

Johnny Karlsson

*Spill: Om djur, hantverk och nätverk i
mälaronrådet under vikingatid och medeltid*

[Waste: Osseous Materials, Craft and Networks in
the Mälaren Region during the Middle Ages]

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Review by László Bartosiewicz

Johnny Karlsson's dissertation in osteoarchaeology (English title, *Waste: Osseous Materials, Crafts, and Networks in the Region of Lake Mälaren in the Middle Ages*), is an ambitious and determined attempt to use material culture to gain insight into medieval life. The category of artefacts selected is special: bone and antler objects were analyzed within the technological context of their raw material waste. This monograph therefore is emphatically multidisciplinary, exploring various aspects of medieval bone manufacturing in central Sweden.

Animal osseous materials include skeletal bone, tooth, and antler, referred to in general as 'bone' henceforth. Until the 1980s, the relatively few, highly worked bone objects found through excavation were treasured by archaeologists as *bona fide* archaeological artefacts, retained for stylistic/typological studies. Attention was but rarely paid to the precise identification of their raw materials. A good example is the unmodified reindeer metacarpus from Sigtuna saved after the 1936 excavations as a putative ice skate (Karlsson 2016:69, figure 2.31). The bulk of refuse bone, on the other hand, was typically handed over to natural scientists (paleontolo-

gists, veterinarians and so forth) with little expertise or interest in recording slight modifications on occasional fragments (workshop *débitage* and unfinished bone objects) commingled with the masses of bone more typically representing meat consumption. There has therefore been an increasingly evident niche for scholars identifying and studying humble manufacturing waste from *both* a zoological and archaeological point of view.

Seen within a broad research context, Johnny Karlsson's work combines two twenty-first century trajectories in zooarchaeology. For over 160 years zooarchaeological research has been dominated by prehistoric studies. Although in recent decades medieval animal remains have also been studied, it was the 'animal turn' in human sciences (Ritvo 2007) that directed the distinguished attention of medievalists – historians and archaeologists alike – to the cognitive significance of animals in the Middle Ages. This development created a platform for the integration of previously isolated medieval animal bone studies within a more sophisticated, archaeologically informed context. Adopting the concept of *chaîne opératoire* (operational chain; Leroi-Gourhan 1964) in bone manufacturing has resulted in the integrated analysis of both craft refuse and high-quality end products. In Sweden this approach was represented in the 1980 PhD thesis by Axel Christophersen on medieval bone manufacturing in Lund.

Karlsson's volume focuses on the medieval use of osseous raw materials in the Mälaren region, central Sweden, defined as the catchment area of Lake Mälaren, where important medieval centres evolved. Materials were studied from several sites within the settlements of Birka, Sigtuna, Nyköping, Strängnäs, and Östra Aros (present-day Uppsala). The author's aim was to capture both diachronic and geographic/spatial patterning in the procurement, manufacturing and use of osseous raw materials. The research is based on the analysis of 700kg antler and bone manufacturing waste. Even if this find material is distributed over almost three centuries between *c.* 985 and 1260 (Karlsson 2016:102) its major concentrations in time and space provide a solid basis for conclusions.

The book begins with a review of the most important schools of archaeological thought on the topic, from simple formalism to the post-substantivist approach. Zooarchaeology represents an overlap between natural sciences and research in humanities: formulating research questions and the ways materials are used in answering them are therefore of utmost importance (Karlsson 2016:9).

How does bone manufacturing waste mirror past socio-economic developments? The underlying hypothesis central to this work is that the emergence of monetary economy and a strengthening feudal system during the studied period is reflected by subtly changing trends in the procurement and manipulation of osseous raw materials as well as in the handling of the

actual end products. As social relations and practices were perpetually re-defined through time, diversity increased in social and economic functions both within and between the emerging towns in the region.

Precise zoological identification is of key importance in recognizing the circulation of animal raw materials in ever-changing regional and interregional trading networks. Some materials were evidently mundane, others must have been perceived as highly exclusive; some could be acquired by opportunistically exploiting marginal resources, others were products of long-term investment and organization. Although local elk antler constituted the bulk of the manufacturing waste, raw materials for about 30 percent of the objects identified at the island site of Birka were exotic for the Mälaren region. Even if the exact origins of imports cannot be localized, main directions from which crafts at this early centre were provisioned may be recognized. They ranged from Sami areas in the north (reindeer) to the Baltic Sea (red deer) to the Atlantic coast (whale bone), outlining southern and south-western trading relations. Appraising the intensity of imports is biased by the fact that red deer have never been exploited on the same scale as large herds of reindeer. The importance of red deer antler is shown by the fact that the entire operational chain for rings made from the antler rose of stags is represented among the finds from Birka. These culturally specific objects may have been produced by itinerant craftsmen who also brought along the raw material from the south, indirectly supporting hypotheses about the ethnic diversity of the inhabitants (Karlsson 2016:131).

Whether imported or local in origin, antler is a raw material of central interest for this study. It is grown and shed in annual cycles by elk bulls and red deer stags, as well as by both sexes in reindeer. Consequently, it is a renewable wild animal resource that can be acquired, stockpiled and traded without killing the animals. Due to intensive annual growth, the microstructure of antler is denser and more homogeneous than that of skeletal bone, rendering antler more malleable and flexible. Naturally antler can also be procured by hunting, but separated bases of shed antler in workshop refuse are usually indicative of gathered raw material. Among the elk antler finds in Sigtuna found in statistically meaningful numbers (over 500 fragments) on average only 20 percent could be identified as originating from hunted individuals (Karlsson 2016:63, figure 2.29). The author points out that there were no restrictions on collecting shed antler in medieval provincial laws or in the national law of King Magnus Eriksson. Hunting, on the other hand, could be limited by ownership on landed estates and in other special areas (Karlsson 2016:203).

A more variable pattern of antler procurement is apparent in the case of reindeer. Most of this material originated from hunted individuals. These

animals were widely preyed upon in southern Norway but possibly also originated from trade with Sami groups in northern Scandinavia.

In contrast to Birka, the earliest layers in Sigtuna are indicative of only small-scale crafting, including the manufacture of bone or antler items. The inhabitants of this important political and ecclesiastic centre also laid far lesser emphasis on trading and exchange. Early manufacturing waste shows antler working only on a household level, supplying a secluded circle of locals. Sporadically the bones of bovids and even dog were used as raw materials, representing the expedient end of the manufacturing continuum (Choyke 1997). Elk still provided the majority of the antler processed by medieval craftspeople. During the earliest phase (980–1000) reindeer antler was regularly worked, a possible sign of the same northern connections that were documented at Birka. Red deer antler, on the other hand, could be identified only rarely before small quantities became persistently present by *c.* 1020.

Declining reindeer antler use as well as scarce red deer antler working until the late twelfth century may be related to a general lull in bone manufacturing, reducing demand for imported raw materials. At the end of the twelfth century quantities of reindeer antler were processed again. Isotope signatures show that, in contrast to the forested habitats previously represented, this time reindeer antler originated from hilly regions (Karlsson 2016:76). The slight increase in reindeer antler debitage seems to coincide with the onset of coin minting at the location. Meanwhile another imported osseous substance, valuable walrus tusk, also starts appearing. This raw material is evidently of northern origin. It is thus possible that (along with most reindeer antler) it arrived from Norway during this later phase.

A diachronic increase in the accumulation of workshop refuse, reflecting a concomitant diversity of raw materials, seems to indicate increasing market demand. The spatial distribution of bone manufacturing waste reflects the roles of this craft in diverse social contexts. By the turn of the twelfth and thirteenth century bone manufacturing began to increase at urban settlements in the Mälaren region. Absolute numbers of red deer antler may have grown by this time, but they still constitute a negligible proportion of the find material. Documentary sources indicate that during this period Frisian craftspeople arrived at Birka, which may explain the presence of this exotic material (Karlsson 2016:196).

Minor deposits containing refuse from antler working in Östra Aros seem to have been left behind by opportunistic craft activity which does not match the large-scale production and spatial continuity observed in contemporaneous Sigtuna and Strängnäs. Thirteenth-century bone manufacturing refuse from Nyköping, Strängnäs, and Östra Aros is dominated by skeletal bone from livestock. This shift in raw material utilization is indicative of a social context differing from that of the aforementioned spe-

cialized crafts, which were likely associated with local elites who had relied heavily on high-value imported raw materials. At these urban sites, utilizing the bones of ordinary domestic animals seems rather related to the large-scale, possibly centralized processing of livestock during the 1200s. Early urban craftspeople operated on the level of households depositing waste inside living quarters. By the late twelfth century workshops appear to have been opened outwards to the streets. Changing relationships between the artisans and townsfolk are reflected in the spatial distribution of manufacturing refuse. Artefacts are no longer produced only for domestic use. They are being increasingly supplied to the public.

In Strängnäs bone manufacturing waste reflects patterns similar to those observed in Sigtuna. Bone working is continuous between the eleventh to the early thirteenth century. However, the *en masse* use of bones from domestic animals does not emerge until the turn of the thirteenth and fourteenth century. In Nyköping the situation was markedly different during the early thirteenth century. Cattle were butchered and processed in a designated city block. Hides and bone were utilized at this site as well, giving the impression of a near-industrial operation. In the meantime evidence of systematic antler manufacturing is missing.

At sites in Östra Aros, the majority of manufacturing waste originates from elk antler, with sporadic remains of reindeer antler. The taxonomic diversity in the material reflects antler trade, which develops during the second half of the twelfth century, also yielding some finds of red deer antler. Possibly due to settlement structure, bone working at Östra Aros does not display the same spatial continuity as observed in Sigtuna and even Strängnäs. By the thirteenth century, concentrations of antler waste give place to sporadic deposits created by bone working. The remains recovered here included fragments of walrus tusk and a modified dolphin vertebra, two medieval finds unusual in the region. However, the bulk still consists of cattle metapodia widely used in comb making.

Specialized medieval bone manufacturing is in general characterized by carefully planned, often composite end products at the 'high end' of the manufacturing continuum. Combs are dominant representatives of this category in the material studied. Antler and bone combs were used in all segments of society as a personal possession throughout the discussed period. They were sought after and mass-produced in Birka. In addition to the use of locally available elk antler, strong market demand sustained the import of antler from deer species exotic to the region. Subsequently, this craft was provisioned with skeletal bone from butchered livestock in newly developing urban centres. Written sources in Sweden reveal no viable information on comb makers, although contemporaneous Norwegian documents contain some references to this craft. Combs were a cheap commodity but

marketed in quantities at a time when the quality of individual design on combs was on a decline (Karlsson 2016:206). This can be seen as the commoditization of bone artefacts (Kopytoff 1986): as these products became increasingly common, they became less distinguishable from one another from a consumer's point of view.

How can these trends in material culture be translated into a historical narrative? Understanding past choices made between the changing pool of raw materials and end-products of highly variable sophistication requires both osteological expertise and archaeological insight. Taxonomic, temporal and spatial patterns observed in the raw material base illustrate how crafting traditions and scales of local as well as regional exchange were affected by the development of both economic and societal factors. A marked diachronic trend emerging from the study is the replacement of antler from cervids (especially omnipresent elk, a local resource) by skeletal bone from domestic livestock. This was almost certainly the result of declining elk populations due to deforestation caused by urban expansion: high concentrations of townsfolk could be sustained only by cultivating previously wooded areas.

Antler working and the manufacturing of objects from ordinary bones are also associated with different social contexts. During the thirteenth century competition intensified for feudal control over the human population and other resources in the Mälaren region. The monopolistic positions of Sigtuna and Strängnäs were challenged by newly emerging urban settlements. In addition to marked changes in the cultural landscape, consolidating the privileges of landed nobility, such as hunting rights, led to restricted access to antler, a high-quality raw material widely available in the past. Easy access to bones from butchered animals concentrated in towns explains the shift to this less costly material. The find material from Sigtuna stands out as established towns maintained their social practices. While new towns with extensive rural hinterlands began emerging in the region, Sigtuna remained a high-status centre. The manufacturing of antler was supported by both religious and secular elites until approximately 1300. Urban bone manufacturing waste mirrors new social relationships and the large-scale commodification of domestic animals and their products.

Trends observed in the manufacturing refuse from Sigtuna suggest that this craft was primarily influenced by social agency rather than purely economic considerations. Although direct causality would be difficult to prove, qualitative and quantitative changes in bone manufacturing are paralleled by the increasing circulation of minted silver coinage, a clear sign of external trading contacts.

By the thirteenth century bone manufacturing waste displayed a tantalizing diversity in the studied towns. In the new urban contexts this vari-

ability mirrors the heterogeneity in social and economic functions within and between the towns in the region. This may be seen as a general tendency in the Middle Ages, driven by the relationship between newly emerging urban centres and their hinterlands. Such changes occur at different times across Europe, but the underlying mechanisms of socio-economic transformation are similar. Among others, Johnny Karlsson cites the example of Hedeby in modern Germany, where antler manufacturing dominated, while in neighbouring Schleswig, craftspeople relied overwhelmingly on processing skeletal bone from livestock, a by-product of butchering operations (Karlsson 2016:202). By the thirteenth century, bone manufacturing in the Mälaren region began appearing outside the elite quarters in towns linked to animal trade such as Nyköping and Östra Aros and subsequently Strängnäs and Sigtuna. This is a clear sign of spatial differentiation within urban areas under the influence of societal change.

Centuries of development and functional and structural changes in urban space also affected attitudes to rapidly accumulating waste. An interesting phenomenon regarding medieval microenvironments is the observation of rodent gnawing marks on the waste material indicating the presence of rats both inside and outside houses (Karlsson 2016:103). Statutes in King Magnus Eriksson's contemporaneous urban law ascribe responsibilities of waste disposal to house owners (Karlsson 2016:209). Working with mostly collected antler was not a source of particular pollution in the proximity of elite centres. The source of skeletal bone used in manufacturing, on the other hand, was the mass-processing of animal carcasses. The crafts of butchers and tanners were notoriously polluting even by relatively low standards of medieval hygiene. In medieval England, urban tanning was gradually moved to manufacturing centres outside densely inhabited areas (Albarella 2002:80). If, as Johnny Karlsson suggests, comb-makers were included in a broader craft identity of specialists who processed carcasses of livestock, new efforts of waste management may be reflected by the conspicuously small and spatially dispersed accumulations of bone manufacturing refuse at urban sites.

Why is this book of interest? The scenario outlined through the analysis of medieval bone manufacturing in the region of Lake Mälaren shows both local developments and general tendencies. It helps elucidate trends in the handling and exploitation of raw materials as a proxy for socio-economic and cultural change. Although the book is written in Swedish, the 210 pages long work is followed by a detailed nine-page summary in English. The list of references contains over 250 entries, covering all the important literature relevant to the topic.

The volume is richly illustrated. Given the technological aspects of the research and the author's fundamentally positivist approach to the data,

concise visual representation is an important tool in clarifying the results. Most of the 129 figures illustrate the discussions of individual sites. Over half of them (71) are related to the analysis of sites in Sigtuna, the settlement best represented among the assemblages available for study. Basic types of manufacturing waste as well as end products are presented mostly in colour photographs. The images also include diagrams and site plans. The latter are indispensable for understanding the spatial distribution of bone manufacturing waste. These features make Karlsson's work accessible to specialists beyond Sweden. Much of the content is of international interest, because – as has been successfully demonstrated by the author – archaeologically informed analyses of medieval bone manufacturing can be highly relevant to better understanding the Middle Ages across Europe.

References

- Albarella, U. 2002. Tawyers, Tanners, Horn Trade and the Mystery of the Missing Goat. In: Murphy, P. & Wiltshire, P. (eds). *The Environmental Archaeology of Industry: Symposia of the Association for Environmental Archaeology*, pp. 71–83. Oxford: Oxbow Books LTD.
- Choyke, A.M. 1997. The Bone Manufacturing Continuum. *Anthropozoologica*. Vol. 25–26 pp. 65–72.
- Christophersen, A. 1980. *Håndverket i forandring: Studier i horn- og beinhåndverkets udvikling i Lund c:a 1000–1350*. Bonn: Habelt.
- Kopytoff, I. 1986. The Cultural Biography of Things: Commoditization as Process. In: Appadurai, A. (ed.). *The Social Life of Things: Commodities in Cultural Perspective*, pp. 64–91. Cambridge: Cambridge University Press.
- Leroi-Gourhan, A. 1964. *Le Geste et la Parole: I, Technique et langage*. Paris: Albin Michel, coll. Sciences d'Aujourd'hui.
- Ritvo, H. 2007. On the Animal Turn. *Daedalus*. Vol. 136(4) pp. 118–122.