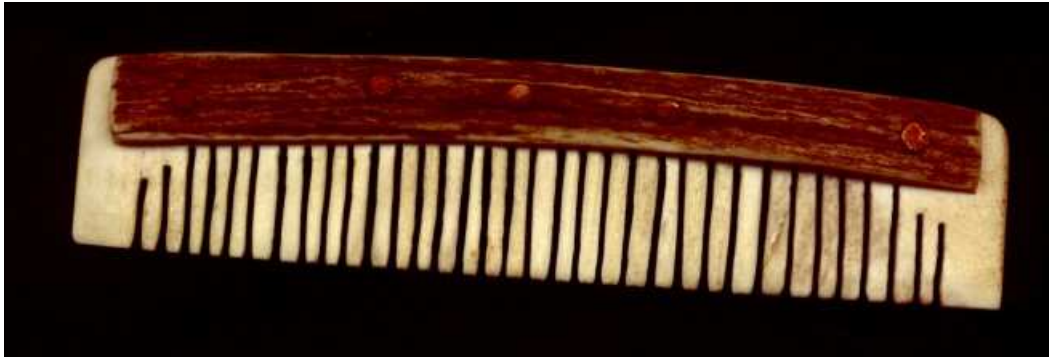


VIKING COMB

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by

Danr Bjornson

Summary

Viking hair combs have been found dating from the 9th to 15th century all over Scandinavia. The primary material is antler, due to its strength, but a few combs of bone and wood are also recorded. The tools used have much in common with carpentry and blacksmithing. The manufacturing and artistic style of these combs are very similar all over the Viking world, suggesting that at least some of these craftsmen traveled. Most of the evidence used for this project comes from the Coppergate, Bedern, and Piccadilly sites in present-day York, specifically from the 10th and 11th century finds.

My primary source was the archaeological document Bone, Antler, Ivory, and Horn from Anglo-Scandinavian and Medieval York by A. MacGregor et. al. It includes many construction details and technical information that the "generic Viking history" books lack.

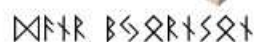
The method of fabrication is summarized in my drawing below. I chose to leave the natural antler surface on the side plates instead of filing them down and carving decorations. I also chose to use copper for the rivets instead of iron, because it is easier to work.

1. Cut side plates from a long section of straight antler beam. The length of this piece determines the approximate length of the comb. The side plates have a semi-circular cross section.

2. Cut tooth plates from short sections of straight antler beam. The length of the plates is the height of the comb, and it is best to overestimate this due to sanding down the edges later. The short sections used for tooth plates are best cut from less straight beam sections not suitable for side plates.



3. Put a final shape and sanding on the side plates prior to final assembly, because the rivets will prevent this later. Clamp the tooth plates between the side plates, drill and rivet. The Viking craftsmen put rivets on the joins between interior plates in order to get a lighter comb with fewer rivets. After flattening the rivet heads, sand or scrape the final edges, cut the teeth, and sand or scrape the edges of the teeth. Geometric designs on the side plates were popular as decoration.



My father-in-law assisted by teaching me to use his bandsaw. He also showed me to make and set rivets using wire as a raw material.

A few things went wrong that I could have done better. I used some tooth plates that were cut too close to the spongy center of the antler, which gave them a somewhat rough surface. I also broke a tooth while rounding the edges and had to glue it back on.

Main Documentation

There are many archaeological finds of combs in the Viking world. I have chosen just a few, those that provide the best information about how these combs were made.

First is the drawing from page 1924 of MacGregor. This picture shows an assortment of combs from the 10th, 11th, and 12th century layers of the Coppergate site in York. They are all single-sided (teeth on one side), and consist of narrow tooth plates sandwiched between side plates of semi-circular cross-section and held by rivets. The spaces between the teeth are nearly uniform but not perfect. A few stray saw marks show that the teeth were cut after being riveted. The teeth are usually not cut all the way to the ends, presumably for greater strength. The rivets are spaced on the joins between tooth plates wherever possible (1931). The backs of the combs have a curved shape, but the inside may be curved or straight. Some faces of

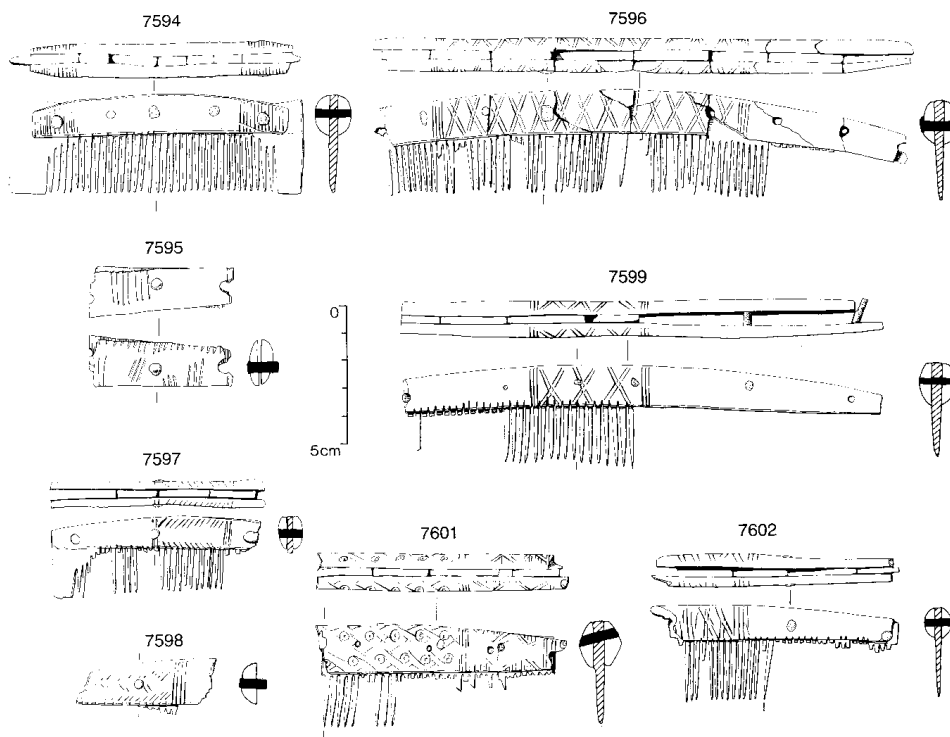
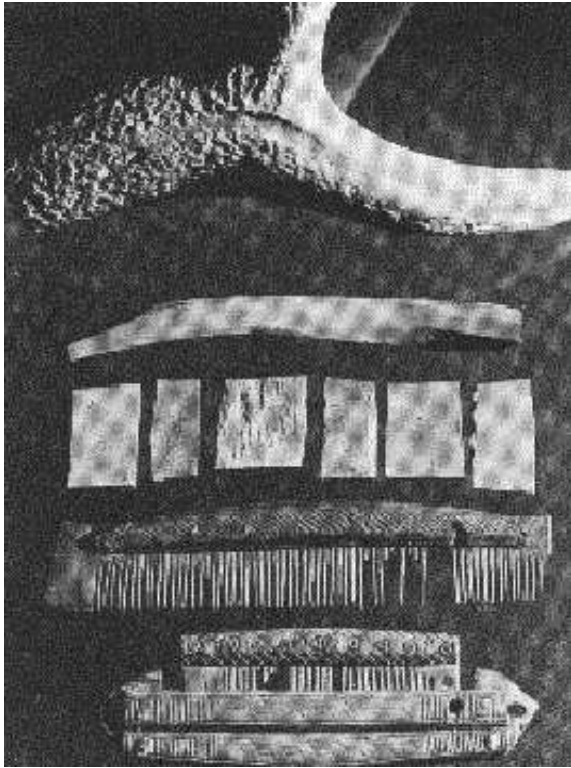


Fig.888 Single-sided composite antler combs from 16-22 Coppergate, Period 4/5 (7594-5), Period 5Cf (7596) and Period 5Cr (7597-9, 7601-2). Scale 1:2

the comb have decorations made by saw cuts, usually in a variety of geometric patterns. The MacGregor book has many more drawings and photos of combs, but this picture shows the common characteristics of the majority of the combs and fragments found.

MacGregor also goes into great detail as to the frequency of different styles, materials, and decoration among the many finds. The average comb was single-sided, decorated with saw cuts in a pattern of lines, and had a curved back.



Sawyer shows a nice photo of combs, antlers, tooth plates, and other raw materials on page 107 which is shown to the right. These items date to 12th-century Dublin. The raw materials shown here look very similar to the raw materials left from making my comb.

Sawyer also quotes from an Irish poem of that time in which the taxes due the church were listed. These taxes included, "a comb from every comb-maker," (107). If the craft was important enough to be taxed by the church, it is likely that comb-making was a skilled and respected trade.

There are numerous pictures of combs in my half-dozen other Viking books, but none provided any additional information useful in constructing the combs.

Process and Materials

The majority of combs were made of antler, usually red deer. I selected a piece of elk antler because it is close to the size of the antlers used by the Vikings (MacGregor 1907), and because it was all I had at the time. For the rivets, I chose 16-gauge copper wire because it was easier to work than iron and I had never made rivets before.

I made all cuts on a band saw under the instruction of my father-in-law. The Viking craftsmen used a hand saw, of which a few survive. I did not wish to waste antler and so chose the greater degree of control available with the bandsaw.

First, I cut a long piece of antler beam. Choosing the straightest side, I cut the side pieces from opposite sides of the beam. If you sight down the back, you can see the wavy shape of the original antler, even though the tooth plates lie straight as seen by sighting down the teeth. These pieces began 1/4 of an inch thick and nearly 3/4 inch wide, but sanding reduced their width. I found it easiest to sand them by clamping them together, thereby making them uniform in size and shape. In the process of sanding I removed the thin edges. I prefer the natural look for my work, so I decided to leave the natural antler surface, rather than sanding it off and carving the surface beneath as the Viking craftsmen did. Its appearance is similar to wood grain and gives a pleasing grip for the user.

Next, I cut this antler beam and others into shorter sections suitable for tooth plates. These plates were about 1 1/2 inches long. In a few cases, I underestimated the length desired and had to scrap those tooth plates. The curved back of the comb helped lead to this error, and in the future I can avoid this with more careful planning. I cut the tooth plates 3/16 inch thick. Then I sanded each one to take off the thin edges resulting from sawing out of a circular cross-section and make their edges parallel. When cutting the tooth plates, I had to avoid the soft inner core of the antler, and the scrap left over from the project illustrates how soft this core material is.

When all the plates were cut, I laid them out to find the longest ones that were free of flaws and would fit well between the side plates. Again, careful measurements would have helped somewhat, but I was measuring "by eye" as the craftsmen would have, though I lack their experience. I had to reject plates cut too close to the surface, because they had too many of the undulations found on the antler surface. In fact, the tooth I would break later broke along just such an undulation.

Having chosen the tooth plates I wanted, I put the widest ones on the outside. The end plates are important because they have to withstand a rivet through their center, as contrasted with the other plates, which generally get rivets through their edges. These plates would also lock all the other plates between them and be subject to stress where they protrude beyond the side plates.

I clamped the tooth plates between the side plates. This was tricky because I wanted to line up the tooth edge of the plates, which is more visible than the back edge hidden between the side plates. I drilled the holes on the drill press, because of the finer degree of control than with the hand brace, which the Viking craftsmen would have used. I used clamps to hold the assembly together while drilling. After I drilled each hole, I riveted it prior to drilling the next hole. This ensured that nothing had a chance to slip or loosen while I was moving clamps around.

For the rivets, my father-in-law showed me how to make rivets from wire. I used 16-gauge copper wire because it is softer and easier to work than the iron used by the Vikings. After slipping a piece of wire through the hole, I tapped the ends into a mushroom shape with the hammer. I alternated between beating the center, to make the rivet shorter and fatter, and beating the sides of the rivet head, to make a rounded dome shape. This technique is easy and allowed me to shape both ends of each rivet and tighten it into the hole. I riveted two waste tooth plates together for practice and then used the same procedure for the combs.

When all the rivets were in, I sanded the edges to shape. This included rounding the back where the tooth plates protruded, giving a nice shape to the end plates, and making a smooth straight surface where the teeth would be cut.

Next, I marked where the teeth would be cut. I had to take into account the size of each tooth plate, the thickness of the saw blade, and the overall uniformity of appearance. Because the tooth plates are slightly different widths, the spacing of the teeth is not exactly uniform. It is, however, close enough to fool the eye except under close examination. The original Viking comb teeth were spaced in exactly the same way. I cut the teeth on the band saw, making the end teeth shorter to lend extra strength to those end plates.

The last step was to smooth the teeth. This was the most time-consuming portion of the construction, because of the delicacy of the teeth and their number. I rounded the edge with sandpaper, and attempted to carve the corners off of each tooth with a sharp knife. Carving the edges with the knife worked fine, until I broke one of the teeth doing so. I glued it back on and continued smoothing the teeth with sandpaper. The Viking craftsmen are presumed to have used small files for this work.

After this minor accident, I simply smoothed the teeth and did not sand them down to a tapered shape such as that found on most Viking combs. The non-tapered shape is slightly stronger and seems less susceptible to breakage.

This comb took three hours to build and cut the teeth, and about 6 hours to finish the teeth. I made it for my lady, and it will add a great deal of authenticity to her regalia.

Sources

MacGregor, A. et. al., [Bone, Antler, Ivory, and Horn from Anglo-Scandinavian and Medieval York](#), York Archaeological Trust for Excavation and Research, 1999. ISBN 1-872414-99-0. This book goes into great depth about its very specific topic. While its academic inspirations do not make exciting reading for most, the discussions are well-reasoned and the conclusions well-supported. This series of books is of great interest to craftsmen seeking authenticity and the technical details that authenticity requires.

Sawyer, Peter, [The Oxford Illustrated History of the Vikings](#), Oxford University Press, Oxford, 1997. This book is much like other "generic Viking" books, but is more scholarly than most. The book draws on the entire body of evidence, including the recent finds in the early 1990s. In some cases the writers present several possible conclusions on that evidence where the writers do not agree. It has little to say about combs beyond that referenced in this paper.



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