CRAFTING BONE – SKELETAL TECHNOLOGIES THROUGH TIME AND SPACE

Proceedings of the 2nd meeting of the (ICAZ) Worked Bone Research Group

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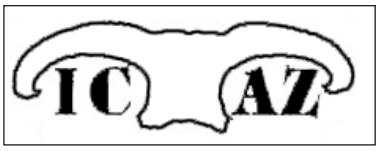

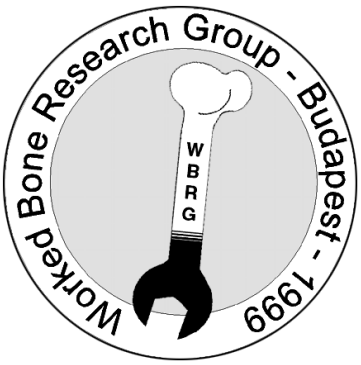

Worked Bone Research Group 2nd Meeting
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Special Assemblages

Participants in the WBRG 1999 Budapest conference (left to right): Ülle Tamla, Elisabeth Brynja, Tina Tuohy, Liina Maldre, Karlheinz Steppan, Heidi Luik, Gitte Jensen, John Chapman, Alice Choyke, Janet Griffitts, Andreas Northe, Noëlle Provenzano, Jörg Schibler, Nerissa Russell, Colleen Batey, Lyuba Smirnova, László Daróczi-Szabó, Daniella Ciugudean, Mária Bíró, Kordula Gostenčnik, Eszter Kovács, Christopher Morris, Sabine Deschler-Erb, Ans Nieuwenberg-Bron, Katalin Simán, Isabelle Sidéra, Mickle Zhilin

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Introduction

Archaeologists and Archeozoologists, both study worked osseous materials (bone, antler and tooth, including ivory, in short all referred to as "bone"). Such reports, however, are often buried at the very back of faunal analyses appended to site reports. Furthermore, the two groups of specialists have had little chance to interact, even within Europe since they tend to attend different conferences and write for different fora.

At the root of this problem lay the arbitrary, largely institutional division between pre- and proto-historians, often imposed on bone manufacturing experts by nothing but formalism in research tradition. The most exemplary series of studies n this field is entitled: "*Industrie de l'os neolithique et de l'age de metaux*" (Bone industry *from the Neolithic and Metal Ages*). Another classic, a book, is sub-titled "The Technology of Skeletal Materials *since the Roman Period*". In very early prehistoric assemblages, attention is often focused on the question of whether a particular piece of bone was worked or not. In later assemblages, it is the intensity of manufacturing that often renders objects zoologically non-identifiable, so that important aspects of raw material procurement, including long distance trade, remain intangible.

The history of raw material use, however, is continuous and many of the constraints and possibilities inherent in skeletal materials are the same whether one is dealing with Paleolithic or Medieval artifacts. Indubitably, the organization of manufacture, the function and value of bone artifacts (as well as some technological innovations such as the regular use of metal tools or lathes), differ substantially between simple and complex societies through time. On the other hand, fundamental questions of tensile characteristics, procurement strategies, style and certain technological requirements are not only similar diachronically, but also open up new vistas when apparently unrelated periods are compared. The function of these objects as social markers, for example, remains remarkably constant through time, even if details vary. The papers in this volume reflect these conceptual similarities and differences as did the papers delivered at the conference itself.

The first meeting of what was to become the Worked Bone Research Group (WBRG) was organized by Dr. Ian Riddler in the **British Museum, London, in January 1997**. The committment and enthusiasm of that first workshop has greatly inspired subsequent efforts in recruiting a wide range of bone specialists, capable of contributing to discussions concerning bone manufacturing.

In keeping with the aims of the Worked Bone Research Group, since 2000 an official working group of the International Council for Archaeozoology (ICAZ), an effort was made to present these papers on the basis of what *connects* them rather than segregating them by archaeological period or region. Contributions mostly include articles based on papers delivered in September 1999 at the second Worked Bone Research Group meeting in Budapest, organized by the editors with the unfailing support of the Aquincum Museum (Budapest) and its staff. Several people who were unable to be present at this conference were also asked to contribute papers. Finally, five of the studies in this volume, originally delivered at a symposium on bone tools organized by Dr. Kitty Emery and Dr. Tom Wake, entitled "*Technology of Skeletal Materials: Considerations of Production, Method and Scale*", at the 64th Annual Meeting of the Society for American Archaeology (Chicago 1999), were added thereby expanding the academic spectrum both in terms of research tradition and geographic scope.

There are a total of 36 papers in this volume. Research was carried out on materials from Central and North America to various regions of Europe and Southwest Asia. The authors represent scientific traditons from Estonia, Hungary, Romania, and Russia, European countries in which, until recently, ideas developed in relative isolation. Other European countries represented include Austria, Denmark, France, Germany, Great Britain, Greece, and Switzerland. Last but not least, the North American scholarly approach is also represented here.

Schools of thought may be said to be exemplified by what used to be Soviet research, well known for pioneering works on taphonomy, experimentation and traceology. Bone manufacturing was first brought to the attention of Western scholars by the publication in 1964 of the translation of S. A. Semenov's *Prehistoric Technology*, published originally in 1957. Scholars in France have also carried out decades of co-ordinated work on operational chains in the manufacturing process from the selection

of raw materials to finished products, with special emphasis on prehistoric modified bone. An entire working group, "Unspecialized Bone Industries/Bone Modification", is directed by Marylene Patou-Mathis. This working group itself is part of a larger research program on bone industry "*La Commission de Nomenclature sure l'Indistrie de l'Os Prëhistorique*" headed my Mme. H. Camps-Fabrer. Several specialists such as Jörg Schibler in Switzerland, have created laboratories where ground laying work has been carried out for years on worked osseous materials, especially from Swiss Neolithic Lake Dwellings and Roman Period sites. Language barriers have often prevented these important bodies of work from being as widely disseminated as they deserve. Arthur MacGregor in England, writing in English, has had a decisive influence on specialists working on more recent Roman and Medieval worked bone assemblages in Europe.

The work of all of these groups as well as certain individual scholars is well known within limited circles. Otherwise, however, the overwhelming experience of most researchers on worked bone have been feelings of isolation and alienation from most archaeological or archaeozoological work related, most importantly, to the absence of an international forum where their often specialized work can be presented and problems discussed.

In spite of the fact that there have been many practical obstacles to information flow between specialists in this field, there are really remarkable similarities of approach which should ultimately lead to the development of more compatible paradigms in research. Agreement on methodologies will have a positive feedback on communications, helping the field to grow and develop properly.

It seems that, at last, archaeologists and archaeozoologists and other specialists are talking to each other and sharing methodologicial points of view. One striking example of this can be seen in the the emphasis on raw materials studied in parallel to types found in the majority of papers in this volume. Previously studies often concentrated on typo-chronological questions, ignoring the questions of raw material morphology and availability. The series published by the *Centre National de la Recherche Scientifique*, edited by Mme. Henriette Camps-Fabrer in France is largely to be credited for beginning this new trend. It contains many papers concentrating on understanding manufacturing sequences and, indeed, from Europe to North America there are papers which explicitly deal with manufacturing sequences in individual assemblages.

There is also a consistent emphasis on experiment and manufacturing techniques present in much of the work in this volume. The related but fraught question of function continues to tantalize and frustrate most specialists. A number of articles attempt to apply techniques of hard science, such as scanning electron microscopy or light microscopy, together with experiment to get objective, "processual" answers to this important group of questions. Other researchers rely deductively on analogy, archaeological context, gross morphology, and textual sources as they try understanding how these objects were used.

When editing the volume, we tried to concentate on the underlying main concepts represented by each paper rather than grouping them diachronically or by geographical region. As a result, contributions follow a line from the theoretical through the problems of raw material selection, manufacturing techniques, experimental work, technical function and socio-cultural interpretations. Obviously many of these papers deal with several of these aspects simultaneously. Finally, analyses of assemblages are grouped to show the current state of general application of these principles as illustrated in papers in the rest of the volume. Reports on bone tool types will ultimately benefit from more unified typologies and also provide researchers with comparitive databases from regions beyond their own.

Finally, a word on the organization of papers in this volume. Although the editors have tried to group these papers by what they see as the main theoretical and methodological thrust of the authors it should be understood that most papers, to a greater or lesser extent, overlap between these artificial sub-titles. Happily, almost all these works include considerations of raw material exploitation, manufacturing and functional analyses and all make some attempt to consider the social context from which these artifacts emerged. It is exactly this cross-cutting of boundaries which allows us to hope that the study of worked osseous materials is well on the way to developing into a discipline in its own right.

In addition to the generous support given by our sponsors and technical editors for this volume, organizing the conference would not have been possible without the active help of numerous colleagues. Special thanks are due to Paula Zsidy, Director of the Aquincum Museum, Katalin Simán, archaeologist and two students from the Institute of Archaeological Sciences (ELTE, Budapest): László Daróczi-Szabó and András Markó. The Hotel Wien, Budapest and its efficient manager provided a comfortable setting for our discussions at a reasonable price. Last but not least, help with abstract translations by Cornelia Becker, Noelle Provenzano as well as Marjan Mashkour and Turit Wilroy should also be acknowledged here.

LATE NEOLITHIC RED DEER CANINE BEADS AND THEIR IMITATIONS

Alice M. Choyke

Abstract: More than 300 beads made from real and artificial red deer canines were discovered in special burials at the late Neolithic village site of Polgár–Csőszhalom-dűlő 6 in the north of the Great Hungarian Plain. These beads, made into bracelets, belts and necklaces worn by the deceased, were for the most part probably assembled at the time of burial. There are differences between most male and female graves in terms of the distribution of imitation and real canine tooth beads as well as other grave goods. The role of and reasons for producing imitations or copies for ornaments both in everyday life and ritual is considered in detail. There is also a discussion of the symbolism of these objects at the end of the Neolithic across Europe.

Keywords: Late Neolithic, Hungary, burial rites, red deer canine beads, imitation beads

Résumé: Plus de 300 perles aménagées sur des craches de cerf naturelles ou artificielles proviennent de sépultures du village énéolithique de Polgár–Csőszhalom-dűlő, au nord de la Grande Plaine hongroise. Ces perles étaient assemblées, probablement au moment même de l'inhumation, en bracelets, ceintures ou colliers qui ornaient le défunt. Il existe des différences prononcées entre les sépultures d'homme et de femme quant à la distribution des perles aménagées sur de vraies craches de cerf ou sur des copies. Le rôle de ces "faux" ou copies, ainsi que les raisons de leur fabrication dans le domaine de la vie quotidienne, comme dans celui du rituel, sont examinés en détail. La discussion traite également du caractère symbolique de ces objets à travers l'Europe, à l'extrême fin du Néolithique.

Mots-clés: Enéolithique, Hongrie, rites funéraires, pendeloques en crache de cerf, copies

Zusammenfassung: Aus speziellen Bestattungen in der eneolithischen Siedlung von Polgár-Csőszhalom-dűlő 6 im Norden der Ungarischen Ebene wurden mehr als 300 Perlen aus künstlichen und echten Rothirschgrandeln entdeckt. Diese Perlen, verarbeitet zu Armbändern, Gürteln und Halsketten und getragen von den Verstorbenen, wurden vermutlich zum Zeitpunkt der Grabniederlegung angehäuft. Die Verteilung von echten und gefälschten Grandeln ist in den Gräbern von Männern und Frauen deutlich unterschiedlich. Warum solche Schmuckperlen überhaupt nachgemacht wurden und welche Bedeutung sie im täglichen Leben und im Grabritus hatten, wird im Detail ebenso beleuchtet wie der Symbolgehalt dieser Fundstücke, welche in ganz Europa am Ende des Neolithikums in Erscheinung treten.

Schlüsselworte: Eneolithikum, Ungarn, Grabritus, Perlen aus Eckzähnen von Rothirschen, Kopien

The life-bringers, and the death-guides. But they set guards at the gates both of life and death. They keep the secrets, and safeguard the way. Only a few are initiated into the mystery of the bath of life, and the bath of death...
(D.H. Lawrence 1932)

Introduction

The settlement, known as Polgár–Csőszhalom-dűlő 6, lies near the town of Polgár in the Upper Tisza region in northeast Hungary (fig.1). Around 120 graves have come to light at this settlement dating to the 5th millenium BC, marking the first phase of the Tisza culture, the late Neolithic in the Carpathian Basin. Part of this material has been reported on elsewhere (Choyke 1997a). Of particular interest are nine graves, both male and female, containing red deer 'wolf teeth' – the upper mandibular canines – or bone imitations of them. All objects found in such ritual contexts carry their special codified meanings relative to both the deceased and the society in which the deceased lived. These symbolic meanings were apparent to the people taking part in the burial, today they can only be guessed at. This paper will be concerned with the use of red deer canines in ritual contexts across Europe during the final Neolithic. Furthermore, the various meanings of these copies will be reviewed as subtly altered practical and symbolic phenomena of group identity and social continuity during the burial ritual.

Ornament as symbol

It has long been recognised that beads are not merely ornamental. King (1974,1981) first discussed the use of beads as markers of group identity among California Indians. Pydyn (1998) defines the value of an object as entailing a combination of shape, originality and artistry as well as its prime and added value. Placement of beads in graves in the quantities sometimes found both at the Polgár–Csőszhalom-dűlő 6 site and especially at contemporary sites to the east, represents a form of accumulation. The context of the creation of value, its maintenance (collection) and disruption (hoards and burials), represent a fundamental principle of prestige, value and wealth. Valued objects thus, have the ability to transcend time and space and act as links between the living and the ances-

tors. Red deer canine beads and their copies would represent the perfect kind of valuable mortuary goods (Bailey, 1998) because they come from an important game animal and are restricted in their availability. In turn, as prestigious goods, bestowing canines as ornaments for the deceased may have been used to signal and thus, maintain a hierarchy of important social affiliations related to the individual and the larger society. Clan affiliation within the village would be one such important status. A limited group within each settlement may have traced its ancestry within a particular clan, explaining the restricted distribution of these beads among the 120 graves. On the other hand, clan affiliation likely extended beyond the local village to groups of other related settlements, explaining the wider distribution of certain phenomena within the region. In the smaller social group the relative value of the ornaments placed in the grave also could have signaled the status of individuals based on personal performance (for example as hunters), birth position (ascribed status) and gender (imitations worn only by women). Pearson (1998) has pointed out that the moment of interment is an emotional, theatrical moment. What better time not only to honor the dead but to reconfirm and strengthen the fabric of social intercourse? In this paper I shall show that the red deer canine/imitation ornaments placed in the graves were for the most part fabricated for the deceased at the time of death, signalling a wealth of social information to the living gathered at the graveside and living in houses just by these graves.

Red deer canines outside Europe

The upper canine teeth of red deer *(Cervus elaphus)* a.k.a. elk in North America, have always been among the most prized parts of the animal in both Europe and North America (McCabe 1987). Perhaps their significance is also reflected in the variety of terms used to describe them in English alone: buglers, ivory teeth, whistlers, tusks, and wolf teeth. Both sexes of red deer have upper canines but in stags they are well developed and, thus, are formally better suited for ornaments. In shape, the crown is bulbous, while the root is flattened and easily drilled through. Where canines are employed as prestige ornaments, copies in other materials such as stone or bone are also always found. These sometimes mimick the natural shape of the tooth. Other times, as in France and Hungary, they are carved in a blunted propeller-shape (fig. 5, two left hand beads). The beads are designed to fit into each other at right angles with only the rounded ends of the *Ersatz* teeth showing, giving the impression of multiple teeth. The rounded ends alternate in a manner reminiscent of the uneven way multiple real canines naturally fall on a necklace. Both the red deer canine beads and their imitations clearly belong to the category of what has been termed planned objects (Choyke 1997b).

Both does and stags have upper canines although these teeth are more developed in the males. There are only two such canines per animal. Furthermore, the specimens which are truly suitable for ornaments come from adult males, which further limits their availability. Among some American Indians, value was even further refined by color, larger canines with a brownish color were most valued (McCabe 1982). Thus, the supply of these teeth is inherently restricted, and that of the most preferred specimens even more so.

The same is true for the lower tusks of wild boar, which have also been traditionally valued throughout European prehistory for tools and ornaments alike. Wild boar tusks, still intact in the mandibles, were also placed in the male graves from Polgár–Csőszhalom-dűlő 6. Thus, both boar and red deer canines as well as the unusual blunted propeller-shaped bone copies of the red deer canines clearly represent multiple values beyond simple beauty or worth related to relative scarcity or the economic significance of the game animals they derive from.

The North American use of "elk" canines

One fascinating aspect of historic ethnographic attitudes toward elk canines, as reported on by McCabe (1982) is the way they were ascribed value by groups of native Americans in some of these societies. These descriptions can be of real value in helping scholars understand the way the equivalent teeth were used in other prehistoric contexts. Permanent canines were the equivalent of "pearls to the Europeans". Used as decorative beads, pendants and necklaces, such canines have been found archaeologically from sites dating back to 3000-5000 BP. Prior to AD 1800 the use of elk teeth was restricted to women and was culture and region specific. Since each elk had only two canines and not all these were suitable, it took time to gather significant numbers either through hunting and bargaining. McCabe (1982) notes that in 1805 one horse could be purchased for 70-80 elk canine teeth while in 1854 a fancy dress of bighorn sheep hide with 300 elk teeth sewn onto it was worth 25 bison robes or $75. A Cheyenne dress decorated with elk teeth was valued at eight ponies or $200. Among the Arahapo, elk teeth could be inherited. Teeth were, thus, considered prestige items and could be inherited (and accumulated across generations). They represented family wealth and rank. All these various aspects of the use of elk canines seem to have parallels at the end of the Neolithic in Europe as well.

As canines became scarce in the late 1800's some Plains and Plateau Indians became adept at producing imitations from bone. A craftsperson could make five artificial canines in a day. Even today elk canines, carved in a realistic fashion from bone, can be purchased in stores in the western United States (Sandra Olsen, personal communication) or from internet mail order catalogues with a Native American orientation such as the Matoska Trading Company (fig. 11).

Chronological and Geographical Distributions in Europe

Examples of the use of red deer canines as ornaments can be found very early on in Europe. Stiner (1999) looked at upper Paleolithic assemblages from Italy where non-shell orna-

ments contributed less than 1% to the assemblage. Red deer canines cluster in Gravettian and Epigravettian contexts, Stiner reports. The Aurignacian level also has copies in the form of four small basket-shaped beads, one carved from bone or ivory, the other three faceted specimens from steatite. The Aurignacian specimens are consistent in size, form, and high manufacturing investment and mirror the natural forms of red deer canines and *Cyclope nerita* shells. The production of red deer canine imitations involved a 'high manufacturing investment'. This pattern was repeated elsewhere in later periods as well, especially at the end of the Neolithic and beginning of the Chalcolithic.

Another interesting early example of the use of what appear to be copies of the red deer canine form can be found as far afield as a pair of necklaces from a Natufian burial at El-Wad in the Carmel mountains of Israel. The excavating archaeologist, Anna Belfer-Cohen, has described them, not as red deer canine imitations, but rather as pear and kidney-shaped bone beads (see Ayalon and Sorek 1999). The latter seem to be the last stage in the production of the pear-shaped beads, before the pairs were separated. The size and the shape of the pear-shaped beads are identical to European red deer canines to the extent that simple visual examination of them lying in the exhibition case left it unclear to a number of archaeozoologists looking at them whether some of the beads might actually be real teeth.

As a post-script, it should be noted that even today red deer canines are traditionally used to decorate ornaments worn by hunters in Central Europe. Silver and deer canine jewelry hunter's sets became common in Central Europe from the second half of the 19th century but we may suppose that canines decorated hunter's outfits earlier on in the region as well. The fact that the teeth are set in precious materials such as silver is a reflection of their intrinsic value in the same way that the Neolithic custom of combining canine teeth with valuable imported spondylus shell (Adriatic in origin), marble or limestone beads and exotic shells also signaled their worth. Evidently even in modern times, red deer canines remain a key symbol of the major game animal from which they were taken. Wearing them is a traditional part of middle and upper class hunting customs in the region. However, the author is not aware of what the exact symbolic significance is of wearing such objects to today's hunter.

The Final Neolithic

The end of the Neolithic and beginning of the Chalcolithic across Europe mark a time of social change into increasingly complex, hierarchical societies. Despite the fact that domestic animals are of ever increasing importance in economic life there appears to be a sudden rise in the use of hunting symbolism in ritual, especially as part of the burial rite. In the case of the use of teeth, wolf, dog, bear, wild boar and red deer canines are often found sewn on clothing, headdresses or necklaces. Red deer canines are apparently the teeth most consistently present and copied.

The most westerly evidence for the use of red deer canines in Europe comes from France. Sidéra (1997) has discussed the social background to this phenomenon with regard to objects from late Neolithic graves from necropoles in the Cerny region. Up to seventy objects from 10 sites were studied including an exceptionally high proportion of grave goods from bone, bracelets and necklaces decorated with red deer canines or their copies, wild boar canines, and dog canines. Variability in the combinations of grave goods, Sidéra suggests, is related to ethnic, regional, family and clan identities. Variability may also be related to temporal differences and changes of customs through time. These grave goods, thus, reflected both the social standing and hunter identity of the deceased. Here as elsewhere, they represent multi-levels of codified symbols. The copies of red deer canines appear related to the immediate non-availability of these teeth at the time of death and the demands of the burial ritual. Sidéra (this volume) expands further on this theme, pointing out the increase in this phenomenon at the very end of the Neolithic-beginning of the Chalcolithic. Graves may be found of women buried with necklaces with many red deer canine beads or realistic imitations in limestone or shell. Intriguingly, she also shows a picture of a blunted propeller-shaped bead recarved from a red deer canine (Sidéra 1997: fig. 4.5) which is remarkably similar to those found in their hundreds from graves at Polgár–Csőszhalom-dűlő 6 and in lower numbers in graves from the late Neolithic Lengyel period in western Hungary. She also reports that the beads used show signs of wear and some were even lost (and found) in settlement material, in contrast to the Hungarian material (this may be due to differences in excavation methods). The fact that such beads are rarely found in settlement materials suggests they were in limited use in daily life and that they were consistently removed from the community through burial. This would also have increased their value.

Elsewhere in France, Roussot-Larroque (1985) reports on a fascinating assemblage from a late Neolithic grave of a young female found in a rock-shelter. In addition to two perforated upper red deer canines there were other teeth including one wolf canine and one wild cat canine. There were also two copies of red deer canines. One was crudely carved from limestone and the other was carved from serpentine. Not directly related to the topic of this paper, but inviting thought *vis à vis* the topic of why people produce copies in general, two roe deer medipodials were placed in the grave. One was genuine while the other was an imitation, carved from the long bone of a large ruminant (Roussot-Larroque 1982)! The same author (1985) also mentions perforated red deer canines used in a necklace from a late Neolithic burial from Mas Sacré a Fargue. In the same volume, Voruz (1985b) describes perforated red deer canines from the beginning of the final Neolithic (2400-2200 b.c. non-calibrated) at the site of Clairvaux (Jura) in eastern France.

Small numbers of red deer canine beads and imitations in both stone and antler have been found in final Neolithic lake

dwelling settlement materials in Switzerland. Schibler (1997) reports on real red deer canine beads (plate 19,12; 39; 40) and imitations (plate 21,14.15) in the late Neolithic Horgen levels of the Mozartstrasse lake dwelling site from Zürich. An imitation antler bead was also found in the final Neolithic Auvenier component of the Saint Blaise site on the lake of Neuchâtel in western Switzerland (Choyke in preparation). In refuse bone materials from this site there are consistent signs that red deer has increasing importance as a game animal. The cemetery rites of these late Neolithic lake dwellers are not well understood unfortunately. The phenomen of the rich use of such beads in burials or other ritual contexts seems likely to have been present in this region as well but to date concrete proof has not been found. Voruz (1985 a and b) also reports on the use of red deer canine beads in late Neolithic settlement materials from Western Switzerland. There is also what I would describe as a blunted propeller-shaped bead made from a pebble from the settlement of Delly/Portalban II (Ramseyer 1987, fig 57:5).

From the northern Neolithic in Sweden come examples of what look very much like versions of the blunt propeller-shaped imitation beads. These beads, however, are carved from amber (Tilley 1996: fig. 6; 39-6.40). Russell (1995) also mentions the use of red deer canines from the settlement materials of the late Neolithic site of Selevac in Serbia as well as a possible imitation in antler (Russell 1995: plate 14.8).

Skipping over the Hungarian variation of this phenomenon for the moment, we come to the deer canine bead hoards and burial goods of the Rumanian Cucuteni culture, that is, more or less contemporary with the Polgár grave finds. Ursachii (1990) describes a hoard find with 480 objects stored in an '*askos*' type vase from the Eneolithic and Bronze age settlement site of Brad on the central plateau of Moldavia. Among these objects were more than 200 red deer canines as well as some imitations (Ursachii 1990: 352; pls. VI-XIII, 377-384). These were combined with simple but valuable beads of marble and copper. This clearly represents an accumulation of wealth, removed from circulation in the community in a manner besides being placed in graves. Other hoard finds were found at the Eneolithic sites of Habasesti-Holm (22 red deer canines) and Ariusd (Dimitrescu 1951; 1957), also in Rumania. Further, 124 red deer canines from a necklace were found in a hoard at Cărbuna strung together with 12 beads that are red deer canine imitations in bone (Sergheev 1982). This site is in what was formerly the western part of the former Soviet Union.

Further east in Bulgaria, an unspecified number of red deer canines were found in graves at the Eneolithic cemetery of Varna (Ivanov 1991). At the Durankulak cemetery (Vajsov 1992) a total of 62 red deer canines are illustrated in the report. Finally, there is a report on Neolithic graves of the Mariupol' type from the southern Ukraine near the Black Sea, where the deceased were buried in group graves. Grave goods include flake stone tools, bone perforators and plaques made from boar tusk as well as beads made from carp pharyngeal teeth. Necklaces of approximately 10 red deer canines each were found in significant quantities (Telegin 1991; Telegin and Potekhina 1987). Because several bodies went into each grave it is difficult to ascertain age or sex related differences in the grave offerings. From the pictures of re-drillings, most of the red deer canine beads clearly had been worn as adornment or accumulated through trade by the deceased during their lifetime.

What stands out in some of these more eastern examples are the large numbers of canine beads which had to be accumulated. It is likely that, as in the aforemetioned North American situation, such masses of teeth must have been gathered by high status individuals through hunting, exchange and, finally, complemented by the production of imitations. Such consumption would be one way of communicating social status. Clearly, in this part of the world red deer canines also represented wealth which could be hoarded or buried in graves and thus withdrawn from circulation. The Hungarian example lies somewhere in between the Western European examples where use of red deer canines in burials is more symbolic and the Rumanian and Bulgarian examples where the large numbers have both a symbolic content and also have a value in and of themselves.

Hungary

Perforated red deer canines or their imitations as clothing ornaments and in combination with marble or spondylus, both valuable raw materials, are found chiefly in graves from the final Neolithic of Hungary (circa ca 4500-3900 BC cal) in both the western and in the eastern part of the country, especially Tisza culture sites. In the west and the north of the country their use is associated with Lengyel period sites such as the site of Aszód–Papi-földek where both red deer canines and their blunted propeller-shaped imitations may be found, although in more limited numbers (Kalicz 1985, fig. 8). They are also combined with beads of imported spondylus shell in necklaces.

There are fewer than twenty tells from the Tisza culture in northeastern Hungary. The graves from the Tisza and Csőszhalom cultures are located outside houses or cluster within settlements. Everywhere the dead were buried in contracted positions with men laid on their right side and women on their left side. Red ochre was used extensively. Sometimes coffin-like chests have been found or else the deceased was wrapped in rushwork mats. Burial goods are rare at the beginning of the period and increase toward the end of it, with boar tusk pendants and boar mandibles as well as stone ax blades found exclusively in male graves in the final Neolithic and the Chalcolithic Tiszapolgár and Bodrogkeresztúr cultures. Red deer canines inter-strung with other beads were found everywhere in the region in burials (Kalicz and Raczky 1987). However, relatively speaking, the graves mostly have very few grave goods with the red ochre and there is a general uniformity in the mode of burial, reflecting the expression and reinforcement of communal identities (Raczky 1987). Chapman (2000) notes that necklaces of marble, limestone, spondylus

and red deer canine beads are found associated with all age and gender categories. He writes that this general use of these jewelry elements reflects wider social networks and categorization of people and things into a normative social order both at the household level and the wider community. Thus, with minor differences between groups, use of red deer canines were simultaneously a symbol of power, of hunting, of differentiation among members of the social group, and of emphasizing the continuity of the group, even at the moment of burial.

Red deer canine beads have been found together with valuable limestone and spondylus beads at other contemporary Tisza culture tell sites on the Great Hungarian Plain (Korek 1989). These include the site of Kisköre–Damm where among the various graves, five contained red deer canine beads as part of necklace elements in both male and female burials. One particularly rich grave, grave 21, was that of a women who wore a necklace composed of 324 limestone beads and 24 red deer canine beads strung at even intervals. Grave 4 contained a female child interred with a necklace of 13 intact and 2 broken canines together with 3 imitation canines, while grave 36 contained a man buried with a necklace of limestone beads (Korek 1989). Korek also reports on a child's rich grave (grave 11) from Szerencs–Taktaföldvár where 6-8 canines made up a necklace and formed part of a headdress. Hódmezővásárhely–Kökénydomb also has a grave with red deer canines (Korek 1989).

The Sites: Csőszhalom and Polgár–Csőszhalom-dűlő 6

The tell site of Csőszhalom and the settlement site of Polgár–Csőszhalom-dűlő 6 are located 5 km east of town of Polgár in the northern part of the Great Hungarian Plain, in the northern upper reaches of the Tisza river (fig. 1). Part of the site is a tell (Csőszhalom) surrounded by five concentric circular ditches and a rampart system. The settlement associated with the earlier levels at the tell was found at a distance about 500 meters distantfrom it although it is clear that the tell itself was located at the western edge of a large (28 ha) horizontal settlement. The excavated area of horizontal settlement was 400m long and 200 m wide. Houses, auxiliary buildings and refuse pits and wells were all found there. Naturally, not all this settlement area was inhabited at the same time. The settlement structure and material culture of the Csőszhalom and the settlement site of Polgár–Csőszhalom-dűlő 6 reflect the settlements position at the cross-roads of a number of spheres of influence. The site is unique in the region because of its ditch system and great size which is far more typical of western Hungarian Lengyel sites. Proximity to Tokaj and the obsidian sources there suggests that the settlement possibly had a strategic location in exchange systems to the east, west and north.

Around 120 contracted inhumation burials have been recovered. There are approximately the same number of women as men and many juveniles, although clearly the entire population was not buried in this manner. As elsewhere, the male burials are characterized by the deceased lying on the right side as well as by grave goods of ochre, stone axes, flaked stone tools, boar mandibles or perforated plates from wild boar tusk. Some male burials appear to have been symbolic, lacking the skeleton but containing a boar mandible, a small lump of ochre, a small stone axe, and a few beads where the head should have been. There are only two men who were buried with real red deer 'wolf teeth'. None are buried with imitations of them. Female burials may include ochre, spondylus bracelets, "belts" composed of several strings of spondylus or marble beads, beads of various sorts braided into the hair, beaded necklaces, bracelets, headdresses made from sponylus or marble beads sometimes combined with a few red deer 'wolf" teeth' and imitations (fig. 2). Graves of babies or children are more common, at the tell which seems to have been a special area (Raczky et al. 1997). The proportion between the sexes is, more-or-less, the same at the horizontal site. Altogether 11 graves, male and female, juvenile and adult, were found containing red deer canines and/or their blunt propeller-shaped imitation beads (A. Anders pers. comm). These came exclusively from the Polgár–Csőszhalom-dűlő 6 horizontal site.

One of the graves examined here from the settlement was clearly that of a high status woman who had the right to wear a necklace with the largest number of real red deer canine beads from the site and large spondylus shell beads (fig. 3). She was accompanied by other valuable goods as well (tab.1).

The deceased in the graves from this site complex were relatively richly buried compared with other sites of this period in the region. This may be related to the hypothesized central role of the settlement in the economy of the region. We can be sure of the presence of elites; and perhaps only a few individuals had the right to wear canines or their imitations.A variety of other objects, as can be seen in tab. 1, were also contained in graves containing red deer canine beads and the copies.

The Polgár–Csőszhalom-dűlő 6 site is unique in terms of the large number and regular production of imitation red deer canine beads. Sites to the west seem to be characterized by accumulations of large numbers of real canines in necklaces and to the east by hoards of real canines.

The real canines at Polgár–Csőszhalom-dűlő 6 can be well worn and sometimes show well worn holes or even redrilling (fig. 4). This suggests that these were all canines which had been accumulated during the lifetime of the deceased. This is in contrast to the imitations, some of which are well worn, others of which seem to have been newly made for the funeral to put on the deceased as part of the visual impact (Pearson 1998).

Are the propeller-shaped beads really imitations of the real red deer canine beads? Fig. 5 shows the progression of wear in the copy beads. The first bead on the left has a rough, newly drilled hole. At this stage these beads only resemble real canines when dovetailed together with their ends sticking out (fig. 2). The next bead to the right has a worn hole and the middle of the bead has become exceedingly thin. Once broken, the bead is smoothed at the break and redrilled. At this point they clearly resemble real canine beads.

Item No.	Number of canines	copies	Other Components	Age	Sex	Other finds in burial
105 necklace	5		6 spondylus and 4 marble beads	ad.	male	6 limestone beads, lump of ochre, cup, 10 spondylus beads, 2 wild boar tusk plates, 4 chipped stone tools
111A belt	6		240 spondylus beads	ad.	female	triangular bone plaque, ochre
111B necklace	5		306 spondylus beads			
196A headdress		63		ad	female	hair ornament with 3 Aegean shells, 21 marble beads, 83 snail shells plus copies, ceramic fragment
196B		11				
226 bracelet	2	80	6 spondylus and 4 marble beads	juv.	female	marble bead belt
362A	1 worn	35	2 marble, 15 spondylus, 83 snail beads	ad.	female	marble bead necklace, belt 2 flint tools
362B necklace	1 worn	31 new	24 spondylus beads			
406 necklace	3			ad.	male	flint tool, spondylus beads, pendant
611	2			juv.	female	flint tool, spondylus beads
613	3			ad.	female	beads, ochre, belt vessel
619 necklace	1	42		ad.	female	belt ring, flint tool
836 necklace	21		large and small spondylus beads	ad.	female high status /st. 1	6 spondylus bracelets, bone ring, ochre, vessel, marble bead belt, spondylus beads at feet
886 necklace		22 new	spondylus beads	ad.	female /st.2	3 spondylus bracelets, marble bead belt

Tab. 1 The composition of material by burials

Tab. 2 Differences between the mean measurements (mm) of red deer canines and imitations

One way of trying to detect similarity between red deer canine beads and what look like imitations is by comparing the mean measurements (as defined in fig. 7) of these two groups by Student's t-tests (tab. 2).

These calculations show that there was no statistically significant difference in the length and smallest thickness (usually measured near the suspension hole) of the two types of beads, notwithstanding the difference in shape. Two dimensions that were different, however, are the greatest width and greatest thickness: real red deer canine beads are significantly more robust than imitation (1 and 0.5 mm larger in the two respective dimensions). A multivariate, Hotelling T-test also shows that the overall size difference between canine beads and imitations is statistically different.

When greatest width and greatest thickness are plotted against each other (fig. 8), however, a major overlap becomes apparent between the two groups. As is also shown by standard deviations (tab. 2), real canines are more dispersed across the size range, while copies tend to cluster between the boundaries of c.a. 8-10 mm of greatest width enhancing the impression of more controll presented by the imitations.

The inconsistent size of red deer canines seems to reflect natural variability in the stags killed that is also displayed in the length distribution of these beads. In fig. 9, the length of red deer canine beads is plotted by individual items. The distribution is far from normal and even shows a vague bimodality, that may be attributed to the mixed age structure of animals represented by these beads.

The proportion of the two measurements to each other (tab. 3) shows that imitation beads are carved into a somewhat rounder form than the natural shape of red deer canines creating a more managed or controlled image. Regression equations between the two measurements also reveal that this proportion changes with size at an almost identical rate in the two groups. This trend is supported by a weak, but statistically highly significant, linear correlation.

Thus:
- On average, real red deer canine beads are more robust than imitations, but their size is significantly more variable.
- The heterogeneity of red deer canine beads is expressed in both length and transversal dimensions.

Manufacturing technique

Most of the copies were made from the long bones of large ruminants, probably metapodials, from the thicker part of the shaft near the epiphysis. Many of the beads exhibit the porous surface of bone taken from near the epiphyses. A very few beads were made from red deer antler. The manufacturing technique seems to involve grooving short contiguous strips around the diaphysis shaft or antler beam which were then snapped apart (Choyke 1997b:159). Some beads still display remnants of this grooving where the separation was not perfect (fig. 6). The imitation beads were then formed by grinding, polishing and drilling the central hole.

Symbolic meaning

What could the meaning of this exceptionally large number of imitations be? It seems to be far more than simply a need to complement an inadequate number of real canines for an elite group, although this is certainly a factor. Imitation may also be about creating objects that contain the same social information about group identity but by their very artificiality also carry other messages which the original object. The Polgár imitation red deer canine beads could be made in larger numbers and with formal alterations that subtly enhanced the symbolism of the jewelry. It is likely that the additional information was somehow related to gender.

Use of the red deer canine is clearly a trans-European phenomenon at the end of the Neolithic, a valuable symbol of an important game animal. However, the imitations obviously belong to the female sphere. Their form imitates not only the individual canine beads but also, when fitted together, reflects the way real canines actually lie up and down on necklaces (see fig. 3). However, the imitations create a more controlled and orderly impression (see fig. 2). Speculatively, this may reflect the more passive nature of the women's realm as opposed to more improvised, spontaneous sphere of the hunting male, represented by the wild pig tusks and mandibles. The notable exception to this rule may be found in the necklace of red deer canines and spondylus given to the high status woman in grave 836 at Polgár–Csőszhalom-dűlő 6 (fig. 3).

The graves are also related to particular houses. Perhaps the right to wear both real and imitation red deer canine beads was related to kinship in a clan type group. This would explain why the use of real and imitation canines is found both in Transdanubia (Lengyel culture) and at contemporary final Neolithic sites in the northern Hungarian Plain. People at these settlements may have recognized common lineages. Only individuals from the highest status families within these kinships were buried with these and other symbols representing both the community and continuity of particular social elements. Personhood, thus, can be seen as related to group membership as expressed by those who are in charge of what these individuals were buried with (Chapman 2000:177).

Burial ritual

The fact that the imitation canines seem to be similiarly worn away within each piece of jewelry (termed 'item' in the metrical analysis) suggests that most of the pieces were assembled at one and the same time, sometimes during the lifetime of the deceased and sometimes even on the occasion of the burial ritual itself. The necklaces, headdresses and bracelets would have been visually stunning during the funeral and reinforced the group affiliation of the deceased in terms of the living.

In order to decide whether imitation beads from various items

	Width/thickness	Regression equation	Coefficient of Correlation	P
Canine, n=49	0.888	y=0.563x+1.263	0.490	0.000
Copy, n=249	0.926	y=0.343x+1.344	0.344	0.000

Tab. 3 Differences between the width (x) to thickness (y) proportions of red deer canines and imitations

Item No.	N	Mean	s.d.	Minimum	Maximum	Skewness	Kurtosis
196A	11	19.0	1.3	17.0	21.1	0.376	-0.464
196B	63	20.3	1.7	15.8	23.6	-0.632	0.051
226	80	21.0	1.7	15.5	24.8	-0.424	0.791
362A	35	18.0	1.3	15.2	19.9	-0.395	-0.559
362B	31	18.1	1.3	15.1	21.1	-0.188	0.380
886	22	16.8	1.6	12.4	19.4	-1.049	1.716

Tab. 4 Univariate statistics of length (mm) of imitations in major items

	Large, Mean	n=143 s.d.	Small, mean	n=101 s.d.	Df	t-value	p
Length	20.7	1.7	17.9	1.7	242	13.245	0.000

Tab. 5 Difference in the length (mm) of "large" and "small" imitations in items

of jewelry were more similar to each other or to those in other pieces, univariate statistics of their lengths were calculated in six items available for study with the largest numbers of imitation beads. The parameters calculated (tab. 4), suggest that at least two major size groups existed, separated by the c.a. 20 mm size threshold.

Most notably, large and small beads alike were identified in the two items from Grave 196 (adult female). Additional large beads were found in Grave 226 (juvenile female), while the two items of jewelry in Grave 362 (adult female) were rather uniform. Grave 886 (adult female) had the shortest beads of all. The size difference between pooled "large" and "small" beads (on two sides of the 20 mm cut-off point) was tested using a Student's t-test (tab. 5).

The highly significant difference between the two size groups can also be visibly appraised in the histogram in fig. 10. The overall length distribution of all imitation beads pooled is largely Gaussian. The bell-shape of the histogram, however, is composed of the homogeneous subsets of items described in tab. 3. The small beads of Grave 886 are clearly separated, although they fit within the "small" size group, together with the items from Grave 362. Items from Graves 196B and 226 clearly belong to a different set on the basis of their sizes. The dimensions of imitatons, greater in number, vary between items, sets of "larger" and "smaller" could be metrically distinguished. Thus:

Bead sizes tend to be consistent within individal necklaces. The dimensions of copies, greater in number, vary between individual pieces of jewelry and sets of "larger" and "smaller" beads that could be metrically distinguished.

In other words, some of the pieces were manufactured during the lifetime of the deceased while others seem to have been put together at the time of the funeral from beads taken from other necklaces or newly made. Even the act of making these imitation pieces would have required a kind of group cooperation to gather and manufacture enough components to make a necklace or bracelet. Probably the very way the spondylus and deer canines are distributed in individual necklaces also had both stylistic and symbolic components as well.

The final length of these beads is obviously a combined result of the original length attained from the time of manufacturing and the loss of material resulting from extensive wear. Size differences between the two gross size groups seem to be basically defined by how long the beads were in use.

Conclusions

One of the major goals of this report was to collect information on the phenomenon of the use of wild animal symbols, and red deer canines in particular, across Europe at the end of the Neolithic. Red deer canine beads in France, Switzerland and Germany, along with a few imitations, appear in graves as parts of necklaces, sometimes in considerable quantities. In Rumania and Bulgaria, on the other hand, masses of red deer canine beads are accumulated in necklace form as wealth in hoards. They again appear as jewelry in Ukrainian Neolithic Mariupol' type cemeteries as part of the burial rite. Red deer canines and their imitations are not found in the ordinary settlement material from Polgár–Csőszhalom-dűlő 6, but only in a limited number of female and a few male graves closely associated with houses. What makes the Polgár–Csőszhalom-dűlő 6 material special are the large numbers of imitations found associated with female graves. The neat and even appearance of the assembled imitations, as opposed to the helter-skelter appearance of natural canines in a necklace, may reflect differences in the society's perceptions of the more circumscribed female role. The wild pig tusks and mandibles buried with men seem to reflect the more improvisational hunter's role apparently assigned to them. This makes the necklace of real canines and spondylus beads worn by the high status woman in grave 836 especially noteworthy.

Calculations on measurements show that the imitations are nearly the same size as the real red deer canines, helping to demonstrate, aside from simple visual comparisons, that these bone beads really were intended as copies of the natural form. Measurements to assess the similarity of the imitations within and between pieces of jewelry show greater homogeniety within necklaces. These beads were often new, and thus, it seems that sometimes the ornaments were produced for the funeral iself.

The fact that only a limited number of elites seem to have had the right to wear these canines, either real or imitation, suggests that these artifacts symbolized a special kind of group identification also associated with the late Neolithic Lengyel culture of Transdanubia. However, at the moment of death the link between the deceased and the living is limited to a much more intimate sphere. The theatrical moment of the funeral is meant to enhance group identification and continuity with the ancestors/founders of the lineage. The deer canine bead jewelry would provide a small but spectacular sign of affiliation between the audience and the deceased.

This study was designed to show that detailed examination of even small artifact categories can provide useful insights into past societies and ritual behavior.

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References

Ayalon, E. & Sorek, C. 1999. *Bare Bones: Ancient Artifacts from Animal Bones*. Catalogue, Eretz Israel Museum, Tel Aviv.

Bailey, D. 1998. On being famous through time and across space. In *The Archaeology of Value: Essays on Prestige and the Processes of Valuation*, ed. D. W. Bailey. British Archaeological Reports, International Series 730, Oxford, pp. 1-9.

Chapman, J. 2000. Tension at Funerals: Social practices and the subversion of the community structure in later Hungarian prehistory. In *Agency and Archaeology*, eds. M.-A. Dobres & J. Robb. Routledge: London – New York, pp.169-195.

Choyke, A. 1997a. The Bone Tool Manufacturing Continuum. *Anthropozoologia* 25-26, pp. 65-72.

Choyke, A. 1997b. Polgár-Csőszhalom-dűlő lelőhely csont-, agancs- és agyartárgyainak vizsgálata (Investigations of the bone, antler and tusk objects from the site of Polgár-Csőszhalom-dűlő). In *Utak a Múltba: Az M3-as Autópálya régészeti leletmentései* (Paths into the Past: Rescue Excavations on the M3 Motorway), eds. P. Raczky, T. Kovács & A. Anders. The Hungarian National Museum and the Archaeological Institute of the Loránd Eötvös University, Budapest, pp.157-159.

Choyke, A. forthcoming, The Antler Tools from Saint Blaise. In *The Faunal Material, Bone Tools and Antler Tools from St. Blaise*. eds. B. Stopp, A. M. Choyke & L. Bartosiewicz. Saint Blaise/Bains des Dames series, Archéologie Neuchâteloise, Musée cantonal d'archéologie, Neuchâtel.

Dumitrescu, Vl. 1951. *Habasesti-Holm.* Bucharest, pp. 275-402.

Dumitrescu, Vl. 1957. Le depôt de parures de Habasesti et le probleme des rapports entre les tribus de la civilisation de Cucuteni et les tribus des steppes pontiques. *Dacia* I, Bucharest, pp.73-96.

Ivanov, I. 1991. & Der Bestattungsritus in der chalkolithische Nekropole von Varna. In *Die Kupferzeit als historische Epoche*, ed. J. Lichardus. Saarbrücker Beiträge zur Altertumskunde 55. Saarland Museum, Saarbrücken pp. 125-150.

Kalicz, N. & Raczky, P. 1987. The Late Neolithic of the Tisza Region: A survey of Recent Archaeological Research. In *The Late Neolithic of the Tisza* Region, ed. L. Tálas. Budapest–Szolnok, pp. 11-30.

Kalicz, N. 1985. *Kőkori falu Aszódon* (Neolithic village in Aszód). Múzeumi Füzetek 32, Petőfi Múzeum, Aszód. 59, fig. 38 p. 148.

King, C. 1974. The explanation of differences and similarities among beads used in prehistoric and early historic California. In *Antap: California Indian political and economic organization*, eds. L. J. Bean & T. F. King. Ballena Press Anthropological Papers 2, Ramona, pp.75-92.

King, C. 1981. *The Evolution of Chumash Society: A comparative study of artifacts used in social system maintenance in the Santa Barbara Channel region.* Ph.D. Dissertation. Department of Anthropology, University of California - Davis.

Korek, J. 1989. *Die Theiß-Kultur in der mittlern und nördlichen Theißgegend*. Inventaria Praehistorica Hungariae, Hungarian National Museum, Budapest.

Lawrence, D. H. 1957. *Etruscan Places*. The Viking Press, New York.

Matoska Trading Company. http://www.matoska.com/cgi-bin/gen

McCabe, R. E. 1982. Elk and Indian: Historical values and perspectives. In *Elk of North America: Ecology and Management*, eds. J.W. Thomas & D. E. Toweill, Stackpole Books, Harrisburg, pp.61-123.

Pearson, M. 1998. Performance as valuation: early Bronze Age burial as theatrical complexity. In *The Archaeology of Value: Essays on Prestige and the Processes of Valuation*, ed. D. W. Bailey. British Archaeological Reports, International Series 730, Oxford, pp. 32-41

Pydyn, A. 1998. Universal or relative? Social, economic and symbolic values in central Europe in the transition from the Bronze Age to the Iron Age. In *The Archaeology of Value: Essays on Prestige and the Processes of Valuation*, ed. D. W. Bailey. British Archaeological Reports, International Series 730, Oxford, pp. 97-105.

Raczky, P. 1987. Öcsöd–Kováshalom, A settlement of the Tisza Culture. In *The Late Neolithic of the Tisza Region,* ed. L. Tálas. Budapest–Szolnok, pp. 61-83.

Raczky, P., Anders, A., Nagy, E., Kurucz, K., Hajdú, Zs. & Meier-Arendt, W. 1997. Polgár–Csőszhalom-dűlő: Újkőkor végi telep és sírok a Kr. E.V. évezredből (Late Neolithic Settlement and Graves from the 5th Millenium B.C.). *Utak a Múltba: Az M3-as Autópálya Régészeti Leletmentései* (Paths into the Past: Rescue Excavations on the M3 Motorway). eds. P. Raczky, T. Kovács & A. Anders. The Hungarian National Museum and the Archaeological Institute of the Loránd Eötvös University, Budapest, pp. 34-43.

Ramseyer, D. 1987. *Delley/Portalban II, Contribution ŕ l'Étude du Néolithique en Suisse Occidentale.* Edition Universitaires Fribourg.

Roussot-Larroque, J. 1982. Poinçon en os sculpte imitant un metapode de chevreuil dans la sepulture Neolithique de l'Abri Vidon a Juillac (Gironde). In *Industrie de l'Os Neolithique et de l'Age des Metaux 2*, ed. H. Camps-Fabrer. Editions de Centre National de la Recherche Scientifique, Paris, pp.124-134.

Roussot-Larroque, J. 1985. Objet anciformes et pendeloques en quille des Allees Couvertes d'Aquitaine. In *Industrie de l'Os Neolithique et de l'Age des Metaux 2*, ed. H. Camps-Fabrer. Edition de Centre National de la Recherche Scientifique, Paris, pp. 91-111.

Russell, R. 1995. The Bone Tools. In *Selevac: A Neolithic Village in Yugoslavia*, eds. R. Tringham & D. Krstić. Monumenta Archaeologica 15, University of California - Los Angeles, Institute of Archaeology, Los Angeles, pp. 521-548.

Schibler, J. 1997. Die Knochenartefakte. In *Zürich "Mozartstrasse": Neolithische und bronzezeitliche Ufersiedlungen Vol.1*. eds. E. Gross *et al.* Berichte der Zürcher Denkmalpflege, Monograph 4, Zürich, pp.167-175.

Sergeev, G. 1963. Rannetripolskii klad u s. Karbuna (Early Tripolye hoard from Karbuna), *Sovietskaya Arkheologiya*, pp.135-149.

Sidéra, I. 1997. Le mobilier en matieres dures animales en milieu funéraire Cerny: symbolisme et socio-économie. In *La culture de Cerny. Nouvelle économie, nouvelle société au Néolithique*, eds. C. Constantin, D. Mordant & D. Simonin. Actes du colloque international de Nemours 1994, Mémoires du musée de préhistoire d'Ile-de-France 6, Nemours pp. 499-513.

Stiner, M. 1999. Paleolithic mollusc exploitation at Riparo Mochi (Balzi Ross, Italy): food and ornaments from the Aurignacian through Epigravettian. *Antiquity* 73, pp.735-754.

Telegin, D. & Potekhina, I. 1987. *Neolithic Cemeteries and Populations in the Dnieper Basin.* British Archaeological Reports, International Series, No. 383, Oxford.

Telegin, D. 1987. *Neolitichskie mogilíniki mariypolskogo tipa: svod arthepgichsvks istochikov*. Institute of Archaeology of the Academy of Sciences of the USSR.

Telegin, D. 1991. *Neolitichskie mogilíniki mariypolskogo tipa: svod arthepgichsvks istochikov*. Institute of Archaeology of the Academy of Sciences of the Ukraine, Soviet Socialist Republic.

Tilley, C. 1996. *An Ethnography of the Neolithic in Early Prehistoric Societies in Southern Scandinavia.* Cambridge University Press, Cambridge.

Urasachi, V. 1990. Le dépôt d'objets de parure Énéolithiques de Brad, Com. Negri, Dép. De Bacău. In *Le Paléolithique et le Néolithique de la Roumanie en Context Européen*, eds. V. Chirica & D. Monah. Bibliotheca Archaeologica Iassiensis IV, Iaşi, pp. 335-386.

Vajsov, I. 1992. Anthropomorphe Plastik aus dem prähistorischen Graberfeld bei Durankulak. *Studia Praehisotrica* 11-12, pp. 95-113.

Voruz, J-L. 1985a. Des pendeloques Neolithique particulieres: les Os Long Perfores. In *Industrie de l'Os Neolithique et de l'Age des Metaux 3*, ed. H. Camps-Fabrer. Edition de Centre National de la Recherche Scientifique, Paris, pp.124-162.

Voruz, J.-L. 1985b. Outillages osseux et dynamisme industriel dans le Néolithique jurassien. In *Industrie de l'Os Neolithique et de l'Age des Metaux 2*, ed. H. Camps-Fabrer. Edition de Centre National de la Recherche Scientifique, Paris, pp. 123-162.

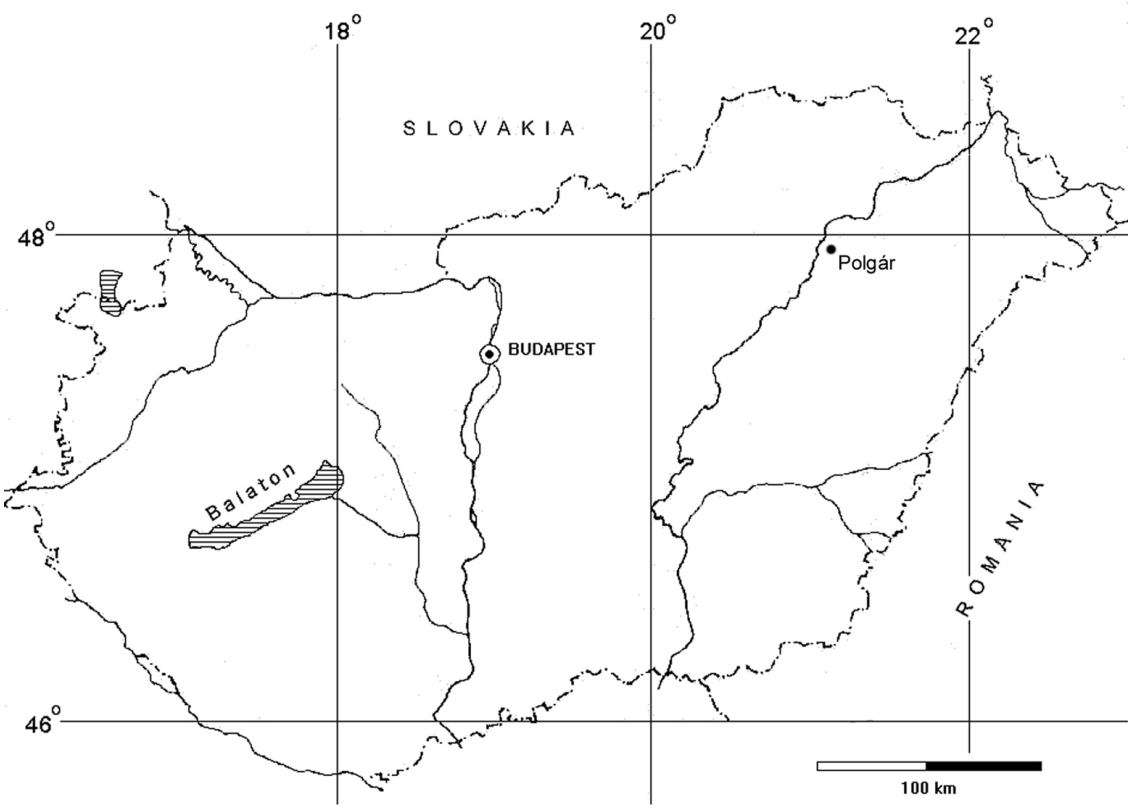

Fig. 1 Map of Hungary showing location of Polgár–Csőszhalom-dűlő 6

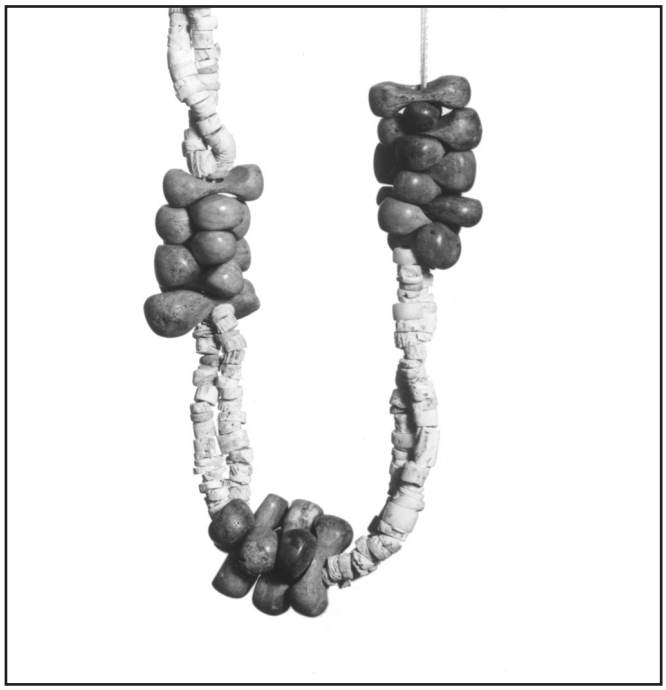

Fig. 2 Necklace of imitation red deer caninces and small spondylus beads from female grave 886

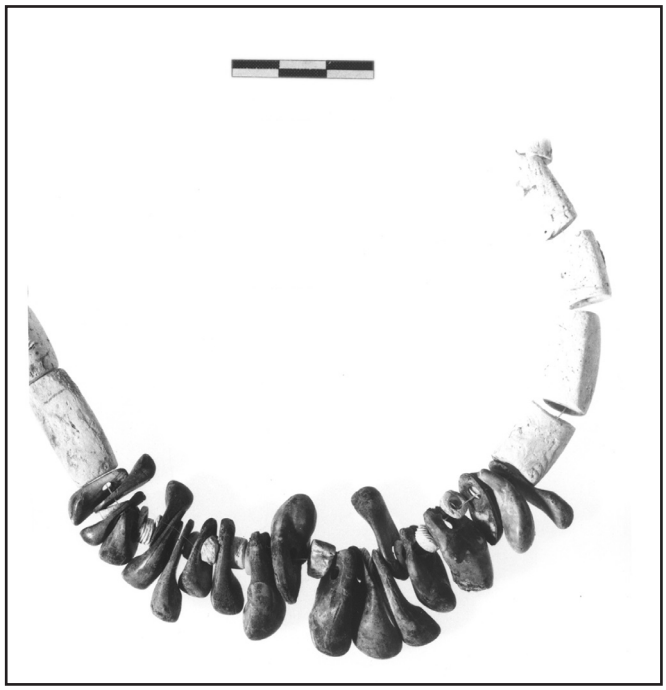

Fig. 3 Necklace of real red deer canines and large spondylus beads from grave 836, a burial of a high status woman

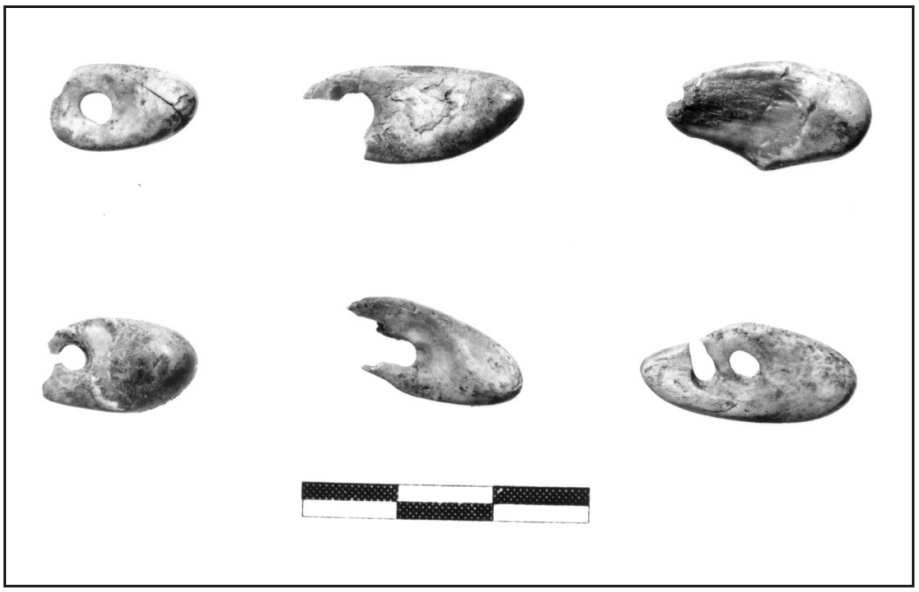

Fig. 4 Worn and redrilled real red deer canine beads

Fig. 5 Progression of wear on imitation beads: from the blunted propeller-shape when new to a half form, most similar to actual red deer canine beads

Fig. 6 Imitation beads with remains of original grooving from the manufacturing process

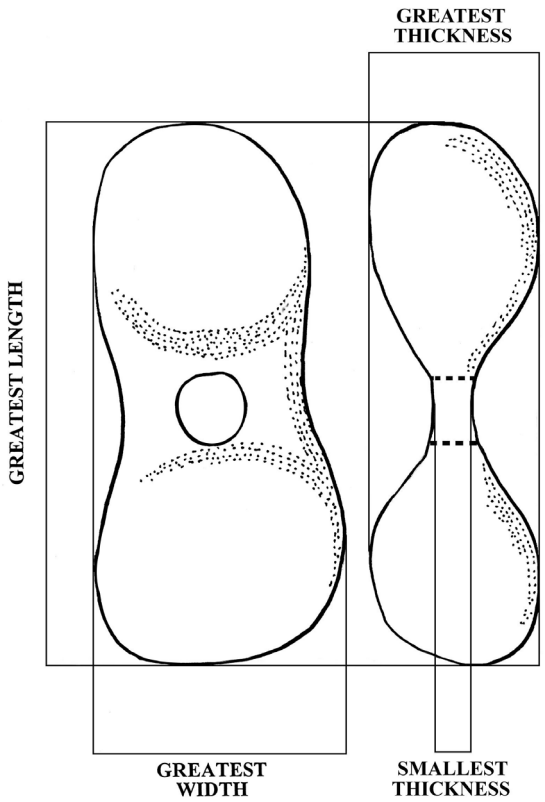

Fig. 7 Measurements taken on imitation beads

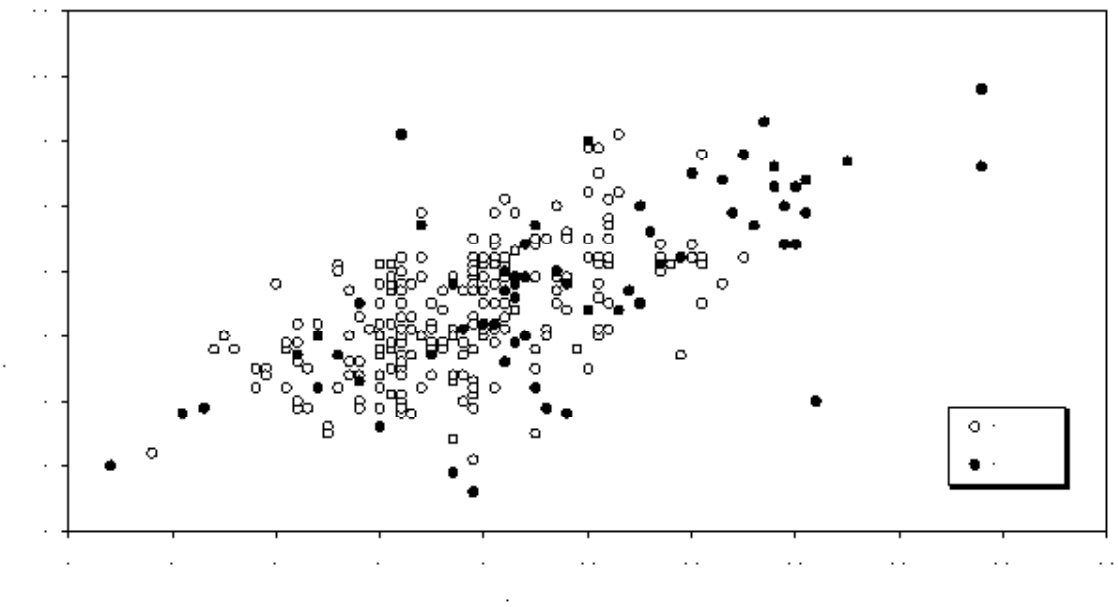

Fig. The size distribution of deer canines and copies by width and thickness

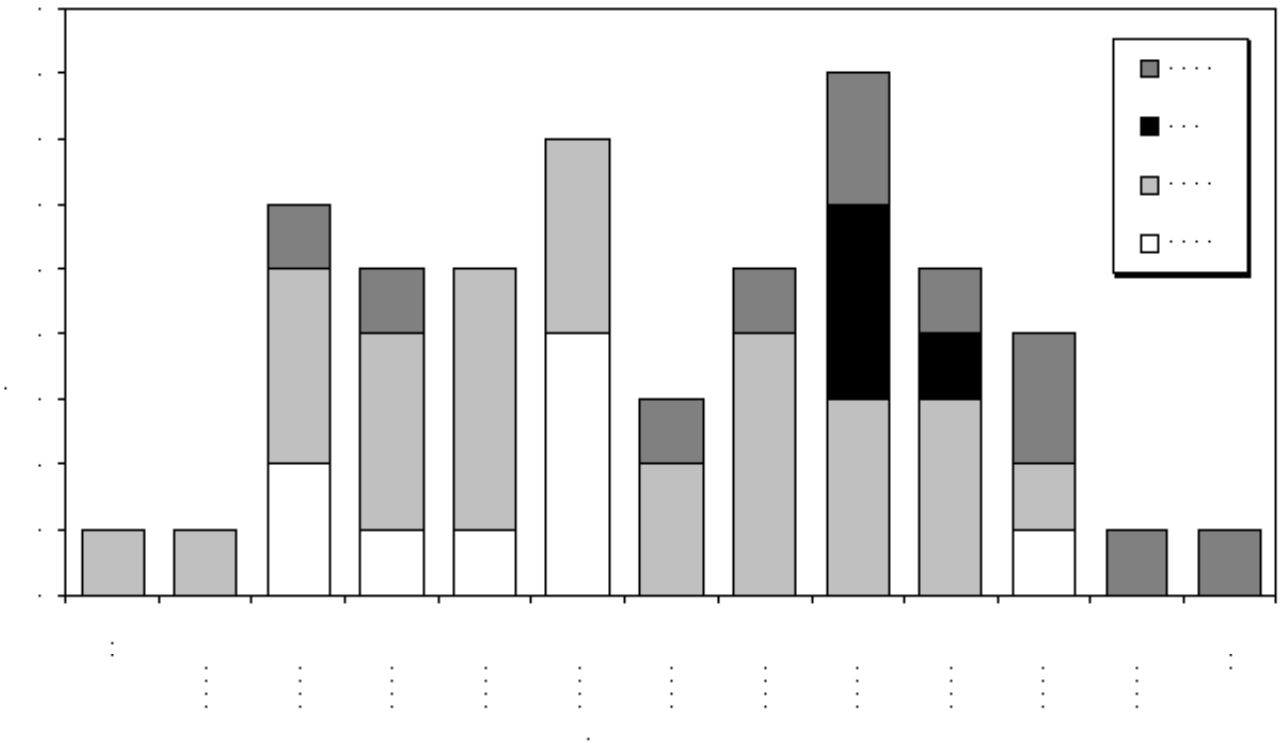

Fig. 9 The length distribution of real red deer canines in various burials

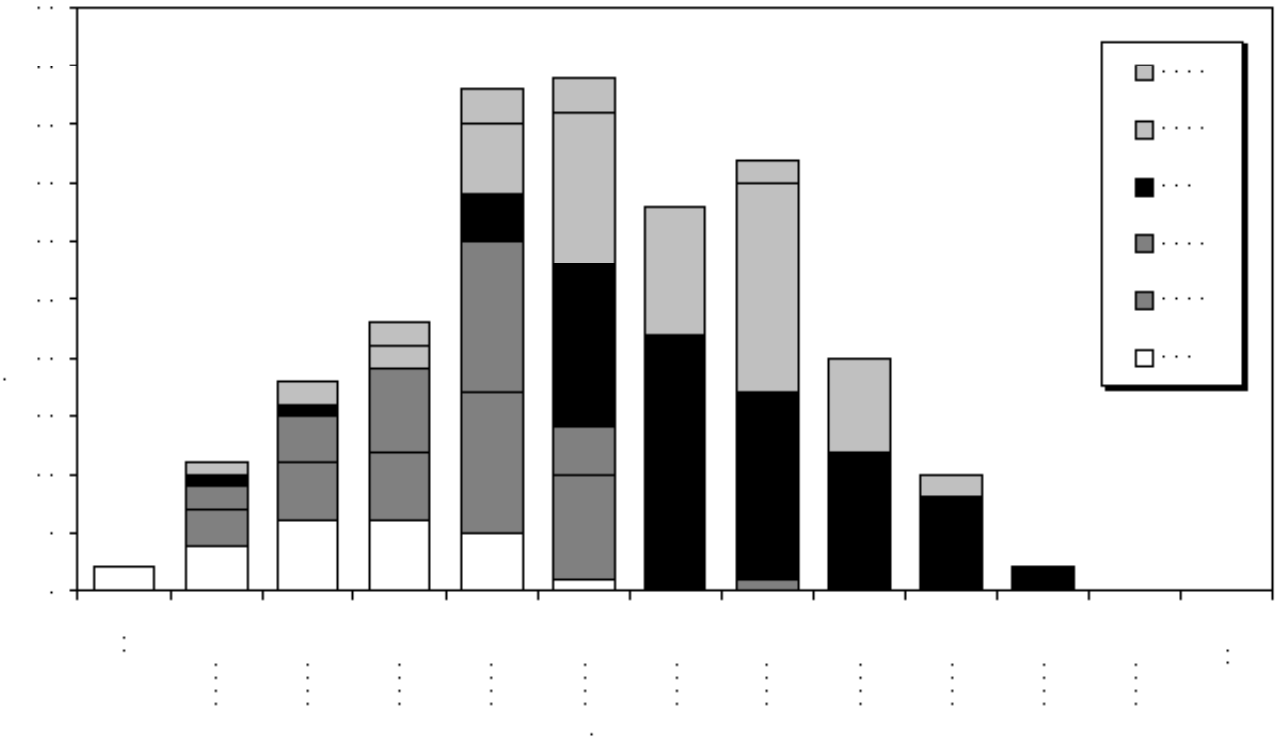

Fig. 10 The length distribution of imitation beads in various burials

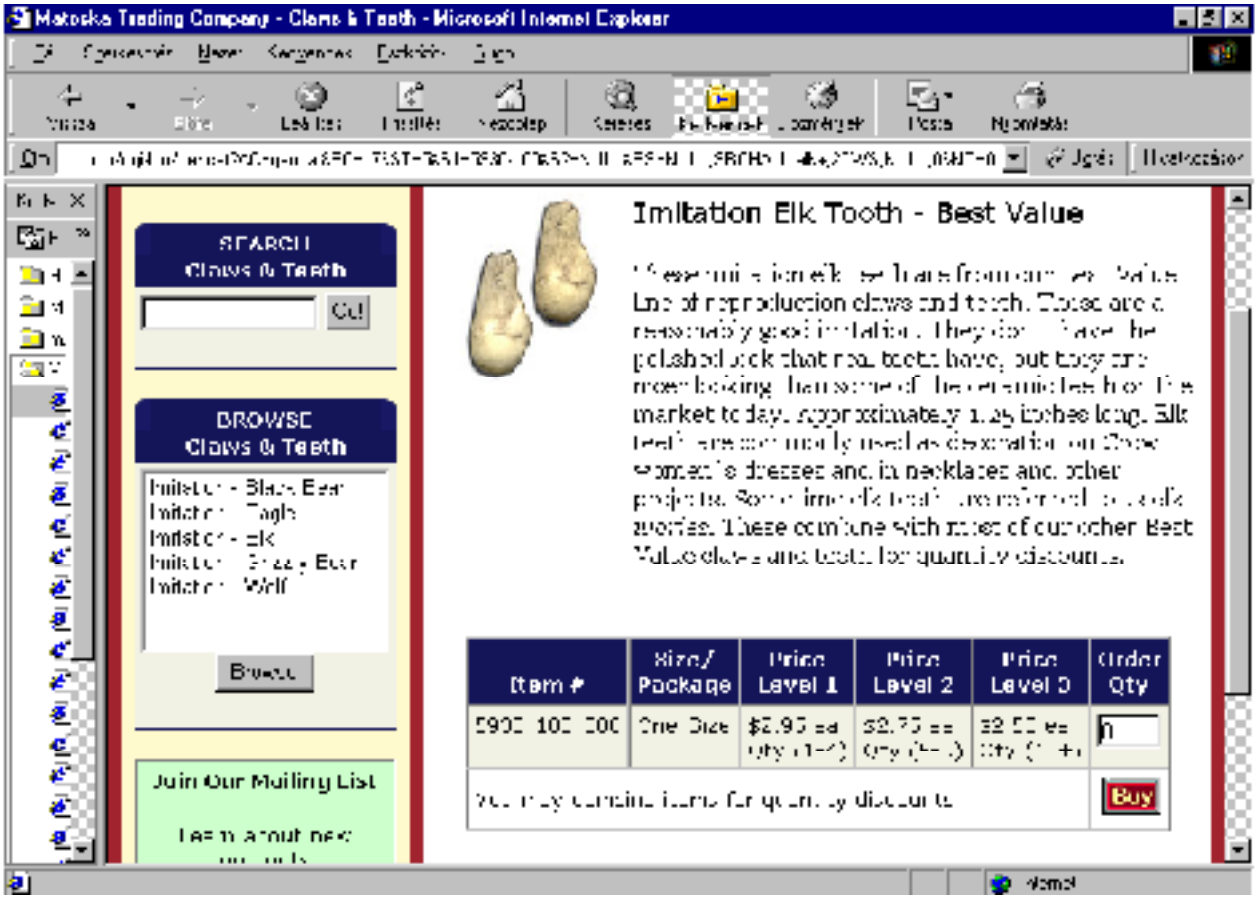

Fig. 11 Web page selling imitation elk canines