

RAW MATERIALS AND URBAN COMB MANUFACTURING IN MEDIEVAL SCANDINAVIA

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Summary

Large quantities of waste reveal where the workshops of comb makers were located in medieval towns. Fragments of bone and antler tell us from what species the raw materials came and how the supply was organized. In the 11th and 12th centuries, antler was the dominant raw material for combs, usually from local populations of elk or red deer. However, there is at least one example where reindeer antler, transported from afar, was clearly preferred over local resources. During the 13th century there was a general change in the nature of the raw material to more bones from domestic animals, especially cattle and horses.

Résumé

Matières premières et fabrication de peignes en Scandinavie médiévale.

De grandes quantités de déchets révèlent l'emplacement des ateliers de fabrication de peignes dans les villes médiévales. Les fragments d'os et de bois nous indiquent de quelles espèces animales venait la matière première et comment l'approvisionnement était organisé. Aux XI^e et XII^e siècles, le bois était la matière première principale. Le bois d'élan ou de cerf venant de la population locale de gibier constituait la majeure partie de la matière première. Il y a cependant au moins un exemple où l'on a préféré aux ressources locales des bois de renne venus de loin. Au XIII^e siècle, la qualité de la matière première a changé de façon générale. On a préféré des os d'animaux domestiques, surtout de bovins et de chevaux.

Zusammenfassung

Rohmaterial und städtische Kammherstellung im mittelalterlichen Skandinavien.

Große Mengen von Abfallmaterialien zeigen, wo die Kammhersteller in den Städten ihre Werkstätten hatten. Die Knochen- und Geweihfragmente zeigen uns, von welchen Tierarten der Rohstoff stammt und wie die Rohstoffversorgung organisiert war. Im 11. und 12. Jahrhundert war Geweih aus örtlichen Hirsch- und Elchpopulationen das wichtigste Material zur Kammherstellung. Es gibt aber auch ein Beispiel dafür, daß man importiertes Rentiergeweih den lokal verfügbaren Rohstoffen vorgezogen hat. Im 13. Jahrhundert hat sich der Charakter der Rohstoffe geändert. Zu dieser Zeit hat man vermehrt die Knochen von Haustieren, bevorzugt von Rind und Pferd, verwendet.

Key Words

Scandinavia, Middle Ages, Comb manufacturing, Raw materials.

Mots clés

Scandinavie, Moyen Âge, Fabrication de peignes, Matières premières.

Schlüsselworte

Skandinavien, Mittelalter, Kammherstellung, Rohstoffe.

Meat, milk, wool, skins and labour - this is the usual way of considering the uses man had for animals in early times. However, one of the most important raw materials used in the manufacture of a number of everyday objects is taken from the animal world. This is not least apparent when carrying out archaeological excavations in the cultural layers in medieval towns where combs, pins, knife handles, dice, playing pieces and spindle whorls made of bones from domesticated animals or antler from wild animals are the most common finds. Traces left from manufacturing activities, mainly of combs, are also found (fig. 1). Dis-

carded remnants, half-finished products and unsatisfactorily made objects show where the towns' workshops were located. Through osteological analysis of the thousands of pieces of waste from the rubbish heaps, it is possible to determine the raw materials used by the comb makers. Unfortunately, today, there are only a few comprehensive collections of material from comb making from a few medieval towns in Sweden that have been totally analysed osteologically. However, from these towns - Skara, Kungahälla and Lund (fig. 2) - there is detailed and comparable information on the nature and composition of the raw mate-

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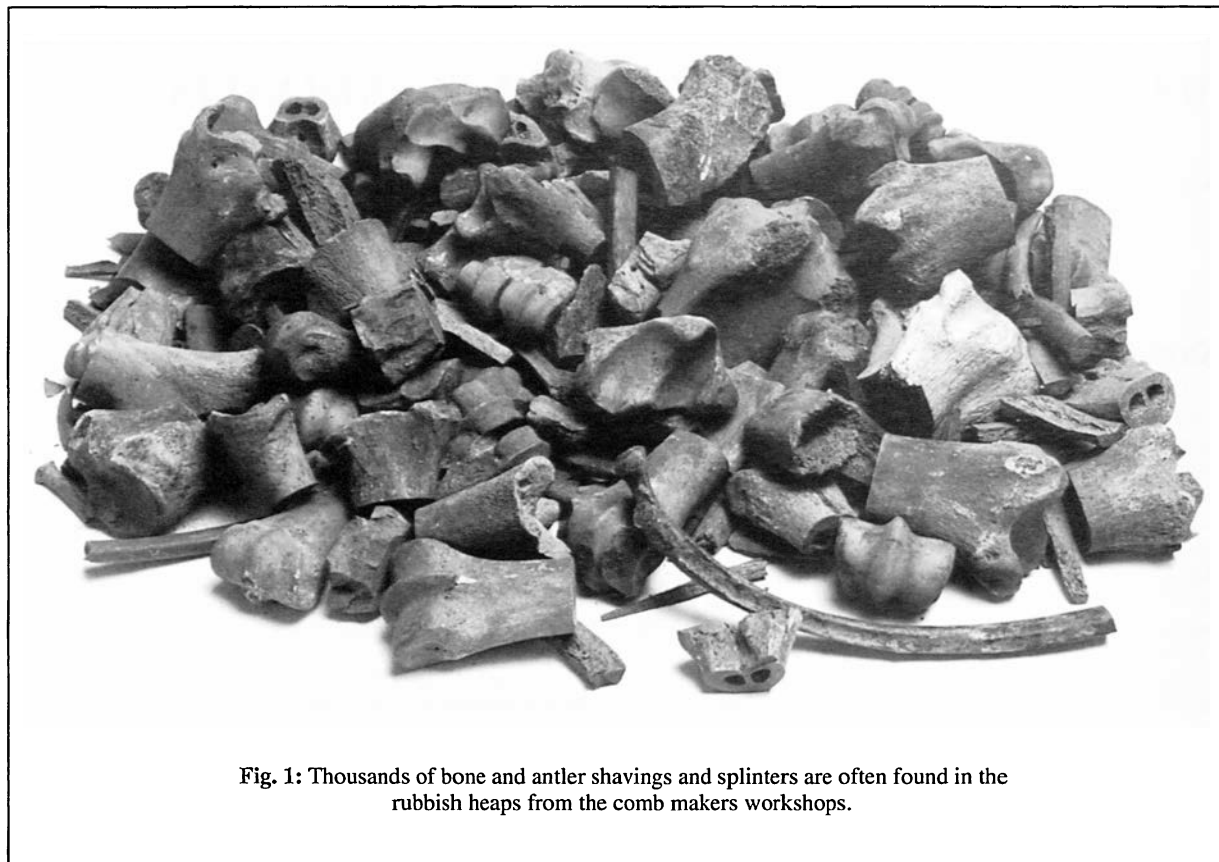


Fig. 1: Thousands of bone and antler shavings and splinters are often found in the rubbish heaps from the comb makers workshops.



Fig. 2: Through the centuries, the national boundaries in Scandinavia changed several times. During the medieval period, Lund belonged to the Danish Crown and Kongahälla to the Norwegian. On the other hand, throughout history, Skara was and always has been Swedish. The map shows the medieval boundaries of Sweden, Denmark and Norway.

Combs of antler and bone

Generally speaking, in medieval towns, the use of bone and antler as raw materials in crafting can be divided into different phases. In the earliest phase (1000 to the mid 1100s) the nearly dominating raw material was antler from wild animals. The local fauna determined the dominating deer species (tab. 1). Consequently, in Denmark, antler from red deer was mainly used, while in Sweden, elk antler was the main raw material. In the following phase (late 1100s to mid 1200s) bones from cattle and horses increased in use to such a degree that it became the completely dominating raw material towards the late 1200s.

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During the 1300s evidence of the use of antler as raw material is normally only sporadically seen (tab. 2).

Different cooperating factors contributed to this development. Both the elk and red deer populations decreased in size during the medieval period which, for example, is reflected in the hunting restrictions placed on wild animals (elk red deer and roe deer) which began during the 13th and 14th centuries. This kind of hunting came to be principally

restricted to the king and his closest circle. At the same time, an increasing trade in food in the growing towns resulted in a good supply of cheap raw materials available through the butchers and tanners. The transition to working with bone from butchered animals from deer antler became the natural solution to the problem of the availability of raw materials.

There are at least two clear disadvantages involved making combs of bone instead of antler. In the first place, it

Table 1: Relative distribution of the number of antler fragments in the comb debris from the period ca 1000-1150 shown according to species.

	Lund	Skara	Kungahälla
Red deer	97.7	< 0.1	3.7
Elk	0.6	99.8	2.7
Reindeer	1.7	< 0.1	93.6
Roe deer	< 0.1	< 0.1	0.0
Total number	6297	2026	8046

Table 2: Relative distribution of antler from wild animals and bone from domesticated animals in the debris from comb maker's workshop in the three different chronological layers in Skara. The calculations have been made on the number of fragments per category.

Chronological layers	Domesticated animals bones	Wild animals antler	Total number
AD 1100-1150	11.8	88.2	69
AD 1180-1250	29.6	70.4	2767
AD 1290-1320	1.7	3.3	478

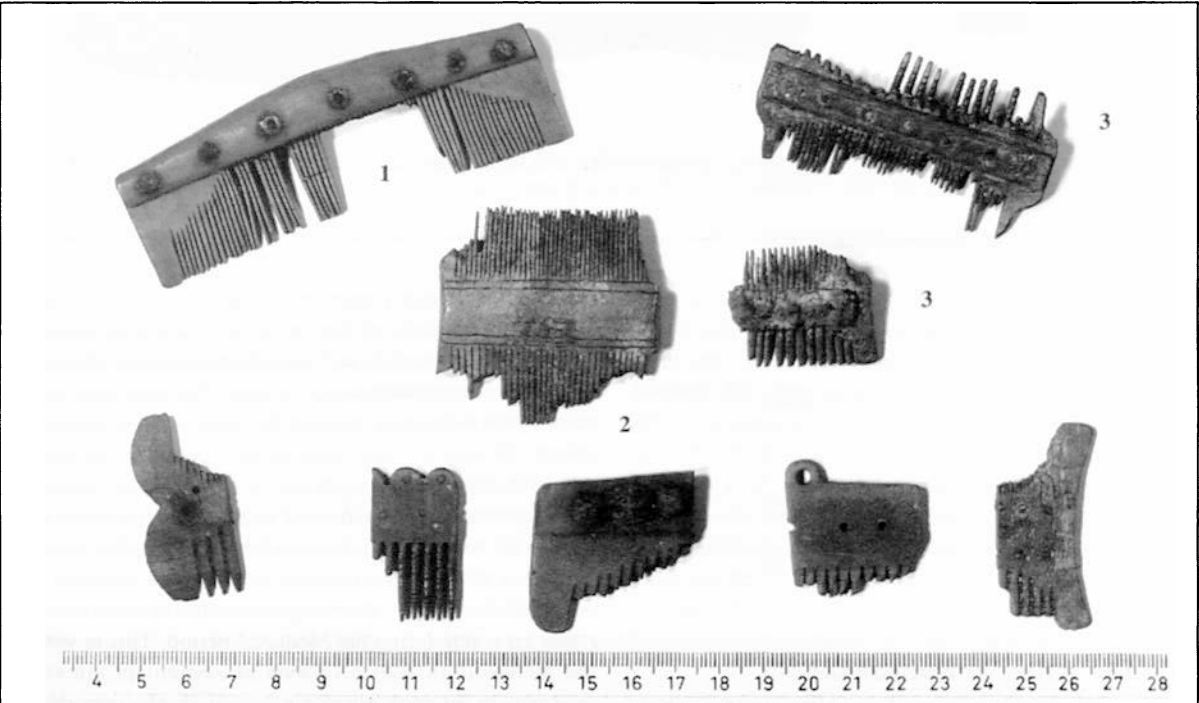


Fig. 3: Medieval combs can be divided into three main types. The earliest was the single comb (*enkelkam*, Sw; 1). During the 1100s even the double one-piece comb (*dubbelhelkam*, Sw) is known (2). A new type appeared in the 1200s, the composite double comb (*sammansatt dubbelkam*, Sw; 3), which combined the advantages of both the earlier types, namely teeth with varying density and composed of several pieces.



Fig. 4: In the Norwegian town of Kungahälla, reindeer antler was the primary raw material used for making combs. Discarded pieces of scrap antler are partly poorly utilized which implies that a good supply of antler was available.

is not possible to extract pieces from bone that are as large as the ones that can be extracted from a deer antler. Therefore, combs sawed out in one single piece (one-piece combs *dubbelhelkamm*, Sw.) were unusual. Instead, combs made of many smaller pieces (composite double combs, *sammansatta dubbelkamm*, Sw.) quickly became increasingly common during the 1200s (fig. 3). The second disadvantage was that bone combs were less durable than antler combs. This implies of course that the demand for combs increased, a situation which favoured the comb makers as handicraftsmen.

Reindeer antler in Kungahälla

It is clear that the comb makers in the Norwegian town of Kungahälla did not follow the same development in their craft that otherwise took place in Sweden and Denmark. In contrast to the comb makers in the other towns, in Kungahälla antler from the local resources of wild animals was

used only extremely marginally. Kungahälla lay in the southernmost periphery of the medieval Norwegian kingdom in the modern Swedish province Bohuslän only about 110 km directly south southwest of Skara. The local deer population ought to have been about the same as in Skara, that is mainly elk with a certain appearance of red deer. However, the comb makers in Kungahälla have preferred to use reindeer antler which is evidenced in the fact that more than 90% of the waste material comes from reindeer (fig. 4).

What was the origin of the reindeer? In Sweden, and above all in Norway, there was a surplus of wild reindeer rather far south during the Medieval period. This is seen in the archaeological excavations of settlement sites, for example, in the high mountain massif Hardangervidda in southern Norway (Kjos-Hanssen, 1973). The reindeer antler found in Kungahälla probably originated from just that area. The shortest distance between the southern part of Hardangervidda and Kungahälla is 300-400 km. If the

antler was transported by boat, the transport itself ought not to have been the greatest obstacle. The first phase in this process of supply, namely the task of obtaining the antler in Norway surely must have been the most difficult.

Collecting shed antlers

There are two methods for obtaining reindeer antler - either cutting the antlers off a butchered animal or collecting antlers that have been shed. The majority of the rose wreaths from Kungahälla come from antlers that had been shed which shows that crafting in antler was based on the collection of shed antlers. In this respect the result from Kungahälla agree with the results from both Skara and Lund where the amount of shed antlers clearly dominates over the amount of antler obtained from hunting elks and red deer respectively (tab. 3).

Table 3: Relative distribution of shed antler and antlers taken from butchered animals found in the comb material.

Town/species	Shed antlers	Antlers from butchered animals	Total number
Skara/elk	75.0	25.0	16
Lund/red deer	71.0	29.0	314
Kungahälla/reindeer	97.7	8.3	84

Regarding the question of the use of shed antlers, there are certain advantages in using antlers from reindeer instead of elk or red deer antlers. Greater amounts of antlers could be found in the same area, because both reindeer cows and bulls have antlers, and because of the fact that reindeer live in flocks. Regardless of species, however, very good knowledge of the animals' patterns of movements during the shedding period is necessary. As a rule, bulls shed their antlers during the period January-March. The considerably smaller antlers of the cows are shed first after giving birth to their calves in May. The reindeer antlers from Kungahälla are well-developed and robust and therefore they can nearly exclusively be supposed to have come from bulls.

Consequently, collecting antlers sufficient for a whole year's production, took place during the late winter/very early spring. It was important to find the shed antlers before they spoiled. At least in the case of reindeer, we know that the animal itself eats the antlers, probably because they contain large amounts of calcium. It is apparent that the collection of shed antlers worked and was sufficient as long as the production of antler objects was kept at

a reasonable level in relation to the supply of raw materials. When the demand for combs increased in the successively growing populations in the 13th century towns, a gradual change was made to the greater use of bones from domesticated animals. This is true except for Kungahälla where unlimited transports of reindeer antler continued. This implies that the supply of reindeer antler was considerably greater than the supply of antler from elk and red deer.

Bones from domesticated animals

There is no doubt that when the comb makers moved to using bone instead of antler, the dominating bone type was metacarpal and metatarsal from cattle (fig. 5). The reason for this, of course, was the supply. These bones were located in the animal's lower extremities which were scarce in meat and which were cut off at the time of butchering. Each butchered animal yielded a total of four such bones. The radius and tibia, which actually are more favorable with larger flat areas, are on the contrary to the former, located in the more meaty parts of the extremities. Therefore, as a rule, they were damaged upon primary butchering in addition to being left in the meat during preservation and preparation. This impaired the quality of the bones and made them less suitable for further use.

The advantage of using horse bones, however, is somewhat different. Suitable bones from the meaty body

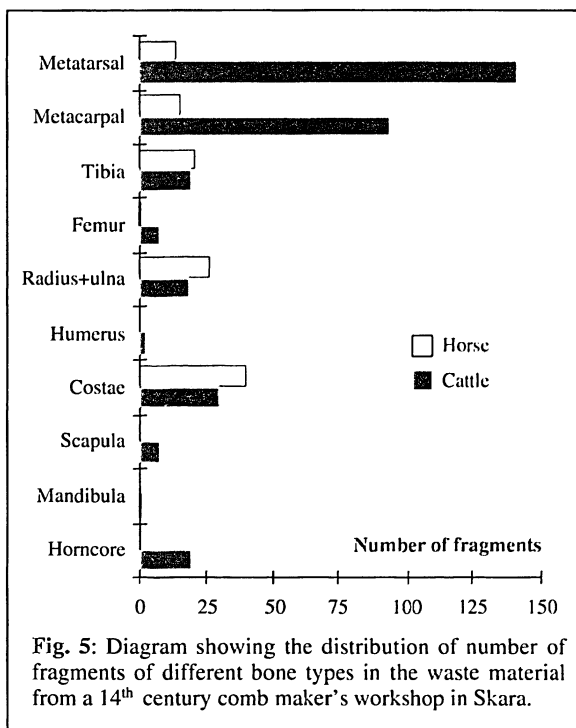


Fig. 5: Diagram showing the distribution of number of fragments of different bone types in the waste material from a 14th century comb maker's workshop in Skara.

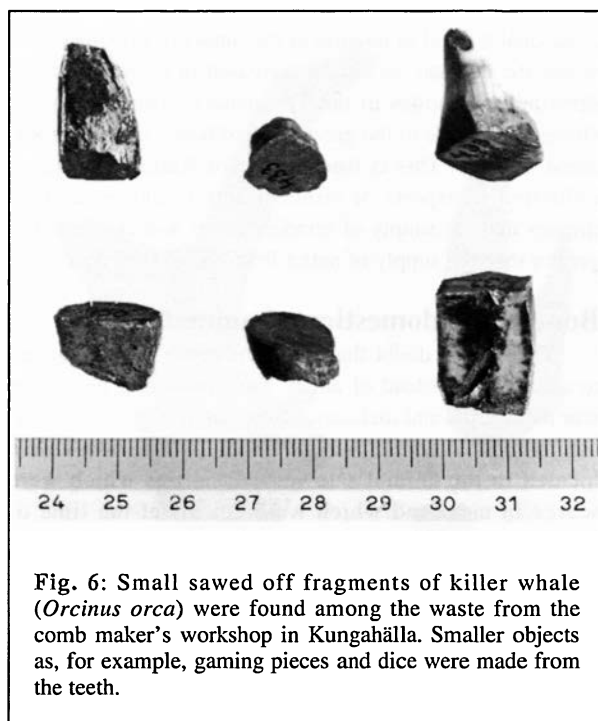


Fig. 6: Small sawed off fragments of killer whale (*Orcinus orca*) were found among the waste from the comb maker's workshop in Kungahälla. Smaller objects as, for example, gaming pieces and dice were made from the teeth.

parts sometimes appear among the spill in equal quantities as bones from parts of the body that are poor in meat (fig. 5). This is because horse meat was not eaten during the Medieval Period. Thus it made no difference where the bones were located in the body, the large meaty parts were still not utilized.

Horse bones were probably more desirable as the raw material for bone crafting because of its more robust structure and, compared to cattle bones, larger flat areas. The supply was limited however as not nearly as many horses were butchered as were cattle. The relationship between cattle and horse bones in the waste left from crafting is approximately 7: 3.

Marine mammals

Sometimes the comb makers's heaps of waste contain pieces from more unusual raw materials as walrus tusks (*Odobenus rosmarus*), killer whale teeth (*Orcinus orca*) and whale ribs. It was mainly in Kungahälla that the more costly raw materials were used in making other objects than combs. Rib bones from whales have a thick compact layer with large areas of bone suitable for making larger objects as, for example, weaving knives or cases. Teeth from killer whales are compact and very suitable for smaller objects as gaming pieces, dice, handles and buttons (fig. 6). In Kungahälla, fragments of teeth from killer whales have been found relatively evenly distributed throughout all the chronological layers. This indicates that the use of these teeth was not temporary but was something that continually reappeared in connection with the production of a small number of more exclusive objects. The situation was the same for walrus tusks which were seldom found in larger quantities.

Whaling took place mainly in the waters off of northern Norway, although the majority of the highly valued walrus tusks come all the way from Greenland. The tusks were the most important ware in the trading exchange between the Norwegian colony on Greenland and Norway, via Iceland. The sawed off tusks, together with other valuables as white falcons and polar bear skins, reached buyers many hundreds of kilometers away. Products from northern Scandinavia and Greenland were apparently well worth the enormous risks which sailing the open seas and the dangerous northern waters meant.

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