

How to make a Medieval English Scabbard Using Period Techniques and Tools

Introduction

This is a step-by-step instruction guide to making a leather scabbard, using the known tools and techniques of the Medieval English leather worker. Basic leatherworking knowledge is assumed, although some of the techniques may be new to the modern leather worker.

Materials and Tools Needed

Knife (or wooden last)	Fleur-de-lis stamp
Plastic wrap	Overstitch wheel - 5 stitches per inch
Masking tape	Iron oxide mixture - rust water
Pen or marker	Sheepwool scrap
5/6 oz. Vegetable tanned cowhide	Latex or Rubber Gloves
Bowl of water	Wing dividers
Straight edge	Wooden last
Tracer	Linen thread (or substitute nylon thread)
Half-moon knife - or a sharp, heavy duty knife	Beeswax
Knife safe cutting board or mat	Stitching awl
Marble slab	2 Harness needles or Boar's Bristles
Wooden mallet	Neatsfoot oil - obtained from pressing the hooves (and possibly bones) of cattle.

Table of Abbreviations

Cowgill, Jane, *Knives and Scabbards (Medieval Finds from Excavations in London: 1)*.

(Referred to as **K&S**)

Rosetti, Gioanventura, *The Plictho*. (**Plictho**)

Salaman, R. A., *Dictionary of Leather-working Tools, c. 1700-1950, and the tools of the allied trades*.

(**DLT**)

History and Extant Examples

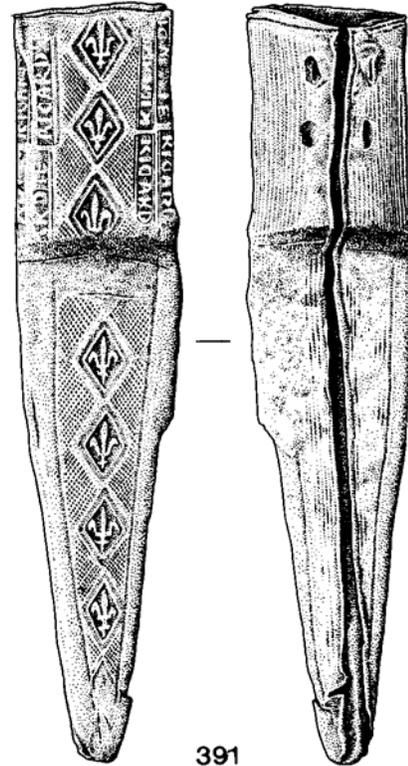
Knives and scabbards (or sheaths) have been essential accessories for people throughout history. Much like a pocketknife today, knives were versatile tools and used in many professions. They were also a necessary eating utensil in Medieval England, at a time when diners were expected to bring their own flatware to the table (K&S 55-56). Leather scabbards have been used since prehistoric times to protect knifeblades. (Waterer 1956, Fig. 119)

The scabbard being created is based upon one recovered from Swan Lane in London dated to the late 13th century, no later than CE1280 (K&S 1).

PLATE 8
Scabbard No.391: detail showing RICARDIE
and fleur-de-lys stamps, and rouletting.



Figure



1. Close up of Scabbard 391. (K&S Pl. 8)

Figure 2. Line drawing of Scabbard 391. (K&S 122)



81 Scabbard, No.391 (late 13th century). Scale 1:2; details of stamps 1:1.

Medieval leather artifacts are usually found in two types of locations: intact items held in collections and remains of items found at archeological sites. Many museums display scabbards and shoes, and there are even Leather Museums in Europe, most notably the *Deutsche Ledermuseum* (Germany) and the Northampton Leather Museum (England). Remains of leather items are most often found in waterlogged sites like the Thames revetments due to the anaerobic conditions; bacteria and other elements normally destroy leather items buried in the

ground. The Museum of London has produced a book of knives and scabbards found in various London excavations.

Leather Basics

Leather is the skin of an animal, processed so that it doesn't rot. Leather can be made from any animal skin, including cattle/calf, ox, goat, deer, horse, and sheep, to name a few. It has been used since pre-historic times for a variety of objects - clothing, tents, shields, etc. Stone scraped skins have been dated to over 100,000 years old, and suggest that some form of preservation was done. 40,000 years ago, 'modern' man was preserving leather by rubbing them with fats (which is similar to the 'brain tanning' used by Native Americans.) (DLT 294)

The processing of skins to make leather requires many steps. The skin is first soaked in lime and water to loosen the hair, which is then scraped off. Then the skin is fleshed (to remove any meat left on from the skinning process.) This is done with specialized tools. If the skin is then staked and dried, 'rawhide' has been created. Rawhide has special properties that make it useful for many items, however it is not truly 'leather' and can rot if exposed to excess water.

If the hide is to be made into leather, the next step is 'tanning'. Tanning impregnates the leather with tannins to replace the natural elements that will deteriorate. This keeps the fibers of leather flexible, and makes it into a stable material that won't immediately decay. Tannins are found in plants, especially in the bark of trees. Oak trees also produce 'galls' - little nodes of concentrated tannins. These are harvested for their tannin. The bark and galls are crushed and mixed with water to form a 'liquor' that the skins are soaked in to create the leather. This process can take up to 18 months to complete, depending on the type and thickness of leather and the tanning solutions involved.

Vegetable tanned examples from Neolithic times (8,000 - 10,000 years ago) have been found. This process was possibly discovered as a result of accidentally immersing skins in pools with a high tannin content, or by trying to color the leather with vegetable matter. (DLT 294) This leather is the type commonly used in scabbards, belts, saddles, and shoe soles.

Tawing is a period method of creating leather through soaking the skin in an alum/salt solution. This method isn't as permanent as tanning, but it creates softer, more flexible leather. This method was known in Egypt c. 4000 BCE (DLT 294) 'Cordovan' or 'cordwain' were a special type of alum tawed leather that made Cordoba, Spain famous in the eighth century. This type of leather was made from goats, and was used in shoe uppers for centuries afterwards.

A third method is oil tanning, which combines tawing or tanning with special oils to create water-resistant leather. Other types of leather manufacture combines these methods to create a wide variety of leather, often for very specific projects.

After the chemical process was complete, the leather was skived (thinned) to the required thickness. This was done with large knives and skilled workers. Modern leather is skived by machines. Leather is measured in 'ounces'. One-ounce (1 oz.) leather is 1/64th of an inch thick. The skiving is not completely uniform, however. Hides are usually referred to by 2 numbers - 5/6-oz. leather is leather whose thickness varies from 5/64 - 3/32 inch thick.

After skiving, the leather is curried - smoothed, stretched, and conditioned. This process kept the leather flexible and the fiber structure from breaking. Dubbing, a mixture of tallow and oil (neatsfoot, cod-liver, or sperm whale oil, for example) was used as the final conditioning agent before sale.

Tanning and tawing can take a long time to complete, and requires specialized equipment and chemicals. This process remained essentially unchanged between the classical Greco-Roman period through the Industrial Revolution. It involved a variety of smelly and sometimes toxic chemicals. It required a large volume of water, and wasn't allowed inside many cities. (DLT 294)

1. Create the Pattern

Each knife is slightly different, so the pattern should be made to fit the knife for which it will be used. Otherwise a wooden last (an approximation of a knife) can be used for a more generic shape.

Here is a modern way to create the pattern, based on the 'duct tape bodice' method:

- Wind plastic wrap around the knife (or wooden last), and then cover the plastic with masking tape.
- Draw the seam line onto the tape (center back, in this case).
- Cut off the tape and plastic along the seam line.
- Transfer this pattern to cardstock to make a permanent pattern.

History

The handles of medieval knives were fairly standardized, so the main variation in scabbards occurred in the blade section. (K&S 35) Experienced sheath makers would probably not need a new pattern for every knife, but would have a variety of 'standard' patterns.

Scabbards were also reused, as evidenced by the cuts and re-stitching on recovered examples. (K&S 39)

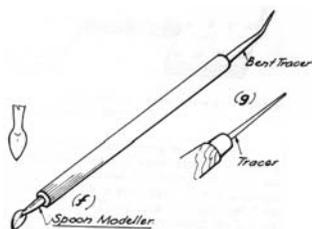
2. Choose Leather

Take the piece of 5/6-oz. vegetable tanned cowhide and carefully examine the piece for any cuts or major marks on the grain side.

History

The scabbards found in London are described as being made of vegetable-tanned calf leather, approximately 2 mm thick. (K&S 34, 122) In modern leather, this translates to 5 oz. (5/64 in. thick) vegetable tanned cowhide.

3. Lightly Wet Leather and Trace Pattern



Use the tracer like a pencil to scribe the pattern onto the front (grain side) of the damp leather. The grain is the smooth side. It is the 'outside' of the

skin, after the hair was removed. It is tougher and more water-resistant, and allows stamping and tooling.

Figure 3. Example of Tracer. (DLT 199)

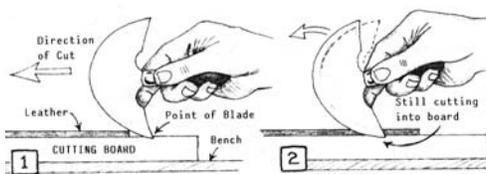
History

The tracer (DLT 138, 198 - 200) was used to scribe the pattern onto the front of the leather.

Tracers were made from metal, wood, or bone. Scabbards were made with the grain side out.

(K&S 34)

4. Cut Leather



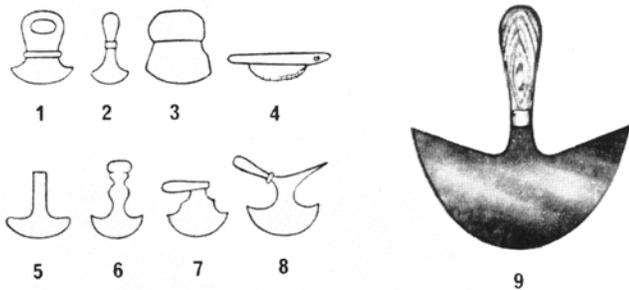
Cut along the pattern line, using the half-moon knife (or other sharp, heavy-duty leather knife). Make sure your knife is sharp, and follow knife safety guidelines.

1984 8)

Figure 4. Directions for Using Half-Moon Knife. (Stohlman,

History

The half-moon knife is the traditional leather worker's cutting tool. (DLT 133, 138) This design of knife has been used since at least the time of the Egyptians. The design has only changed slightly through the centuries.



5. CUTTING TOOLS

The 'half-moon' cutting-out knife can be traced back to c. 1450 B.C., in ancient Egypt (both in actual examples and in mural paintings, e.g. tomb of Rekhmiré): 1. and 2. Egyptian (copper); 3. Eskimo; 4. from Swiss lake village; 5. Iron Age (La Tène); 6. Pompeiian; 7. and 8. Mediaeval European; 9. modern.

1968 48, Pl. 5)

Figure 5. Examples of Half-Moon Knives. (Waterer,

5. Decorate Leather

Look at period examples to see how scabbards were decorated. *Knives and Scabbards (Medieval Finds from Excavations in London: 1)* is an excellent source for examples from London CE1150 - 1450. *Craft, Industry and Everyday Life: Leather and Leatherworking in Anglo-Scandinavian and Medieval York* is another recent book available that has information on sheath and scabbard making and the decorative techniques employed. Both of these books are available through online book sources.

These directions for this project enable you to decorate a scabbard in the manner of Scabbard #391 (CE1280) in the Museum of London collection. (K&S 122)

☐ Thoroughly wet the leather by soaking the piece in a bowl of water until all bubbles stop rising. Let the leather sit until there is no sitting water, and the color has started to return to normal. If it is too wet, the stamping will be blurry; if it is too dry, and the impression won't hold. The piece should be rewet as needed during stamping and decorating.

☐ Do all stamping on a marble slab or other sturdy surface.

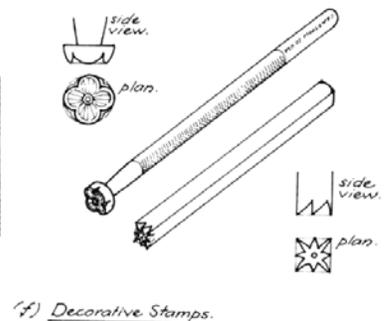
☐ Scribe the division line between the handle and blade sections onto the leather using the tracer and straight edge.

☐ Stamp the line of fleur-de-lis onto the leather.



Figure 6. Craftool Fleur-de-lis Stamp. (Leather Factory 60)

Figure 7. Example of Decorative Stamps. (DLT 197)



☐ Scribe the diamonds around the fleur-de-lis, using a straight edge and the tracer. This is called modeling, because they are pressure lines, not made with a mallet and stamp.

☐ Use the overstitch wheel to create the background dots.

Figure 8. Overstitch Wheel. (DLT 227)



☐ Scribe the back of the scabbard using the tracer to create vertical lines.

History

The leather needs to be wet in order to do any decorations or forming (K&S 35, 40, 43, and DLT 195, 196, 198). The handle and blade sections are divided using the tracer following the extant example. (K&S 40 and DLT 198 - 200) and then stamped with the fleur-de-lis stamp. Stamping is an early form of leather decoration still in use today (K&S 43 and DLT 196). The earliest examples of single-motif stamping in the London collection are from the Swan Lake deposit (no later than CE1280.) (K&S 43 - 44, 122 and DLT 196) Single dot stamping used to 'outline' designs were in use a bit earlier (early to mid 13th century). Heraldic motifs were popular in Medieval England and the rest of Europe – the example is an early representation (K&S 42). At that time, stamps may have been made out of metal or carved out of wood, but modern tools are made from steel or zinc and plated to prevent rust damage on the leather.

The name 'Ricardie' was stamped on the handle of scabbard #391. This has been omitted, but another name could easily be substituted if a suitable stamp was made. Scabbard makers did not mark their work in the extant examples, but there are examples of post-purchase 'graffiti' made by the owner (K&S 40).

An overstretch wheel is a modern equivalent to a *rouletting wheel*, which was used to create the background dots (K&S 43, Pl. 8 and DLT 260). A *roulette* is a small toothed disk of metal attached to a handle and used to make rows of dots or cuts, as on postage stamps.

6. Dye the Leather

To make the leather dye, combine vinegar and water in approximately equal portions with scraps of iron (steel wool or old nails, for example) to create iron oxide. It can take awhile to form enough liquid to dye the leather - start making the dye about 2 weeks early for this project. The liquid is done when it has turned orange/red. A foamy 'scum' often forms on the top, especially in a sealed jar. Straining the liquid ensures that no metal filings stick to the leather.

This mixture combines with the tannins in the leather and will permanently dye the leather. This is a chemical reaction, so the amounts of tannins in the leather can affect the end result.

Apply the dye with a scrap of sheepwool or old cloth. The color is not as dark as modern black dye, and will appear somewhat gray. Apply a second coat. More coats can be applied to achieve a darker color. Gloves should be worn while dyeing the leather to avoid over-exposure to the iron, which can enter any cuts on the hands. Prolonged exposure to the just dyed leather can cause a bit of black rub-off (the liquid washes out a bit of the tannins from the leather) but it washes off. Also, be aware that wood, especially non-finished wood, may have tannin in it, and can be stained black if it touches the rust water.

Making the 'rust water' is recommended over using iron powder (Ferrous Sulfate Heptahydrate, available from nature dye suppliers). Experiments with using the powder to dye leather did work, making the leather black, but a salty residue formed and kept reappearing, even after repeated rinsing and overdyeing with rust water. Further trials with this powder may prove to make it equal to rust water, but the rust water is easy to make and very inexpensive, and authentic to the Medieval period.

History

Black dye on leather and fabric was commonly used through the Middle Ages, a combination of iron (copperas [green vitriol] and/or rusty iron) and tannins - either galls, in the case of fabric, or the tannins added to the leather during the tanning process. (K&S 40; Plictho *xix*; recipes 168, 173, 178, 190, 193) "Then take one ladle of dregs of filings and a half of scale of iron and a flask of white vinegar and one ounce of Roman vitriol" (Plictho, recipe 190) This same principle is seen in the creation of ink listed in *On Divers Arts* around CE1100. The ingredients call for tannin to be mixed with wine and green vitriol, which creates colorfast and long-lasting ink. If the ink is not black enough, Theophilus recommends adding more iron to create more of a reaction (Theophilus 42).

There is no indication of the age of this recipe. Since it is a chemical reaction that is easily produced, it is possible that it has been around since vegetable tanned leather was first

developed. Anything made from iron that gets wet will mark the leather - modern vegetable tanned leather will sometime have black circles that are from the nails in the pallets they are shipped on.

7. Mold the Leather and Mark the Stitch Line

Re-wet the leather and mold it around the last, matching up the seams. While wet, the leather is very flexible, and will stretch around curves. When dry, the leather will retain the shape.

Carefully line up the edges of the seam. Use the wing dividers to mark the seam line approximately 1/16-inch from the seam. While the leather is wet, impress stitch marks using the overstretch wheel, which marks 5 stitches per inch. Mark each side of the seam so that the holes line up.

History

The leather is molded around the last or knife (K&S 35, 37). In extant examples from England, the stitch line measurement is not given, but a good rule of thumb is to inset the seam the same distance as the thickness of the leather (5/64 to 1/16-inch) (Stohlman 7). The stitches were approximately 5-7 mm. apart (K&S 37), which translates to 5 stitches per inch and the overstretch wheel is conveniently spaced for that distance. Experienced sheath makers may have had special tools to mark and space the stitches.

8. Punch the Holes and Sew the Leather

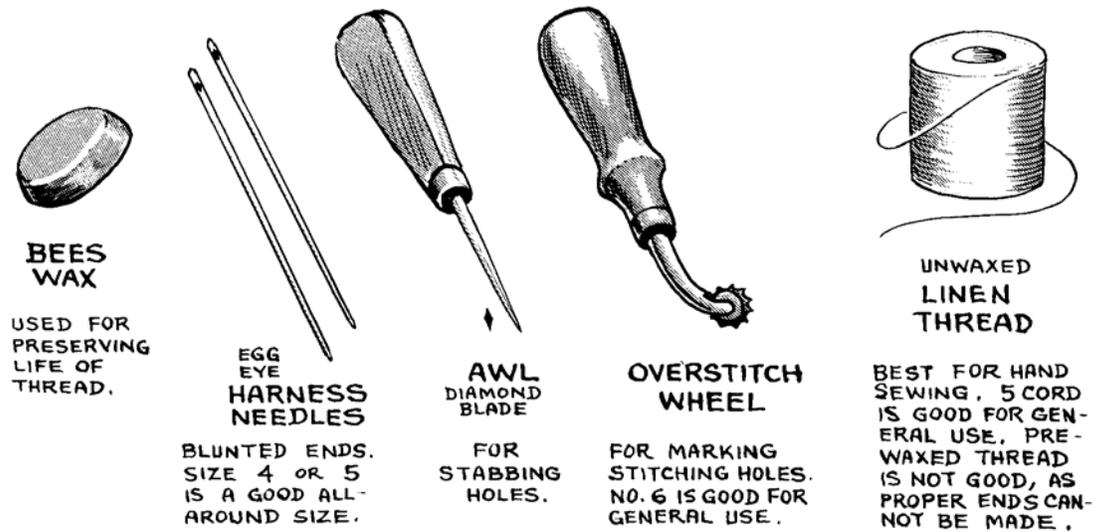
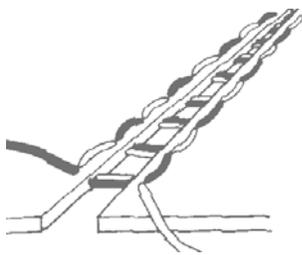


Figure 9. Tools for Sewing Leather. (Stohlman, 1974 4)

The edge/grain stitch is used to stitch the seam. This stitch goes through the grain side of the leather, but instead of going all the way through straight up and down, the thread goes through at an angle



and exits through the edge of the seam. This stitch does not allow the blade to touch the thread, which protects the stitching from wear and tear. Practice this stitch on scraps to learn how tight to pull the thread without tearing through the leather.

Figure 10. Drawing of edge/grain stitch. (Grew, et al. 49)

Use 2-ply waxed thread (either linen or nylon) to sew up the scabbard. Either coat the thread with beeswax, or used pre-waxed thread. The wax helps the stitches 'grip' the leather and keep the stitches tight. Modern leather workers use white thread, but other colors (black or brown) 'hide' the stitching, and are valid choices.

Lightly wetting the leather can help with sewing through the angled holes.

Carefully push the diamond shaped awl so the hole goes through the grain and the edge. Be certain that the holes are lining up so that they match on the sides of the seam. Holes can be punched as pairs and then stitched, or all of the holes can be punched at once.

Cut a length of thread about 3 times the length of the seam to be stitched. If the thread is not pre-waxed, run each strand through the beeswax to get an even, thorough coating. Roll the strands together to form the 2-ply thread. Thread a harness needle on each end of the (waxed) thread. Harness needles are blunt, so they will not cut the leather. Roll the thread and 'tail' together between your fingers until the pressure and heat allows the beeswax to fuse them. The thread coming out of the needle should not be much thicker than the needle, or it may catch on the leather and tear it. The thread will go through each hole twice (like it does in modern saddle stitching).

Another option is to use a curved awl or curved needles. There is no evidence that these were used on the extant examples from England, although it is certainly possible. Flexible needles would also work.

Start stitching at the point (tip) of the scabbard so that the thread can be tied off at the top. Pull the thread halfway through, so there are equal lengths on each side of the seam. Then carefully start stitching up the scabbard, pulling the thread taut without tearing the leather. At the top of the scabbard, backstitch one time, and then tie off the thread in a simple square knot and clip the ends close to the leather. Backstitching another stitch and then pulling the thread to the center and trimming would also work, but the holes are so shallow that care must be taken not to tear the leather.

History

The seam follows the center back and is done with an edge/grain stitch. The holes are punched with an awl with a diamond cross section. 2-ply linen thread was probably used, although the thread has disintegrated in the historical examples (K&S 37). Linen thread came in a variety of weights and colors for clothing (Crowfoot 151), so one can assume it would be available to the scabbard maker as well.

Medieval leather workers used boars' bristles to pull thread (the thread is attached with wax, not through an eye as in modern needles) (Waterer, 1968 50), which was flexible enough to go through curved holes, but this tool is not readily available today. Blunt tipped harness needles will achieve the same result.

9. Trim Leather

The top edge of the scabbard can be trimmed and evened out using a sharp knife after sewing, if necessary.

10. Oil Leather

Apply a thin coat of neatsfoot oil to the scabbard. This will darken the color even more.

History

In Medieval Europe, leather was oiled when it was tanned (Plictho *xix* and various recipes), and curried (trimmed and thinned to the appropriate weight.) (K&S 34) Oiling was also done periodically to prevent it from drying out or rotting. Any number of oils may have been used, but there is no evidence which type may have been used on extant examples. Cod oil, olive oil, and eggs were all used during this time on different types of leather, as well as other oils. (Plictho *xix*; Tuck 5; DLT 108) Neatsfoot Oil is obtained by pressing the hooves of cattle and other animals (*Neat* is an Anglo-Saxon term for cow). This is the most common oil lubricant in use for modern leatherwork.

11. Cut Slits

Cut hanging slits in the back portion of the handle using the half-moon knife. These slits determine the angle at which the scabbard hangs from the belt.

History

In Medieval England, after the scabbard was purchased, the owner would cut hanging slits in it to suit his or her own needs. (K&S 54)

Conclusion

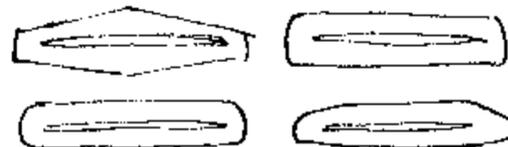
Modern leatherworking tools are not very different from their Medieval counterparts, although some techniques have given way to others. Leather has been utilized for millennia, and the tools used were developed relatively early, with little or no change until the last 200 years. By using authentic tools and techniques, one can experience the level of craftsmanship and skill of the Medieval leather worker.

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MAKING A SCABBARD WITH LACED BELT

NOTE: USE ONLY VEGETABLE TANNED LEATHER!!!
NOT CHROMIUM TANNED!



SHAPES LIKE THIS MUST BE AVOIDED... (MAKES THE SCABBARD LOOK HOLLYWOOD-BULKY!)

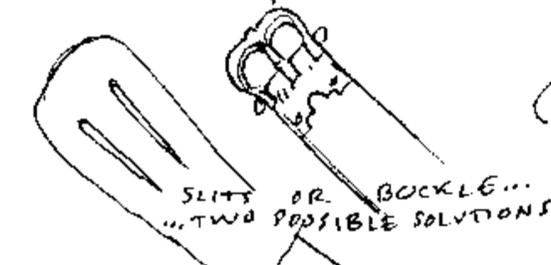
MAKE SURE THAT THE WOODEN CORE IS THIN AND HAS A NICE OVAL SHAPE. - MAKES THE SCABBARD LOOK SLIM, TIGHT & NICE.



SLITS OR BUCKLE... TWO POSSIBLE SOLUTIONS

FRONT

BACK



IS THE FRONT BELT EQUALLY BROAD THONGS.

RADIUS! IMPORTANT

WHEN A & B CROSS ON THE FRONT A GO THROUGH A SLIT IN B AND PASSES A DOUBLE SLIT IN THE LEATHER COVER, THUS FIXING B IN A FLEXIBLE WAY AND SPREADING THE LOAD...

THROUGH THE SLITS ON THE FRONT, AROUND TO THE BACK, THROUGH THE SLITS THERE AND THEN ONE PASS AROUND ITSELF...

JUST AFTER PASSING AROUND THE FRONT BELT THONG A TAPERS TO 1/2 WIDTH

SEPARATE THONG (COULD BE MADE BY SPLITTING AWAY A THIN SECTION FROM B...)

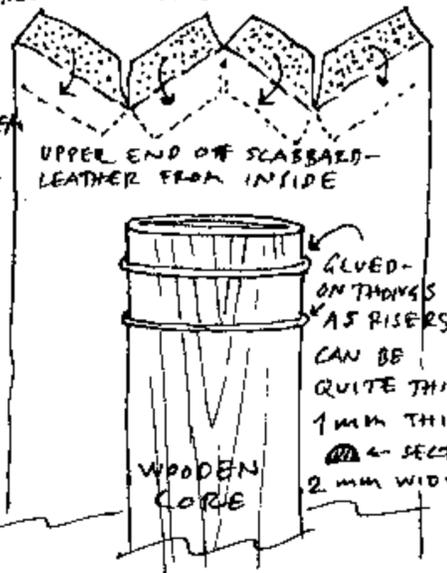
AFTER PASSING THROUGH LOWER BELT HALF BOTH THONGS TAPER TO THIN SQUARE SECTION AND FINISHES WITH KNOT ON THE FRONT

THONG PASSES THROUGH BOTH BELT AND SCABBARD LEATHER ON BACKSIDE

WOODEN SCABBARD SCABBARD LEATHER COVER

(CUT) SCRAPE THE FLAPS THIN WITH VERY SHARP KNIFE. FOLD AND PRESS WHILE WET. IF YOU USE NATURAL HIDE GUE

YOU CAN SECURE THEM WITH THIS BUT IT WILL WORK ANY WAY BY JUST PRESSING.



USE 1 OR 2 NEEDLE SEAM. 1 IS FASTER, 2 MAKES IT NEATER. BOTH ARE HISTORICALLY CORRECT... SEW WHILE LEATHER IS WELL DAMP BUT NOT WET

USE A VERY SHARP KNIFE TO CUT THE SLITS AS YOU START TO LACE THE BELT IN PLACE. IT HELPS IF BOTH BELT & COVER ARE DAMP.

USE STRONG THREAD TO WIND TIGHTLY AT THE RISERS TO BRING THEM OUT CLEARLY.

USE SHARP WOOD-OR BONE TOOL WITH ROUNDED, POLISHED EDGE TO MOULD THE LEATHER AND COMPRESS IT WHILE IT DRIES. THIS IS IMPORTANT TO ACHIEVE A HIGH LUSTRE IN THE LEATHER.

IF YOU USE GLUE TO FASTEN THE LEATHER TO THE CORE, BE CAREFUL NOT TO PUT GLUE ON THE MARKED AREAS. HERE THE COVER WILL BE SLIT & LIFTED



I USUALLY START THE SEAM AT THE TIP OF THE SCABBARD

TO KEEP THE LEATHER FROM DRYING, USE DAMP SPONGE WHILE YOU WORK.

IF YOU REALLY NEED A BRACE, PUT EVERYTHING IN PLASTIC COVER, WHILE YOU REGAIN STRENGTH AND CONCENTRATION...

IF IT BELES WITHOUT COMPRESSING AND POLISHING, THE SURFACE WILL BE LIKE ORANGE PEEL... BONE-OR WOODEN- A SMALL PUNCH CAN BE USED TO PRESS GEOMETRICAL PATTERNS IN THE SCABBARD. LOOK AT MEDIEVAL ILLUMINATION FOR PATTERN INSPIRATION.

MAKING A SCABBARD WITH LACED BELT

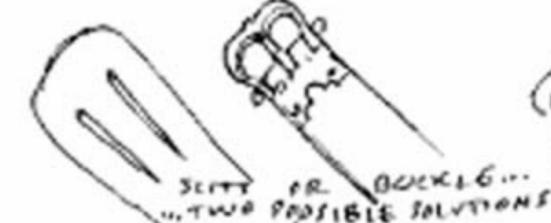
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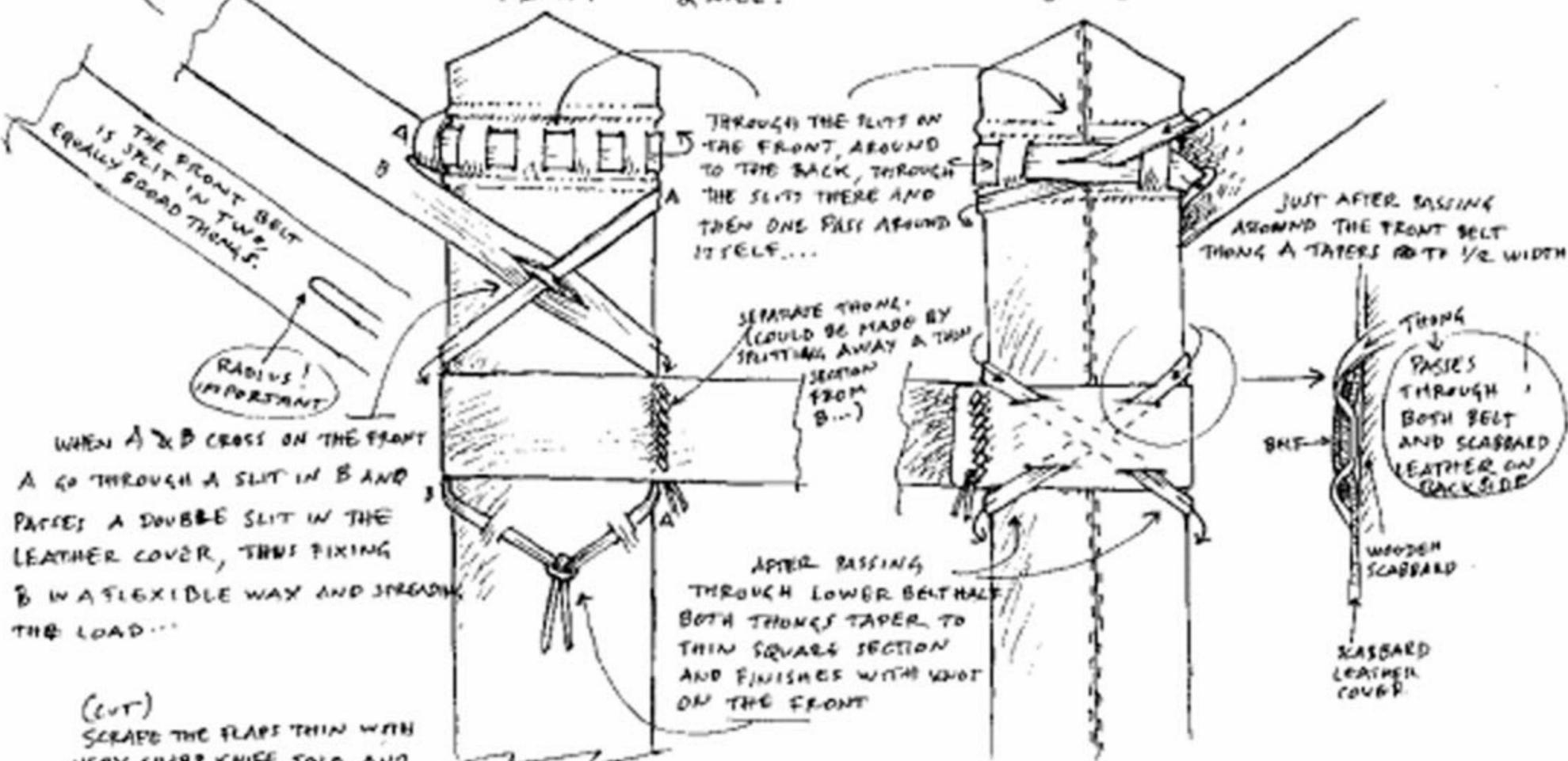


MAKE SURE THAT THE WOODEN CORE IS THIN AND HAS A NICE OVAL SHAPE. - MAKES THE SCABBARD LOOK SLIM, TIGHT & NICE.

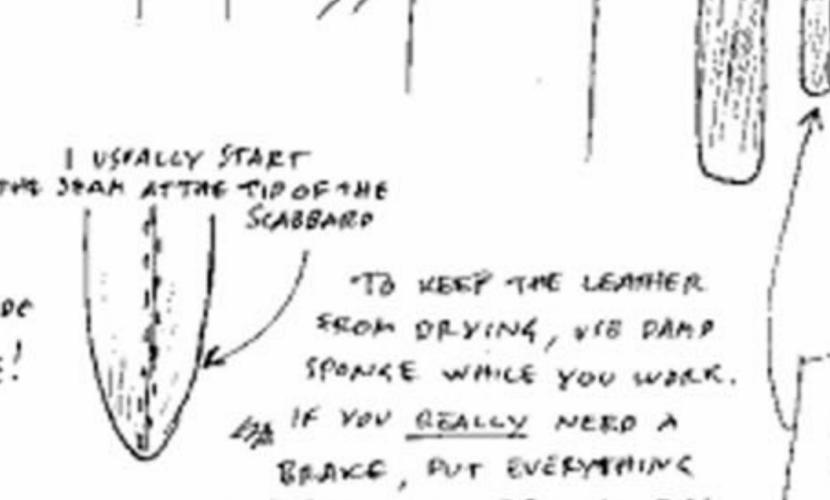
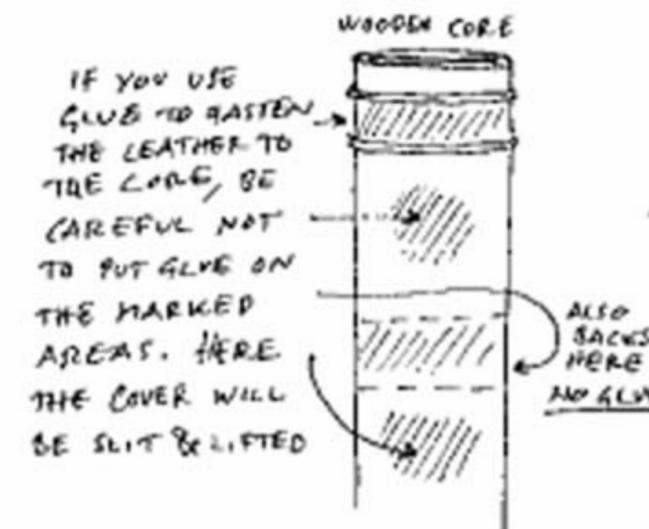
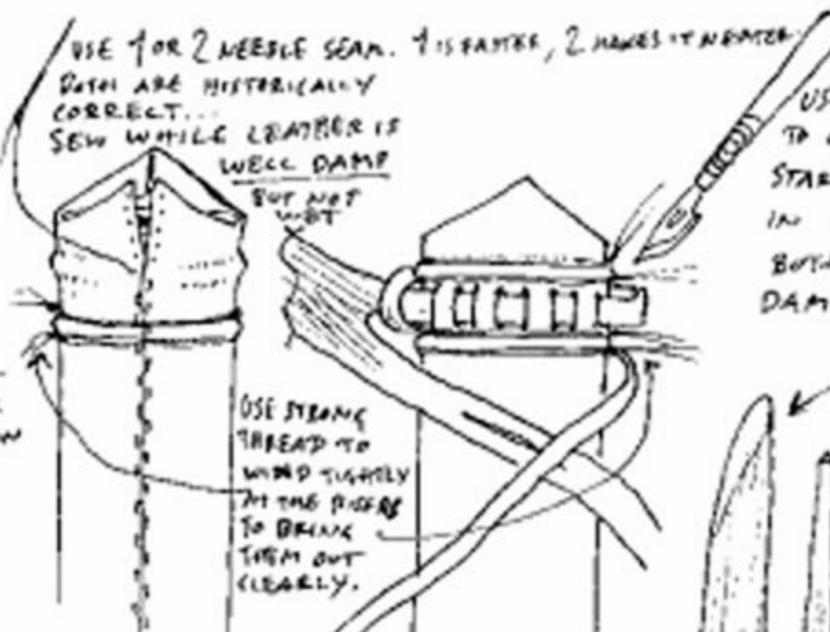


FRONT

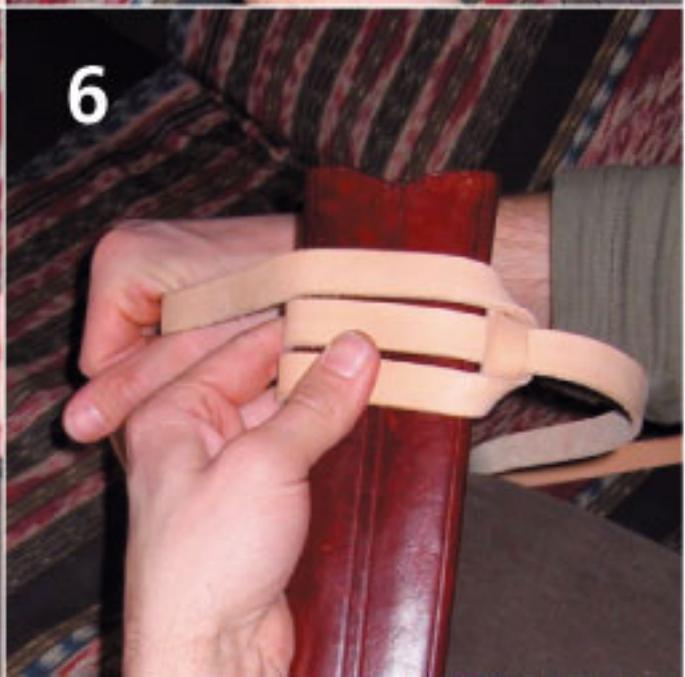
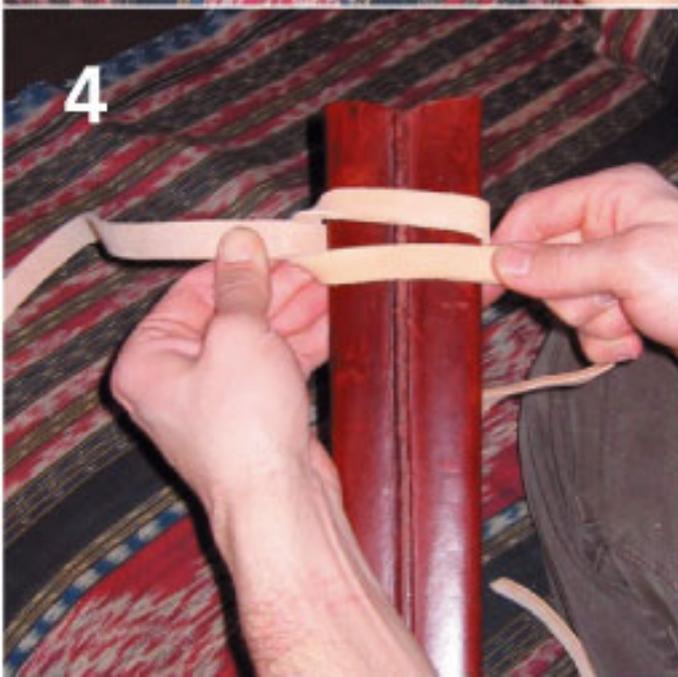
BACK



(CUT) SCRAPE THE FLAPS THIN WITH VERY SHARP KNIFE. SAND AND PREP WHILE WET. IF YOU USE NATURAL



USE SHARP WOOD-OR-BONE TOOL WITH ROUNDED, POLISHED EDGE TO MOULD THE LEATHER AND COMPRESS IT WHILE IT DRIES. THIS IS IMPORTANT TO ACHIEVE A HIGH LUSTRE IN THE LEATHER. IF IT DRIES WITHOUT COMPRESSION AND POLISHING, THE SURFACE WILL BE LIKE ORANGE PEEL... BONE-OR-WOOD- A SMALL PUNCH CAN BE USED TO PRESS GEOMETRICAL PATTERNS IN THE SCABBARD. LOOK AT MEDIEVAL ILLUMINATION FOR PATTERN INSPIRATION.



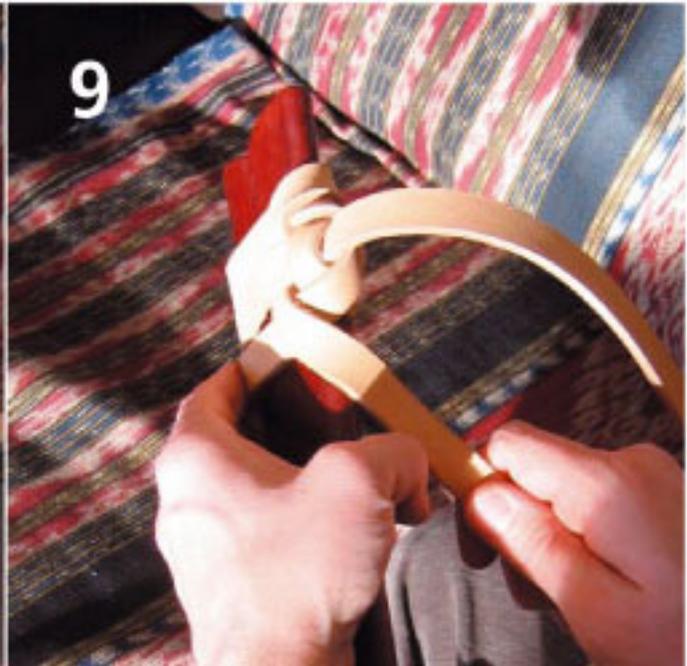
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10



Leather Decoration – an Overview

Leather has been a mainstay material for mankind since pre-history. It is hard wearing, and therefore suitable for a variety of functional items such as shoes, belts, and horse equipment, as well as coverings for boxes and other cases. Leather is used for protective gear, such as gloves and armor. It can also be flexible and lightweight, suitable for more delicate items.

These essential qualities of leather have not changed over the centuries, and these qualities have been recognized and utilized by both modern and historical leatherworkers. Many of the same leather items made in the past are still being made in a similar fashion today, and some of the decorative techniques are almost identical. However, the modern aesthetic (and even the modern re-creationist's aesthetic) is not the same as that of Medieval Europe, and it is in the decoration that this difference is very apparent.

Medieval items made from and covered with leather were often decorated, sometimes quite ornately. While entire volumes could be written documenting the variety of decoration of extant and excavated leather, the decorations fall into broad categories of techniques, including: coloring leather – with dye, paint, and gold leaf; sewing and appliqué; cutwork; metal mounts and decorations; and combinations of stamping, modeling, embossing, and incising. The decorations were influenced by the aesthetic of the culture for which they were created, as well as the intended purpose of the items so decorated. Some of the decorations are very similar to modern leatherworking designs, and the tools used now are very similar to those used in the past.

However, the modern re-creationist rarely appears to copy the more medieval elements of leatherwork design and aesthetic. This results in finished items that do not evoke the same 'feel' of the extant examples. With more focus on the medieval aesthetic, as well as detailed examination and analysis of the extant and excavated pieces, the modern re-creationist can decorate leather items to look more like the historical examples.

The pictures included in the Appendix are meant to be representations of each type of decoration and are not all-inclusive. All are extant examples or excavated pieces. Most of the items are in European museums, notably the *Deutsches Ledermuseum* (German Leather Museum) and the Northampton Museum of Leathercraft in

England. The Museum of London has published several books of its medieval finds, including both plates and archaeological scale drawings of excavated finds.

The Different Types of Leather

Alum tawed leather and vegetable tanned leather were the main types used in Medieval Europe. Alum tawed leather was used for garments, shoe uppers, gloves and other 'soft goods.' The tawing process involves impregnating the hide with alum salts and fats, which make it very supple and stretchy. These salts aren't permanent, and prolonged exposure to water will wash them out. This returns the leather to rawhide, which is not stable, and will not usually survive for extended periods of time, particularly in damp conditions. This means alum tawed leather doesn't survive in most archaeological contexts, and there are few extant examples.

Vegetable tanned leather was used for items like shoe soles, belts, scabbards, pouches, and for covering boxes. True tanning involves impregnating the hide with vegetable tannins (usually from oak bark). This process permanently changes the structure of the hide and is not reversible. Vegetable tanned leather survives in anaerobic archaeological conditions, which usually translates to waterlogged sites. The London waterfront is a prime example: at various times in London's history, portions of the Thames were 'reclaimed' for use, usually by building a retaining wall and then filling in the space with trash and dirt. This became waterlogged, stopping most bacteria, and preserving the items within. When more land was needed, another wall was built, with more dirt and rubbish as fill-in. These building projects are very accurately dated, both by dendrochronology of the wood used for the wall, as well as building records and datable items such as coins. This means that items deposited in these sites can be dated to specific time frames. Leather shoes, scabbards, belts, and pouches have been found in these sites.

Decorative Techniques Used

Because alum tawed and vegetable tanned leathers are very different and are used for different things, some decorative techniques that will work on one will not work on the other. Those described here will work on both unless stated otherwise.

The decorative motifs in medieval leatherwork often seem to echo designs in other media, including stone sculpture and illuminated manuscripts. (Cowgill 40 – 41) The concept of *horror vacui* is prevalent – the idea that designs be adapted to fill the visible space. (Cowgill 42) This is seen from scabbards to shoes, from belts to boxes. Symmetry and balance are also important design elements. In some cases, the imagery on leather items is very similar to that on woodcuts, with rather flat designs and cross-hatching to delineate background from foreground. Other designs incorporate fairly high relief to create more realism. Color is used to enhance these effects. Abstract designs of floral work and interlace are also very common. The workmanship on medieval leather items ranges from fairly simple and crude to incredibly ornate and skillful.

Based upon images in medieval manuscripts and paintings, many leather items like shoes and accessories were brightly colored. Leather dye soaks into the item to provide all over coloring. A variety of dyes for leather were recorded in *The Plictho*, a 1548 Italian dye manual by Gioanventura Rosetti. Ways to color leather red, blue, green, yellow, and black were included. (Rosetti 65 - 83; 159 - 180) These recipes were probably for alum tawed leather, based upon the dyeing processes described. As these items have not survived in archaeological contexts, and are rare in museums, it is difficult to determine how these dye colors may compare to the depictions in manuscripts and paintings.

Examples of dyes used on vegetable tanned leather are even rarer. There is one simple method to dye vegetable tanned leather black that has been used for a very long time, however. It uses a chemical reaction between the tannins in the leather and iron oxide. This reaction is the basis for oak gall ink, recorded in *On Divers Arts* by Theophilus in the 12th century (Theophilus 42 - 43). Vegetable tanned leather exposed to rusty water (or a combination of iron and vinegar) will quickly turn black. This is now being used as a 'spot test' to check the tannage of unknown pieces of leather found on archaeological sites. (van-Driel Murray, 2000 316) This reaction also occurs when leather is in contact with iron-rich soil. This can significantly change the color of leather items after burial, making it hard to determine the original color and decoration.

Leather items were also brightly painted, although little paint survives in archaeological contexts. There are several extant European examples of cases painted in a variety of colors, including red, white, and yellow in the German Leather Museum. (Figures 1 – 7) Many of these have a black background, which could either be black paint, or the black iron oxide dye. Traces of cinnabar (vermillion) paint have been found on a girdle from Anglo-Saxon York, (Mould et. al. 3393) as well as on two scabbards from medieval London. (Cowgill 40) In his treatise *Il Libro dell'Arte (The Craftsman's Handbook)*, Cennino Cennini mentions that leather should be coated with gesso before being painted. (108) Oil paints and egg tempera paint will work on leather, but the included examples are probably oil based paint.

The application of gold leaf was used on expensive leather items, particularly book bindings, religious cases, and showpieces like parade shields. This was a very specialized process, since it involved stamping the leather two times with each stamp – once to form the impression and then again to apply the gold. (Waterer, 1968 38; Gall, 1967 28) The stamps had convex decorations, which when pressed on the leather made sunken designs to hold the gold and keep it from getting worn off. They were usually heated, which helped the design stay crisp, since books were often covered in alum tawed leather, which doesn't take stamping very well. (Salaman 1) To apply the gold, the leather was covered with a base coat (usually red paint), followed by a coating of glair (egg white, vinegar, and water) – a process very similar to how gold was applied to illuminations. (Salaman 8; Gall, 1967 28) (Figure 7)

Leather items were also embroidered, appliquéd, and decorated with sewing elements. Shoes were embroidered down the vamp with fine silk thread of different colors, a technique that started as a functional element to close the top of the shoe, and continued after the design of the shoe changed (Grew and de Neergaard 77). (Figure 8) Similar embroidery was used to reinforce the top edge of ankle boots. (Mould, et al. 3263) Many embroidery techniques, including couching and metal thread work, were done on garments like glove cuffs. (Waterer 1968, 71) There are also examples of tablet-woven seam edges on leather pouches (Egan and Pritchard 344 - 347), although the textile threads have not survived burial. Lines of decorative stitching have been found on girdle remnants as well. (Egan and Pritchard 37 - 39; Mould et. al 3263)

Cutwork and filigree work are possible, because cut leather does not fray like fabric. Simple circle drive punches were used, as well as various shapes and slashes. Shoes with 'The windows of St. Paul's' were described in Chaucer, and archaeological finds support this (Grew and de Neergaard 79 - 83). Belts were also filigreed (Egan and Pritchard 47), as were book covers (Gall 1967, 11), gloves, and doublets. (Waterer 1968, 69 - 71; pl. 33) (Figure 9 – 10)

Metal mounts were also used to decorate leather items. Simple to complex shapes were mounted to belts with rivets or were sewn on. These mounts could be made from high end materials like gold and silver, or from non-precious materials like lead, iron, copper, tin, or alloys (bronze and brass). These base metal mounts may have been gilded or silvered, or possibly painted, as well. Some mounts included precious or semi-precious stones as additional decoration. (Egan and Pritchard 162 - 246) Horse tack and spur straps were often decorated in this way. (Clark) (Figure 11)

Vegetable tanned leather offered unique decorative possibilities that couldn't be done with alum tawed leather. Vegetable tanned leather is very flexible while wet and its surface can be molded and decorated in this state. When dry, the leather rehardens, holding its shape and retaining any decoration.

Vegetable tanned leather can be molded into fairly complex shapes, depending on the heat of the water used to dampen it. *Cuir bouilli* (boiled leather) is a technique used to make very hard leather items like armor and drinking vessels. The water should not be boiling; the best temperature is between 140 and 180°F, based upon personal experience and other re-creationist experiments. Once soaked in the hot water, the leather becomes very elastic and stretchy, and can be formed into curves and shapes. Once it cools, it can still be molded, but not to a great extent. After such heating, the leather is more compact and significantly harder. Leather items can also be dried in an oven on low temperature (approximately 150°F or so) until all the water is evaporated. Such items need a 'last' (mold form) inside to keep the leather from flattening while drying.

When this technique was discovered is unknown – but by the medieval period, many items for drinking (cups, flasks, jugs, etc.) and containers were being made with this method, as were armor for man and horse. (Waterer 1968, 62) In *Canterbury Tales*, Chaucer says of Sir Thopas: 'His jambeaux were of quirboily' referring to his leg-guards. (Sir Thopas line 164, quoted in Waterer 1968, 92) Items hardened in this way can also be decorated with paints, dyes, and stamping, although stamping must be done after the initial soaking and stretching, but before the final drying for the design to remain clear on the leather. (Figure 12)

Stamping (called engraving or punching in some sources) is probably the most common method of decorating vegetable tanned leather. It depresses areas of the leather, creating designs. The leather is dampened, and then a metal or wooden stamp is pressed into the leather, usually by hitting it with a mallet. Brass or clean (not rusted) iron is used for such tools to prevent dark marks on the leather.

Stamping is easily recognized on items with repeating single motifs, especially on book bindings and scabbards. Many of the stamps were quite simple designs like fleur-de-lis, cinquefoils, and latticework, but more complex designs have also been found. (Figures 13) Heraldic motifs, religious icons, and personal initials (including full name stamps) were also used as decoration. (Egan and Pritchard 40 – 45; Cowgill 44; Cherry 304 - 306)

In contrast to single motif stamps that create a specific image, some designs were created by using a stamp to fill in the background, creating a picture in the 'negative space.' Such designs are contrasted with single motif images because multiple copies of the same subject aren't identical. (Cowgill 43; Egan and Pritchard 46) (Figure 3, 4, 6, 14) Backgrounds of round 'pimpling' (Figure 14) were very common. Rouletting wheels (similar to stitching wheels and pattern tracing wheels) may also have been used, as well as a fork like tool called an pricking iron. (Cowgill 43, pl. 8; Egan and Pritchard 46)

Designs can also be pressed into the leather using flat and pointed tools that are not hit with a mallet. This technique is called modeling (or engraving in some sources), and can be used to create rounded shapes and

figures, and free-form floral designs. These specialized tools can be used much like pencils, with harder pressure making deeper designs. This technique is also suited to making 'negative space' pictures, pressing down the background. Interlace patterns that do not cut into the surface of the leather were also probably made with modeling tools. (Cowgill 41) (Figures 15, 16)

In contrast to stamping and modeling, embossing pushes the leather up from the underside to make the designs. These appear as low relief raised decoration. Embossed areas often include a 'leather plug' that supports the raised up portions of the design from behind. Most embossed leather items are made from wood and covered with leather, such as box lids or shield covers. This makes it difficult to tell if the design was made from the back (embossing) or from the front (modeling) – in fact, some authors do not distinguish between the two forms. (Cowgill 42) (Figures 1, 4, 5)

In addition to stamping, modeling, and embossing, leather can also be decorated by cutting (incising). Unlike stamping and modeling, incising actually breaks the top layer of the leather. (Figures 2, 4, 5, 6, 15) Incising was used to create very intricate knot work patterns on leather book satchels, as well as on large leather cases, and small personal items like shoes, scabbards, and pouches. A variation on the cutting technique involves scraping the top layer of leather in a pattern to create a 'fuzzy' texture. (Grew and de Neergaard 83 – 85; Egan and Pritchard 347)

Many of these techniques were combined into large scale items, usually boxes and cases covered in leather. (Figures 1 – 7) The German Leather Museum has several cases that appear to combine incising, stamping, and modeling-embossed areas, many of which are brightly painted. Several crown and coronet cases, as well as cases to hold relics and other religious items, are still preserved in museums – often with the original contents. These cases contain a variety of design styles. Many have an 'all over' design of scrollwork, while others display mythological and religious scenes, such as interpretations of Saint George and the Dragon. (Figure 5) Heraldic displays often accompany crown cases, presumably the arms of the royalty. There are examples of at least two different crown cases that have the same sets of arms (the Holy Roman Empire on the left: *Or, an eagle sable,*

and on the right Bohemia: *Gules, a lion rampant, queue-fourchy argent*), both intricately carved and painted.

(Figure 2)

Comparison to Modern Re-creationist Leatherwork

Modern re-creationists recognize the necessity of leather for items like shoes, belts, and pouches. Items covered in leather, such as boxes, chests, and carrying cases, seem rarer, however. These items appear to have been very common in medieval Europe, but usually aren't seen at modern re-creationist events. Many garments would also have been made or trimmed in leather, but are not commonly used by re-creationists.

There are many designs and styles of leather items to choose from – either 'do it yourself,' or purchased items from specialty merchants who cater to the re-creationist market. Even when modern substitutions and concessions have to be made due to availability and cost, the decoration of leather items can easily approximate the medieval counterpart and add to the overall aesthetic.

Most items are not decorated correctly, however. Some re-creationists assume there was no decoration or color at all, based upon utilitarian items found at excavation sites. This is because the leather from these sites comes out of the ground a uniform brown/black color, and most items do not show any original coloration at all.

Medieval paintings and illuminations also show some very basic shoes and belts, along with more decorative items. However, these are paintings, not photographs, and there are many extant and excavated items that are highly decorated to show that it wasn't all plain brown or black. (Figures 1 – 16)

Most re-creationists who wish to decorate their leather goods do not appear to look towards medieval leather examples for inspiration, unfortunately. Instead, they seem to take their cues from modern leatherworking techniques, or base their designs upon concepts that, while possibly medieval, aren't appropriate for the items in question.

One of the most striking examples can be seen in the use of interlace. 'Celtic knot work' is one of the most

popular designs used on re-creationist leather items. Few, if any, of the designs look like the extant examples, however. Interlace patterns were used on leather – it was fairly common, and seen for several centuries in different cultures throughout Europe. Excavated scabbards in London and York support this. There are also extant examples of Irish book satchels with intricate modeled/embossed knot work patterns. But most modern knot work is based upon the Book of Kells artwork, which does not look like the patterns on the scabbards or satchels. Also, there are few, if any, examples of such 'Book of Kells' decoration on the extant boxes and caskets, which are very ornately decorated and painted. So while the source for the design is medieval, the pattern isn't accurate for the item being decorated. Compare Figure 16 to Figure 17 to see the differences between the types of interlace.

At the opposite extreme, floral scroll work is common to both modern and medieval leatherwork, but is rarely used for decoration by the re-creationist. The 'Western Floral' and 'Sheridan' type of work is very similar to the scrollwork on many of the cases and boxes, with flowing Acanthus leaves and open circles for specialized decoration. But this type of design is not often pursued by the modern re-creationist. Compare Figure 15 to Figure 18 to see the similarities and differences in the floral work.

In addition to these examples of period designs and how they are used (or not used) by the modern re-creationist, the way space is filled in can be very different between the modern and extant examples. Many modern examples often contain just one design element, with lots of open space. As can be seen on the extant examples, this was not usually the case for medieval leather items. Virtually all of the items from the German Leather Museum appear to have all visible surfaces covered with designs, some of which do not seem to fit with the 'main design.' This includes small 'vignette' scenes on the sides of boxes, as well as corner decorations that complement the central image. All over designs, and those with all over backgrounds, appear to be almost completely absent in modern re-creationist leatherwork. Even the simple belt with the initial 'S' stamped along the length (Egan and Pritchard 15) (Figure 13) is not often seen today.

The use of color has changed significantly as well. The variety of colors on the German museum pieces is

amazing. With the greater range of colors in acrylic paint available to the modern re-creationist, the pure 'heraldic' hues would be easy to reproduce. Most modern leather items are only dyed or very simply painted, though. Painting an entire piece is usually not done, and modern leather dye doesn't create the same effect seen on the painted originals. Modern leatherworkers will use stains and antiquing techniques to highlight the grain structure, letting the leather show through. The re-creationist leatherworker seems to follow this practice, which appears to be a modern aesthetic rather than a medieval one, based upon the highly painted examples.

Summary

Leather items have always been fairly easy to decorate. Hand-tooled modern saddles are similar in complexity to the crown cases of medieval Europe and often bear similar floral motifs. The simple scabbard decorated by a modern Boy Scout is no more complex than a scabbard from 12th century London – both may even have the name of the owner stamped on it! And the tools of a modern leatherworker may be of zinc covered steel instead of brass or wood, but many of the stamp designs available now would not be out of place in a medieval workshop.

The major noticeable difference between the historical leather item and its modern counterpart is in the aesthetic that governs its decoration. Determining what is truly correct, even though it may look wrong to the modern eye, is something that the re-creationist must overcome, in order to recreate a truly accurate historical representation. Modern, rather than medieval, ideas and uses of decorative techniques seem to dominate in re-creationist leatherwork. While these obviously appeal to the modern person, they are not the same as what a medieval European would appreciate in leatherwork. Items decorated in such a way would probably seem very strange and out of place, based upon the extant examples - just as some of those examples seem garish and 'not what was expected' to the modern re-creationist. This difference in appeal is at the heart of the aesthetic difference and makes recreating accurate items difficult.

The reasons for the aesthetic difference between modern and medieval leatherwork can be hard to pin down.

The modern art of leatherwork is declining, so there are fewer artisans to create work and pass on information. For the person new to leatherwork, it is difficult to know where to start looking for historical information. There are not many primary sources for comparison, fewer still available or translated into English. And most sources are written by scholars, not leatherworkers, which makes it hard to know if the description of the leatherwork is accurate. There is growing scholarship in this area, with more books being published that are accessible and appealing to the re-creationist. The Museum of London series *Medieval Finds from Excavations* is particularly useful in this regard. As additional items come to light and more is published in English, the modern re-creationist will have more information and examples to draw from, and hopefully new leather items will be closer to their medieval counterparts than ever before.

List of Pictures included in the Appendix

Figure 1: Case with embossed leather and metal fittings. The painting is Italian. Dated to the beginning of the 14th century. German Leather Museum. (Gall 1965, pl. 1)

Figure 2: Leather case for the Imperial Crown. Incising work, stamping, and painting. Dated to 1352. Prague. (Gall 1965, pl. 2)

Figure 3: Case with the arms of the von Rican family. Incising work, stamping, and painting. From Prague, between 1376 – 1378. German Leather Museum. (Gall 1965, pl. 3)

Figure 4: Freudenberg leather case. Incising work, stamping, embossing, and painting. French, dated 1350. German Leather Museum. (Gall 1965, pl. 4)

Figure 5: Small box of the sleeping chivalry. Incising work, embossing, and painting. Northern French or Flemish. Dated to the second half of the 14th century. German Leather Museum. (Gall 1965, pl. 5)

Figure 6: Leather case for the donation cup of Erbach. Incising work and stamping, with the rest painted. Dated to 1440. Erbach. (Gall 1965, pl. 7)

Figure 7: Round shield of the armory of the Salzburg Archbishop Wolf Dieter von Raitenau. Goldleaf and paint. Venetian, dated to 1600. German Leather Museum. (Gall 1965, pl. 9)

Figure 8: Embroidered vamp stripe on ankle-shoe. 3 rows of stitching using red, white, and green silk. Early/mid 12th century. Museum of London. (Grew and de Neergaard 80)

Figure 9: Boy's Jerkin. Tooled lines with stars and heart filigree work. Elizabethan era. London Museum. (Waterer 1968, pl. 33)

Figure 10: Shoe with openwork decoration. Lunate, circular, rectangular and cruciform motifs. Early/mid 13th century. Museum of London. (Grew and de Neergaard 16)

Figure 11: Leather straps with metal mounts. Dated 1150-1450. Museum of London. (Egan and Pritchard pl. 5)

Figure 12: Horse Crupper. Painted leather. Created beginning of the 16th century, modified 1526. Salzburg. (Gall 1965, 134)

Figure 13: Leather girdle with stamped decoration. Late 14th century. Museum of London. (Egan and Pritchard 40) (photograph 4:1)

Figure 14: Two-legged mythical creature, showing background fill stamping. Detail from Figure 3. (Gall 1965, 59)

Figure 15: Crozier case for the Bishop of Aldobrandini. Incising and modeling. Italian, dated to 1475. Victoria and Albert Museum. (Gall 1965, 157)

Figure 16: Budget (book satchel) of the Book of Armagh. Leather modeling. 11 – 12th century. Dublin. (Waterer 1968, pl. 60)

Figure 17: Billfold pattern with 'Celtic knot work' decoration. Modern. (Tandy Leather Factory Craftaid 2033)

Figure 18: Billfold pattern with 'Sheridan Style' decoration. Modern. (Tandy Leather Factory Craftaid 2074)

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