

Composite Construction Wooden Comb

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SUMMARY

The composite antler combs of the Norsemen are well known for their innovative construction, and were my inspiration for this project. While I once made an antler comb a couple of years ago, I wanted to try one of wood, using the same construction technique as the antler combs, because wood is easier to obtain, and I needed to make six matching combs for a particular occasion. While composite combs and wooden combs are easily documented, the difficulty was in documenting this combination of techniques and materials in the same comb. In seeking to do so, I learned some things about period combs and, where the research fell short, drew some logical conclusions about how they were made. In making the combs, I learned about the differences between working wood and antler. I know that the recipients of these combs enjoy having and using them.

Historical Documentation

Composite Antler Combs

While visiting several museums in Denmark, I saw numerous examples of Viking Age antler combs and fragments of them. These combs had some common features. They had tapered teeth, usually along one side, made of many small tooth plates sandwiched between a pair of side plates. The tooth plates were held in place by iron rivets, usually one per 2 tooth plates and set on the seam between them. The teeth were individually cut with a fine saw and tapered with fine files. The side plates are decorated with a series of incised lines or ring-and-dot markings, some of the lines so perfectly parallel they could only have been done with a double-bladed saw. Each side plate had a hemispherical cross-section. The tooth plates were filed flush with the back, though in some cases the end plates protruded above the back and were decoratively shaped, particularly at the ends. This type of construction is inherently very strong, because the "grain" (antler, bone, or wood) runs in the direction where strength is needed for each part.

MacGregor describes the excavation, preservation, and classification of thousands of artifacts made of skeletal materials from the Viking and Medieval period, found at the Coppergate site in York. Combs are a prominent portion of these artifacts. Pictured here is an example (page 1928) which is about 15 cm long. It is typical of Viking Age antler combs, and each feature described above can be seen in the drawing.

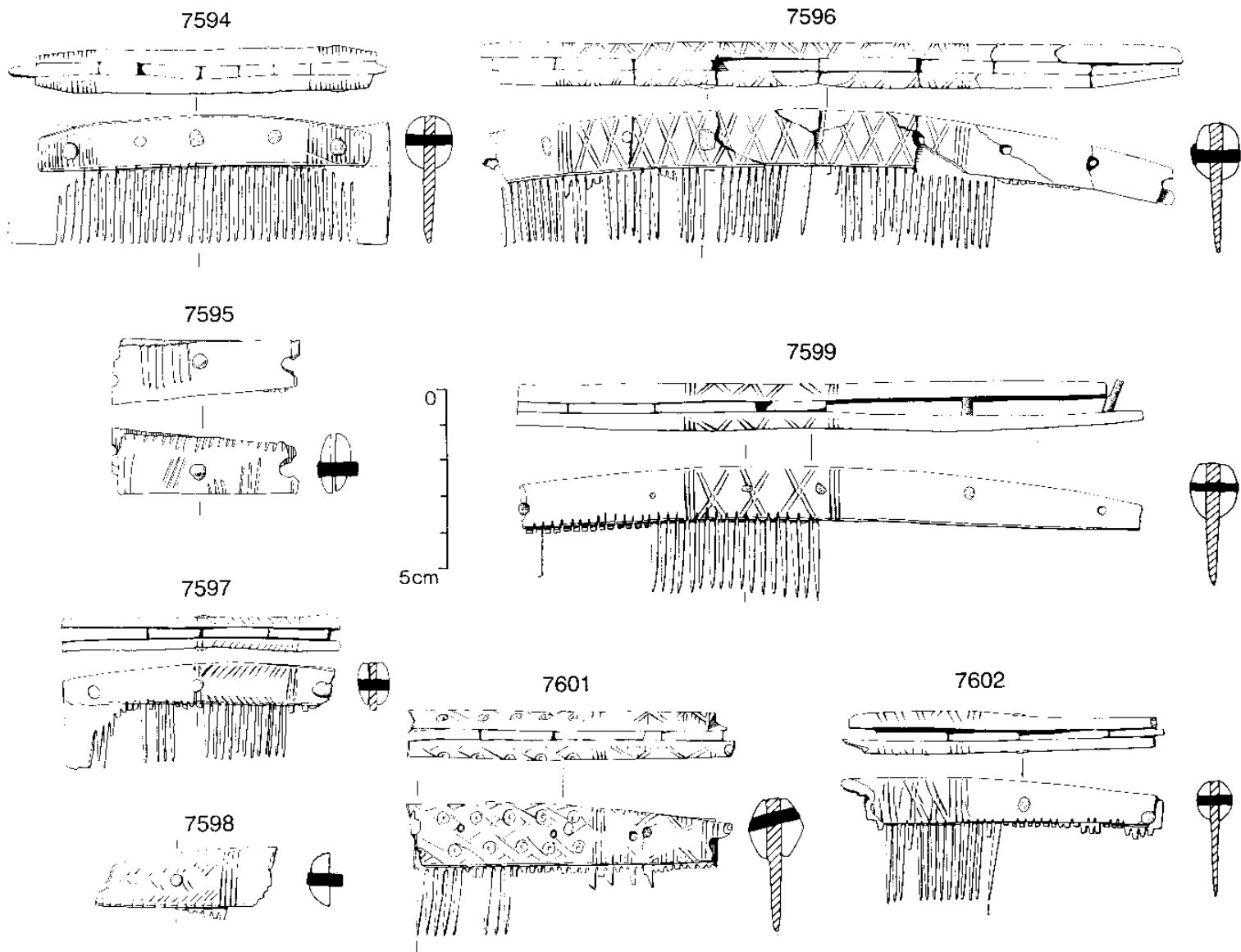
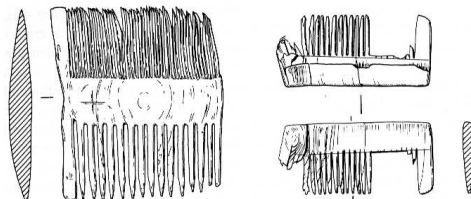


Fig.888 Single-sided composite antler combs from 16–22 Coppergate, Period 4/5 (7594–5), Period 5Cf (7596) and Period 5Cr (7597–9, 7601–2). Scale 1:2

Simple Wooden Combs

Morris describes the excavation, preservation, and classification of thousands of wood artifacts from the Viking and Medieval period, found at the Coppergate site in York. Among them are the boxwood combs pictured here, from the 15th Century (2310; scale approximately 1/2). Morris also refers to other sites, with combs of many different woods,



including an oak comb from 13th-14th Century London, and hundreds of boxwood combs from 10th Century and later Novgorod (2311). Egan catalogues dozens of wooden comb artifacts from the Museum of London, but the earliest are from the 12th Century (374).

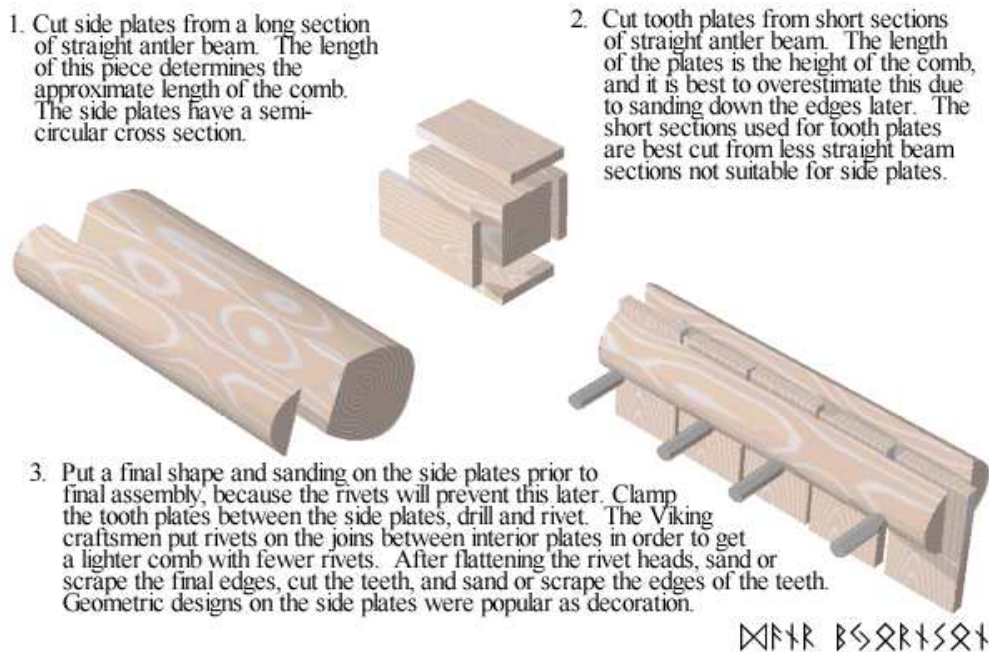
Given the superiority of antler over wood as a material for combs, the subject of why wooden combs became popular is worth discussion. Morris attributes the proliferation of wood combs in the Medieval period to the creation of finer saws, but I have long believed that the Feudal culture, which made certain animals such as deer the property of the nobility, may also have been a factor. Egan supports the theory of royal protection of deer as

the cause of the decline of antler combs in England, but theorizes that increased agriculture in Denmark, which caused many forests to be cut down, reduced the deer population, leading to a decrease in the antler supply (366). In any case, wooden combs became increasingly common from the 11th to 13th Centuries. The wooden combs found in these sites were of simple one-piece construction and, therefore, more subject to breakage.

The evidence, therefore, establishes the existence of antler combs of composite construction from the 9th-12th Centuries, and combs of wood, including oak, of one-piece construction from the 10th-16th Centuries. I found no evidence of composite wood combs. However, an item of wood that had broken or worn out was likely to be used to kindle the next fire, and wood preserves well only in certain moisture and chemical conditions. Given the overlap in time and place between composite antler combs and one-piece wooden combs, it is likely that composite wood combs existed in 11th Century Scandinavia.

Tools and Methods for Comb Construction

The tools used in period for this kind of work were saws, files, knives, bow drills, and a vise. I saw such tools on my visit to Denmark. The museum at Fyrkat shows a representation of a comb-maker at work, using re-handled artifacts including the tools listed. The photos we took of that display did not turn out, though the Regia Anglorum (www.regia.org) has a photo of that same display in their section on bone and antler working. The process used in period to construct a composite antler comb is described in a diagram I made, shown below.



When working with antler, it is not quite as easy as the diagram implies. The outer layer of antler is rough, like the bark of a tree, and the core is spongy, like the inside of a bone. Neither was used in period antler combs. Therefore, only one "slice" of usable material could be taken from a given side of an antler beam. The idea of repeatedly sawing out a slice 1 or 2 mm thick and up to 15 or 20 cm long, from a material as hard as antler, is a daunting one. Even with a fine saw and steady hand, the chance of error is high. To date, I have found no serious experimental research that attempts to solve this question, though I suspect that the sawing was done with the aid of clamps and something resembling what modern woodworkers call a miter box. That is, a slot cut in a pair of parallel boards fixed to the work bench prevented the saw from drifting to either side, and the piece of antler could be clamped in place within it to accomplish a reliable cut. The pieces of antler, once cut, were then filed to the final shape and thickness prior to decoration and assembly.

Finishing a comb would require smoothing the surface sufficiently that it would not damage the user's hair. Period abrasives include many different materials and techniques. Theophilus describes smoothing with a piece of oak covered in ground charcoal (102) or fine sand and cloth (152). He describes final polishing with a cloth covered in chalk (102), powdered clay tiles and water (128), or saliva-moistened shale (115). Biringuccio describes smoothing with cane dipped in powdered pumice, and polishing using tripoli powder (366). Clearly, there were many abrasives available in period, chosen by their availability and relative effectiveness. Since many of these materials mentioned by these authors can stain wood, the likely method that would be used for wood would be small files, followed by sand and cloth, followed by scraping with the edge of a sharp knife.

Materials and Tools

While the best combs were of antler and a few were made of bone, it is difficult for me to get red deer antler from Europe, or American elk antler, which is similar. I therefore chose red oak, which is both beautiful and strong in comparison to other woods. Red oak is darker than English oak, and both color and grain are different than boxwood, which was the most popular material for wooden combs in the Medieval period. I have made boxwood combs before, and it is an easy wood to work with, but risky for a comb because boxwood is structurally weaker than oak. I made the rivets of nickel wire instead of iron, because it stays shiny and is a bit softer to work.

To make this comb, I used some power tools (band saw, drill, belt sander) and some hand tools (hammer, vise, chisels, knives, files, sandpaper, and saw).

Method of Construction

The documentation section above explains how antler combs are built. The principle is the same for any material, with the differences in the details. With wood, the difference is where to make the cuts. Instead of avoiding use of the antler core material, you should choose straight-grained sections of the wood.

I used a band saw for initial cutting of the plates. The side plates are from a longer section of wood, while the tooth plates are from shorter sections. Unlike antler, wood comes in larger sizes and so only two wide tooth plates were needed.

Next, I shaped the side plates on a belt sander. I gave them a slightly curving shape across the back, reminiscent of what is commonly seen with antler, though I did not cut them all the way down to a semi-circular cross-section in order to make decorating easier. I should have done the decoration of the side plates next, but I neglected to do it at this time because I was eager to get to the finished product.

The difficult step is to sandwich the tooth plates between the side plates and drill them. I do not have a bow drill as was used in period, nor the skill to use one. A drill press would have made this relatively simple, but I did not have one of those either, so I used a powered hand drill. I used a little glue to keep things from sliding around, clamped the parts in place, and triple-checked the placement of every part before drilling each hole.

I cut the rivets from nickel wire, shaped the heads with a hammer and vise, and installed them with a ball-peen hammer. I did the finishing work by hand with sandpaper, woodcarving chisels, and knives used as scrapers. I shaped the teeth with a power sander and finished with fine needle files and sandpaper.

I decorated the comb with a double-fret motif using a saw, but because the saw had only a single blade, the lines are not as parallel as the original artifacts. I added my signature rune with a triangular file. The entire comb required about 2 hours to build, 2 hours to cut and sand the teeth, and 2 hours to finish.

Lessons Learned

I found that the proper hand tools, particularly for the finishing work, give far better results than power tools, which can leave burn marks such as those seen along the base of the teeth. After I made this comb, I got a cabinetmaker's saw and finer needle files. I also plan to make a double-bladed saw by riveting two saw blades together with a shim between them, and will attempt to construct a bow drill as well.

I made this comb, and five similar ones, as gifts for guests at an event, and I know they enjoy having and using them.

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