calvarium was destroyed pre- or post-excavation. So far starling has been reported only from one prehistoric site in Hungary: the Early Neolithic (Körös culture) settlement Ecsegfalva 23 yielded six remains from two individuals (all those bones were from the wing: four humeri and two ulnae; Gál 2007b).

Bones of wild pig, aurochs and bison, occur only in the two largest assemblages. Of these, the occurrence of bison is of special interest. Its bones characterise a forested foothill habitat where its rare finds were encountered until the early Middle Ages (Vörös 1989, 1990). With the exception of Balassagyarmat, bones of red deer regularly occur and roe deer is present as well (antler fragments were not included in this part of the material unless found attached to the skull).

The bird remains from Salgótarján represent species living in rocky (jackdaw) woodland (goshawk) and forest-steppe (crow) environments. Goshawk and crow yielded one bone each, while jackdaw contributed six remains from a single individual. Since most of the latter were complete, it has been suggested that the bird died by natural reasons and/or it was buried (Bartosiewicz and

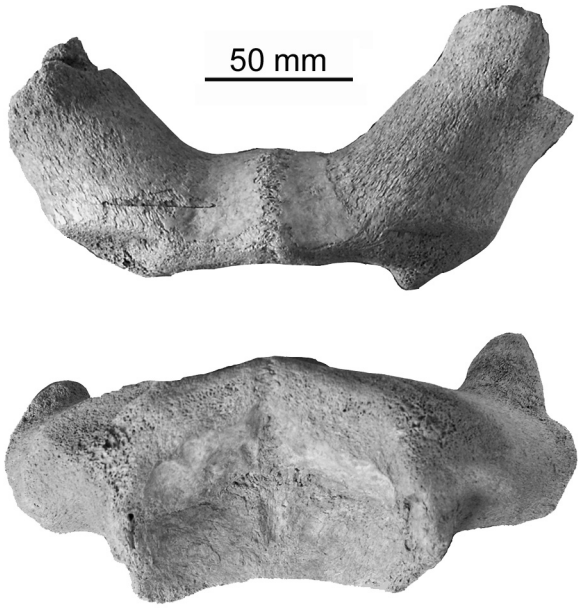

Figure 9.6. Worked stag neurocranium with broken antler from Sajópetri. A cut mark is visible in the frontal view (top). Weathering is less pronounced inside the brain case (bottom).

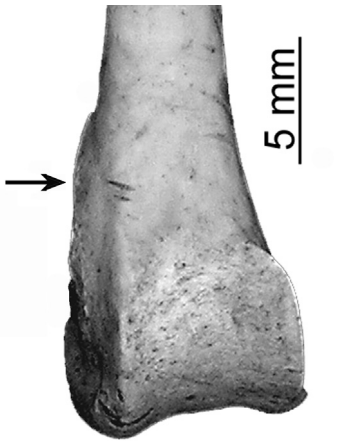

Figure 9.7. Fine metal cutmarks on the tibiotarsus of a mallard from Sajópetri.

Gál, in press). All three species are part of the Hungarian avifauna year-round.

Distinguishing bones of domestic goose from its wild ancestor, grey-lag goose, is one of the hardest tasks in archaeo-ornithology. It is usually successful only in the case of morphological features and osteometric characteristics of certain skeletal parts. Since grey-lag goose is present throughout Europe and Asia, the time and place of domestication is unknown, only written sources provide reliable evidence of goose keeping. Therefore, the single Scythian Period goose bone from Balassagyarmat, a fragmentary coracoideum, has been assigned to the wild form.

The assemblage of Celtic Period Sajópetri is the only where the contribution of wild animal bones exceeded 10%. Much higher percentages of wild animal bones were observed at Celtic sites in Transdanubia, especially in the Celtic layers of Gellérthegy-Tabán (Matolcsi 1979) and Corvin Square (Lyublyanovics, this volume). Celtic burials of complete stags are also well known across Hungary (*e.g.* Vörös 1986; Bartosiewicz 2004). Although no such deposit was discovered at Sajópetri, a curious skull fragment with the broken stubs of both antlers was recovered among the red deer bone (Fig. 9.6).

Another rare find in the large Salgótarján assemblage was the distal half of a left humerus from a brown bear (Feature 13). It is as much an indicator of forested hilly habitats as of sufficiently large sample size. Bones of other carnivores (including burrowing badger and red fox) occurred sporadically. These may have also been exploited for fur the same way as beaver, identified in great numbers at Sajópetri, also reflecting the location of this settlement on a forested river terrace.

Archaeo-ornithological data show the same type of habitat, since bones of waterfowl were recovered almost exclusively from Sajópetri. Mallard and ferruginous duck – among the four bird taxa identified in this assemblage – live in fresh waters. The latter prefers smaller ponds or lakes. It usually nests in thick reed beds and also in the crown of small willows in the case of mallard. Cormorant prefers gallery forests since its nest is made in trees. Grey-lag goose is a wetland species that forages over both grasslands and swamps, and nests on the ground**.** Ferruginous duck also feeds on plant materials such as roots, seeds, green leaves, *etc*. Mallard is omnivorous, while cormorant feeds entirely on fish.

All four wild fowl are summer visitors in present day Hungary, arriving in early spring and leaving in late autumn. Mallard and ferruginous duck may over-winter in the region when food is available during mild winters. Owing to different availability, greater taxonomic diversity and the reduced numbers of bones within the skeleton, taxonomic richness among birds increases more intensively with assemblage size than among mammals (Bartosiewicz and Gál 2007). The exploitation of wild birds, therefore, contributed significantly to taxonomic richness at Sajópetri.

In the absence of water-sieving, only three large fish bones (two originating from catfish) were recovered at Ludányhalászi, and a perforated catfish vertebra was also brought to light at Sajópetri.

Modified animal bones

Although a detailed study of butchering methods is beyond the capacity of this paper, cut marks on many bones originate from metal implements. By the 3rd c. BC most iron tools had evolved to forms that survived almost unaltered until the industrial revolution (Szabó 2005, 86). In addition to heavy tools and agricultural equipment, evidence of fine metal knives is shown by butchering marks. One of the tibiotarsi from a mallard at Sajópetri (House no. 95) displays two short, parallel cut marks on the

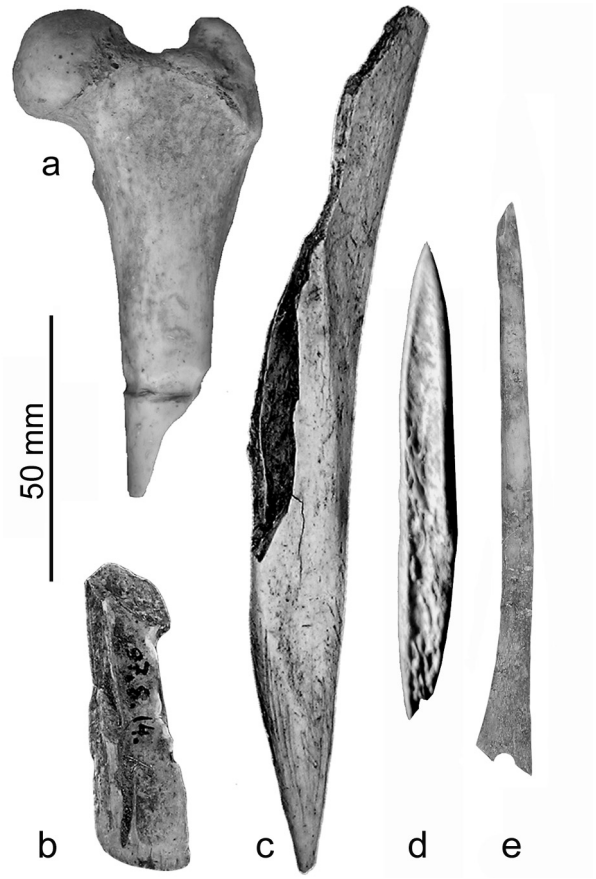

Figure 9.8. Late Bronze Age "Prescythian"/Scythian bone tools: a. Dog femur used as raw material at Salgótarján; b. Small chisel made of a caprine metapodium from Ludányhalászi; c. Distal end of a Type 1/15 large ulna point from Ludányhalászi; d. Small, Type 2/1 double point from Salgótarján; e. broken needle made on a long bone splinter from Balassagyarmat.

caudal-distal part, clearly indicative of careful secondary butchery using a fine blade (Fig. 9.7).

While burn marks on the bones found in the settlement materials cannot be unambiguously attributed to cooking, Méniel (2006, 353, fig. 35) identified burnt pig canines in Grave 1050 at Ludas. Takács (1990–1991, 44–45) explained such marks with singeing, practised when carcass partitioning is aimed at maximising the size of lard attached to the skin. Ethnographically, this method is shown by the vertebral column separated from the animal's sides at the *capitula costae* on either side, rather than splitting the vertebral bodies by hacking (Takács 1990–1991, 46).

The use of iron tools did not only increase the efficiency of butchery. Utilitarian bone and antler tools were soon outcompeted by these artefacts at all discussed sites. The surviving types of bone artefacts barely were manufactured or curated. Choice of raw materials became haphazard, largely relying on the *ad hoc* use of any bone from the food refuse, corresponding to loosely defined "Class II" tools along the manufacturing continuum (Choyke 1997, 66). Antler processing is shown mainly by blanks and cut-off pieces of tine.

Ludányhalászi yielded three artefacts. The best preserved, a large point made from a cattle ulna (Feature 79), corresponds to Type 1/5 in Schibler's (1981, 26) Late Neolithic typology, although the proximal end is missing. It is likely that carefully curated point was abandoned after long use as its handle, the *olecranon*, broke off (Fig. 9.8, specimen c). Similarly, the small chisel (Schibler Type 4/5), made from a caprine metapodium diaphysis (Feature 13) seems to have been used for a long period (Fig. 9.8, specimen b). The third artifact (Feature 53) is an *ad hoc* tool carved from a large ruminant metatarsus, possibly of cattle. These Late Bronze Age bone artefacts are more carefully made than their later, Iron Age counterparts.

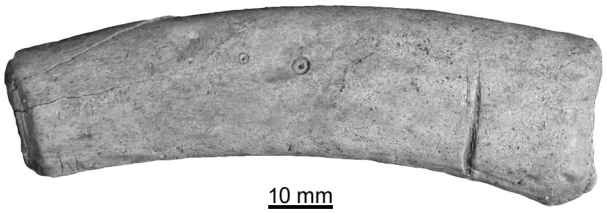

Figure 9.9. Decorated and worn goat horn core segment from Salgótarján.

The Salgótarján assemblage yielded relatively fewer bone artefacts, most of them similarly poorly made. They included small, evidently improvised points made on caprine bone splinters, although one of the double points (Schibler Type 2/1) may have served as an arrowhead (Fig. 9.8, specimen d). The proximal end of a dog femur was not an artefact itself, but was cut around the diaphysis as if it were used in bead-making or producing some tubular object (Fig. 9.8, specimen a). The Scythian site of Balassagyarmat yielded only one manufactured bone. The fine needle (Feature 3), possibly made from a small ruminant tibia splinter, broke at the level of its eye (Fig. 9.8, specimen e). A goat horn core from Salgótarján was carefully cut to size and two dot-and circle patterns made on its surface may be considered a simple decoration. The entire object is smooth, probably as a result of handling (Fig. 9.9). Following the principle of *pars pro toto*, this object representing a "nomadic" animal species, goat, may represent pastoral tradition.

Of special typochronological interest is a cattle radius tool, worn flat at its anterior-proximal end, recovered from Salgótarján (Fig. 9.10, specimen a). Such objects, commonly occurring at Bronze Age settlements in northern Hungary and Slovakia, have erroneously been described as skates (Alice Choyke, personal communication). This identification is contradicted by the irregular wear patterns on their working surfaces. While the function of the Salgótarján specimen is similarly unknown, it represents a markedly archaic, Late Bronze Age element in the bone artefact inventory of the site, "pre-dating" the overwhelmingly Scythian character of pastoral animal exploitation.

Most Celtic Period tools from Sajópetri were also very simple. Two dozen points and "scrapers" were found, similar to the *ad hoc* tool represented by the spinal process

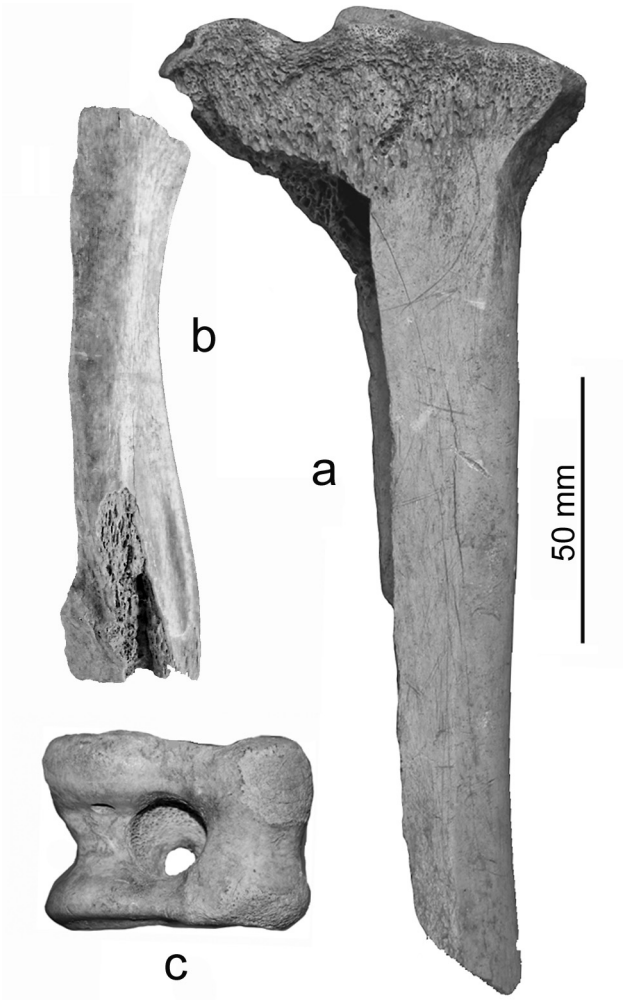

Figure 9.10. Late Bronze Age "Prescythian"/Scythian and Celtic bone tools: a. Late Bronze Age type cattle radius tool with polished surface from Salgótarján; b. Spinal process of a cattle thoracic vertebra, showing high polish along the edge from Sajópetri; c. Red deer astragalus used as a socket for a bow drill utilized for fire making equipment at Sajópetri. Perforated though use.

of a thoracic vertebra from cattle. This piece was used opportunistically and high polish developed on its surface (Fig. 9.10, specimen b). The most interesting utilitarian bone object from this site is a red deer astragalus, part of a bow drill or fire-making kit (Feature A2002/95). Analogies from Greenland and Alaska show that this upper piece of the set, the handhold or socket, was made from the astragalus of a reindeer of very similar size and shape. The natural depression, called the *fossa synovialis, located on the anterior surface,* was not only rounded to a regular hole of 14.2 mm diameter by the rotating motion, but was also perforated by intense use (Fig. 9.10, specimen c). Handling exposed the spongy inside of the bone on its convex surfaces. The top of the neurocranium from a mature stag, with antlers still attached, was recovered from one of two post holes (Feature 95.34) located at either side of a pit dwelling. As shown by a cut mark left by a first attempt, the top was carefully cut off of the calvarium (Fig. 9.6, top). The weathered external surface may be indicative of outdoor display, while the shape is reminiscent of the headgear worn by the Celtic god Cernunnos on the Gundestrup cauldron found in Himmerland (Denmark, 1891) of supposedly Celtic origins, and on a rock carving in Zurla, Val Camonica, Italy (4th c. BC). Discussions concerning the possibly Thracian origins of the Gundestrup Cauldron, however, also point to the universal popularity of the antler/stag motif. Antler has been a complex symbol and a desirable trophy for millennia, its presence therefore cannot be considered culturally idiosyncratic, although the time and place of this curious artefact is certainly thought-provoking.

Discussion and Conclusions

Frontiers have been seen as belts of separation between a polity and its sparsely inhabited hinterland. Modern studies show, however, the importance of understanding how culture contact is interpreted and negotiated between local and expansionist groups (Appadurai 1996, Clifford 1997). Instead of conceptualizing contact areas as zones of distinction, archaeologists have increasingly seen their roles in terms of interaction and hybridization (Van Dommelen 1997, 1998). The comparison of Iron Age assemblages from Northeastern Hungary revealed features of both Scythian and Celtic animal exploitation. It is important that the studied geographical zone was peripheral from the viewpoint of both cultures, such that no homogeneous manifestation of animal related traditions was to be expected.

Following signs of sedentary animal keeping at the Late Bronze Age settlement of Ludányhalászi, the "Scythian" sample from Salgótarján Ipari Park II shows "steppe" elements (such as the dominance of sheep and the consumption of horse meat; Bartosiewicz 2003). Scythian Period food refuse from Balassagyarmat and Jászfelsőszentgyörgy show very similar proportions between domesticates, with somewhat more pig in the hilly region and more horse in the plain. The early occurrence of domestic hen is remarkable at both sites, a clear, qualitative sign of cultural influx from southeast.

Hunting was rather unimportant. Two interpretations of pastoral attitudes towards the "wild" may be contrasted here: some herders may have been reluctant hunters, killing game opportunistically, out of necessity. The other possibility more or less corresponds to the stereotype of warlike "nomads", engaged in hunting as a sport or even military exercise. While the latter image has been perpetuated widely by Scythian artwork, archaeozoological evidence supporting this rich imagery is missing. This is what makes even the very few bones from large game, especially those of bison, aurochs and brown bear important at the sites under discussion here.

Perhaps by coincidence, the same fascination with the wild happens to be better reflected in the animal bone assemblage from Sajópetri. To some extent this may be attributed to Celtic tradition known from Western Hungary,

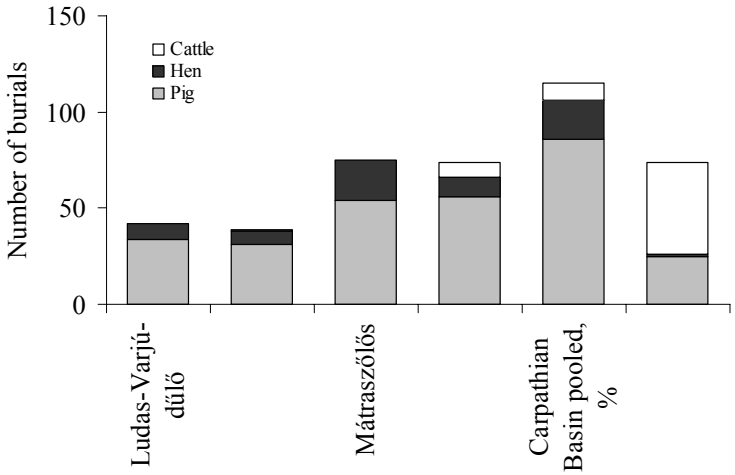

Figure 9.11. The contribution of main animal species to Celtic burials in Northern Hungary/Slovakia.

although it is a lot less pronounced. This meat diet is consonant with the 'Celtic' style of several archaeological artefacts recovered here. A relatively high consumption of pork as well as hunting and fowling are distinctive characteristics of animal exploitation at Sajópetri. However, neither of these sources of meat seem as important as at some Celtic sites in Transdanubia: in fact, this material is not strikingly different from the others, representing the "Prescythian"/Scythian Period in the area (see Fig. 9.2). These "Celtic" features, however, look vague in light of the animal offerings identified at the nearby cemetery of Ludas (Méniel 2006), that reflect far-reaching, classical Celtic mortuary rituals with an overwhelming dominance of pig remains. Fig. 9.11 shows two major Celtic cemeteries from Northern Hungary and one from Slovakia (Palárikovo), as well as a percentual summary of 326 graves from 50 smaller cemeteries (Vörös 1994, 86; note that percentages add up to more than 100% in this graph, owing to overlaps between animal species in several graves). Evidently, this clear pattern is far from what is reflected by the refuse bone material from Sajópetri. In addition to the well known role of pigs in Celtic mythology, domestic hen, a relatively new domestic animal seems to have been a preferred species in mortuary rituals.

The ethnic identity of inhabitants at Sajópetri may have differed from those interred at the Ludas cemetery. Nevertheless, the relative importance of pork and evidence of deer hunting distinguish it from earlier, "Prescythian"/ Scythian Iron Age settlements in this frontier zone, consonant with Celtic influx in the region. In summary:

- The remains of domesticates dominate at all sites in the studied region.
- The Late Bronze Age assemblage from Ludányhalászi shows the least external influence (*i.e.*, seems most localised).
- The Salgótarján assemblage contains typical "steppe" elements (high proportion of bones from caprines and horse).
- Early occurrences of domestic hen at the Scythian site of Balassagyarmat and a previous discovery at Jászfelsőszentgyörgy are of great cultural significance.
- Sajópetri revealed relatively numerous wild animal bones, including a worked stag skull fragment, possibly related to Celtic spiritual life. While important, the contribution of pork to the diet at this settlement does not reflect the massive dominance of pig remains in Celtic cemeteries in the area.
- Probably in part owing to the availability of metal implements, bone manufacturing seems to be limited to extremes: the opportunistic use of *ad hoc* tools, and the production of a small minority of more sophisticated artefacts.

The ethnic composition of inhabitants in the study area is unclear. This frontier thus may be characterized by classical infiltrations of settlers into a sparsely populated hinterland (Wynman and Kroeber 1957). Presuming unidirectional population movements, in this case, would not only represent an unjustified core-centred view far away from both the Scythian and Celtic homelands. It would also contradict the dynamic overlap between archaeozoological evidence of influences from the southeast (*e.g.*, early domestic hen reaching into the Northern Mountains) and the west (*e.g.*, the increasing importance of pig in the Tisza Valley).

Acknowledgements

We thank our archaeologist colleagues Gábor Bácsmegi (Museum of Szécsény; Balassagyarmat, Ludányhalászi), Miklós Szabó (Archaeological Research Institute of the Eötvös Loránd University; Ludas, Sajópetri) and Andrea Vaday (Archaeological Institute of the Hungarian Academy of Sciences; Salgótarján) for inviting us to study the animal bones from their excavations. Valuable consultations with the excavators and with Szabolcs Cifra have improved the manuscript. Erika Gál's research has been supported by the Bolyai János Fellowship and OTKA Grant no. F048818.

References

Appadurai, A. (1996) *Modernity at Large: Cultural Dimensions of Globalization*. Minneapolis, University of Minnesota Press.

Aristotle [2002]. *Historia Animalium*, Vol. I: Books I–X: Text. Cambridge, Cambridge Classical Texts and Commentaries, No. 38.

Bartosiewicz, L. (1984) Az állatállomány faji összetételének összefüggése a lakosság étrendjének energiatartalmával néhány fejlődő országban (Correlations between herd composition and the per capita energy consumption of the human population in developing countries). *Állattenyésztés és Takarmányozás* 33, 193–203.

Bartosiewicz, L. (1995) *Animals in the Urban Landscape in the Wake of the Middle Ages*. Oxford, Tempus Reparatum.

Bartosiewicz, L. (1999) The emergence of holocene faunas in the Carpathian Basin: A review. In N. Benecke (ed.) *The Holocene History of the European Vertebrate Fauna*, 73–90. Archäologie in Eurasien 6, Rahden/Westf., Verlag Marie Leidorf Gmbh.

Bartosiewicz, L. (2002a) Dogs from the Ig pile dwellings in the National Museum of Slovenia. *Arheološki Vestnik* 53, 77–89.

Bartosiewicz, L. (2002b) Ordacsehi–Kécsimező temetőjének állatmaradványai: Animal remains from the cemetery of Ordacsehi–Kécsimező. *Somogy Megyei Múzeumok Közleményei* 15, 65–67.

Bartosiewicz, L. (2003) A millennium of migrations: Protohistoric mobile pastoralism in Hungary. In F. W. King and C. M. Porter (eds.) *Zooarchaeology: Papers to Honor Elizabeth S. Wing*. Bulletin of the Florida Museum of Natural History 44, 101–130.

Bartosiewicz, L. (2004) A Tihany-Óváron feltárt szarvascsontváz előzetes vizsgálata (The preliminary study of a red deer [Cervus elaphus] skeleton from Tihany-Óvár, Hungary), 201–208. *Őskoros Kutatók II. Összejövetelének konferenciakötete*, Debrecen.

Bartosiewicz, L. (2006) Are "autochthonous" animal breeds living monuments? In E. Jerem, Zs. Mester and R. Benczes (eds.) *Archaeological and Cultural Heritage Preservation within the Light of New Technologies*, 33–47. Budapest, Archaeolingua.

Bartosiewicz, L., Daróczi-Szabó, M. and Gál, E. (2006) Iron Age dog remains from Salgótarján–Ipari Park II (Northern Hungary), 27–28. 10th International Conference of ICAZ, Ciudad México D. F., 23–28 August 2006. Abstract volume.

Bartosiewicz, L. and Gál, E. (2007). Sample size and taxonomic richness in mammalian and avian bone assemblages from archaeological sites. *Archeometriai Műhely* 1, 37–44. http://www.ace.hu/am/2007_1/AM-2007-01-BL.pdf

Bartosiewicz, L. and Gál, E. (in press) Állatmaradványok Salgótarján–Ipari Park II. lelőhelyről (Animal remains from the site Salgótarján–Ipari Park II.). In A. Vaday (ed.) Salgótarján–Ipari Park II.

Benecke, N. (1993) On the utilization of domestic fowl in Central Europe from the Iron Age up to the Middle Ages. *Archaeofauna* 2, 21–31.

Boev, Z. (1995) On the appearance of the domestic fowl (*Gallus gallus domestica*) in Bulgaria and Balkan Peninsula and the question of domestication of junglefowls (genus *Gallus* Brisson, 1760) in Southeast Europe. *Historia naturalis bulgarica* 5, 37–49.

Bökönyi, S. (1952) Les chevaux scythiques du cimitičre de Szentes-Vekerzug. *Acta Archaeologica Academiae Scientiarum Hungaricae* 2, 171–183.

Bökönyi, S. (1954) Les chevaux scythiques du cimitière de Szentes-Vekerzug. *Acta Archaeologica Academiae Scientiarum Hungaricae* 4, 93–114.

Bökönyi, S. (1958) Függelék Párducz Mihály dolgozatához a hejőkeresztúri szkíta leletekről [Appendix to the paper by Mihály Párducz concerning the Scythian finds from Hejőkeresztúr]. *A Herman Ottó Múzeum Évkönyve, Annales Musei Miskolciensis de Herman Ottó Nominati* II, 75.

Bökönyi, S. (1968) *Data on Iron Age horses of Central and Eastern Europe*. Cambridge, Massachusetts, American School of Prehistoric Research, Peabody Museum, Harvard University, Bulletin 25.

Bökönyi, S. (1974) *History of Domestic Animals in Central and Eastern Europe.* Budapest, Akadémiai Kiadó.

Chase-Dunn, C. and Hall, T. D. (1991) Conceptualizing core/periphery hierarchies for comparative studies. In C. Chase-Dunn and T. D. Hall eds. *Core/Periphery Relations in Precapitalist Worlds,* 5–44. Boulder, CO, Westview Press.

Choyke, A. M. (1997) The bone manufacturing continuum. *Anthropozoologica* 25–26, 65–72.

Clifford, J. (1997) *Routes: Travel and Translation in the Late Twentieth Century*. Cambridge, Harvard University Press.

Curzon of Keddleston, Lord (1907. *Frontiers. The Romanes Lecture*. Oxford, Oxford University Press.

Eaton, R. (1993) *The Rise of Islam and the Bengal Frontier, 1204–1760*. Berkeley, University of California Press.

Gál, E. (2007a) Bird remains. In A. Whittle (ed.) *The Early Neolithic on the Great Hungarian Plain: Investigations of the Körös Culture Site of Ecsegfalva 23, County Békés*. Varia Archaeologica Hungarica 20, 79–96. Budapest, Archaeological Institute of the Hungarian Academy of Sciences.

Gál, E. (2007b) Bird remains from the archaeological sites around the Lake Balaton in the context of Central Transdanubia. In C. Zatykó, I. Juhász and P. Sümegi (eds.) *Environmental Archaeology in Transdanubia.* Varia Archaeologica Hungarica 21, 361–375. Budapest, Archaeological Institute of the Hungarian Academy of Sciences.

Gallus, S. and Horváth, T. (1939) *Un peuple cavalier préscythique en Hongrie. Trouvailles Archéologiques du premier âge de fer et leurs relations avec l'Eurasie*. Dissertationes Pannonicae ex Instituto Numismatico et Archaeologico Universitatis de Petro Pázmány Nominatae Budapestinensis Provenientes. Ser. II. 9.

Kemenczei, T. (2000) Adatok a szkíta kor kezdetének a kérdéséhez az Alföldön (Beiträge zur Frage des Anfangs der Skythenzeit auf der Ungarischen Tiefebene). *Folia Archaeologica* XLVIII, 27–53.

Kiesewalter, L. (1888) *Skelettmessungen am Pferde*. Leipzig, Inaugural Dissertation.

Koudelka, F. (1885) Das Verhältniss der Ossa longa zur Skeletthöhe bei den Säugetieren. *Verhandl. d. Naturforsch. Ver. Brünn* 24, 127–153

Lyublyanovics, K. (this volume) Animal keeping and colonisation in the Roman province of Pannonia Inferior, Western Hungary.

Matolcsi, J. (1979) Die Tierknochenfunde von der Siedlung Gellérthegy-Tabán. *Acta Archaeologica Academiae Scientiarium Hungariae* 31, 287–291.

Metzner-Nebelsick, C. (2000) Early Iron Age pastoral nomadism in the Great Hungarian Plain – migration or assimilation? The Thraco-Cimmerian problem revisited, In J. Davis-Kimball, M. E. Murphy, L. Koryakova and T. L. Yablonski (eds.) *Kurgans, Ritual Sites, and Settlements: Eurasian Bronze and Iron Age*,

160–184. British Archaeological Reports, International Series 890.

Méniel, P. (2006) Les offrandes animals de la nécropole Celtique de Ludas–Varjú-dűlő (Hongrie). *Acta Archaeologica Academiae Scientiarum Hungaricae* 57, 345–366.

Nobis, G. (1954) Zur Kenntnis der ur- und frühgeschichtlichen Rinder Nord- und Mitteldeutschlands. *Zeitschrift für Tierzüchtung und Züchtungsbiologie* 63, 155–194.

Prummel, W. (1989) Appendix to atlas for the identification of foetal skeletal elements of cattle, horse, sheep and pig. *Archaeozoologia* III/1,2, 71–78.

Pounds, N. J. G. (1951) The origins of the idea of natural frontiers in France. *Annals of the Association of American Geographers* 41, 146–157.

Prescott, J. R. V. (1972) *Political Geography*. London, Methuen & Co.

Ratzel, F. (1895) *Politische Geographie oder die Geographie der Staaten, des Verkehrs und. des Krieges*. München/Leipzig, R. Oldenbourg.

Sümegi, P., Kertész, R. and Hertelendi, E. (2002) Environmental change and human adaptation in the Carpathian Basin at the late glacial/postglacial transition. In E. Jerem and K. T. Biró (eds.) *Archaeometry 98. Proceedings of the 31st Symposium, Budapest, April 26–May 3 1998*, 171–177. Vol. I. British Archaeological Reports International Series 1043 (Central European Series 1).

Schibler, J. (1981) *Typologische Untersuchungen der cortaillodzeitlichen Knochenartefakte. Die neolithischen Ufersiedlungen von Twann.* Band 17. Bern, Schriftenreihe der Erziehungsdirektion des Kantons Bern, herausgegeben vom Archäologischen Dienst des Kantons Bern, Staatlicher Lehrmittelverlag.

Schramm, Z. (1967) Kosci dlugie a wysokosc w klebie u kozy (Long bones and height in withers in goats). *Roczniki Wyższej Szkoly Rolniczej w Poznaniu XXXVI*, 89–105.

Stevens, L. (1991) The history and evolution of the domestic fowl. In L. Stevens (ed.) *Genetics and Evolution of the Domestic Fowl*, 137–169. Cambridge, University Press.

Szabó, M. (1971) *The Celtic Heritage in Hungary*. Budapest, Corvina.

Szabó, M. (2005) *A keleti kelták. A késő vaskor a Kárpát-medencében* [The Eastern Celts. The Late Iron Age in the Carpathian Basin]. Budapest, L'Harmattan.

Szabó, M., Kriveczky, B. and Czajlik, Z. (2004) Késő vaskori település Sajópetri határában (Sajópetri, Hosszú-dűlő; Borsod-Abaúj-Zemplén Megye (Late Iron Age settlement at the outskirts of Sajópetri [Sajópetri, Hosszú-dűlő; Borsod-Abaúj-Zemplén county]). *Régészeti Kutatások Magyarországon 2002*, 25–29.

Szabó, M. and Tankó, K. (2006) Nécropol Latènienne à Ludas–Varjú-dűlő (Hongrie). *Acta Archaeologica Academiae Scientiarum Hungaricae* 57, 325–343.

Takács, I. (1991) The history of pig (*Sus scrofa dom*. L.) butchering and the evidence for singeing on subfossil teeth. *A Magyar Mezőgazdasági Múzeum Közleményei 1990–1991*, 41–56.

Teichert, M. (1975) Osteologische Unterschungen zur Berechnung der Widerristhöhe bei Schafen; In A. T. Clason (ed.) *Archeozoological studies*, 51–69. North Holland Publishing Company, Amsterdam.

Vaday, A. (2001) Szkíták és hunok. Régészeti feltárások az Ipari Park II. területén [Scythians and Huns. Archaeological excavations in the area of Ipari Park II.]. Salgótarján, Nógrád Megyei Múzeum.

Vaday, A. (2003a) A szarmata barbaricum központjai a Kr. u. 2. században [Centres of the Sarmatian Barbaricum during the AD 2nd century]. *Barbaricumi Szemle* 1, 9–22.

Vaday, A. (2003b) Salgótarján, Ipari-park II. lelőhely (Salgótarján, Industrial Park II site). *Régészeti Kutatások Magyarországon 2000*, 31–38.

Van Dommelen, P. (1997) Colonial constructs: colonialism and archaeology in the Mediterranean. *World Archaeology* 28/3, 305–323.

Vörös, I. (1986) A ritual red deer burial from the Celtic-Roman settlement at Szakály in Transdanubia. *Acta Archaeologica Academiae Scientiarum Hungaricae* 38, 31–40.

Vörös, I. (1989) Esztergom–Szentgyörgymező Árpád-kori település állatcsontmaradványai. Előzetes közlemény. (Tierknochenfunde aus der árpádenzeitlichen Siedlung von Esztergom–Szentgyörgymező. Vorbericht). *Dunai Régészeti Közlemények* III, 51–56.

Vörös, I. (1990) Szabolcs ispánsági székhely Árpád-kori település állatcsontmaradványai (Árpád Age animal bones from Szabolcs). *Jósa András Múzeum Évkönyve* XXVI–XXIX, 165–188.

Vörös, I. (1994) Étel- és állataldozat maradványok Vác kelta temetőjében (Speise- und Tieropferreste des keltischen Gräberfeldes von Vác). *Váci Könyvek* 7, 85–100.

West, B. and Zhou, B.-X. (1988) Did chickens go North? New evidence for domestication. *Journal of Archaeological Science* 15, 515–533.

Wynman, W. D. and Kroeber, C. B. eds. (1957) *The Frontier in Perspective*. Madison, The University of Wisconsin Press.

Zalkin, V. I. [Цалкцн, В. И.] (1960) Иэменчвость Метаподий и ее зиачение для изучения крупного рогатого скота древности (Metapodialia Variation and its Significance for the Study of Antient [*sic*] Horned Cattle). *Бюллетенб московского обшества Испытателей природы отдебиый оттиск,* lxv, 109–126.