Making Openwork Shoes

Robert of Ferness, OL

Pennsic 50, 2023 (revised)

Examples of surviving shoes from The Netherlands posted to the Dordrecht Ondergronds Facebook page (A: Sept. 12, 2022; B: Oct. 23, 2019; C & D: Sept. 5, 2022); no attributions for the photos were provided. B. was listed as 14th century, dates of the others were not specified.

A.

B.

C.

D.

Introduction

In this class you will learn some of the concepts of making an openwork 14th-century shoe. We will use modern materials and techniques for the most part, but also cover historical differences so that you are aware of them. The goal is to have you complete one shoe during this course and use that knowledge and experience to make the other one at your convenience.

The materials fee covers the cost of the leather (2 soles, 2 uppers), thread for side seams and sole seams, cardstock, 4 harness needles, this 13-page handout, and optionally some leather laces. (It does not cover an awl, knives, scissors, marking pens, cutting board, etc.)

Note that all instructions below assume your left and right foot are about the same size. If they differ significantly, you may wish to go through the patterning process twice for a best fit for each. The leather we are using for the uppers, however, is fairly stretchy and forgiving so that may not be necessary.

For a list of materials and tools provided and needed, see Appendix A.

Summary of the Process

1. Sole: Trace your foot onto cardstock
2. Sole: Adjust the tracing to determine the shape of the shoe sole you want
3. Sole: Transfer the sole design onto thick sole leather and cut it out
4. Sole: Measure the perimeter of the sole

5. Upper: Trace the outside edge of a provided upper design template onto cardstock
6. Upper: Adjust the upper's length and/or width to match the sole's perimeter measurement
7. Upper: Trace a design onto thin upper leather and cut it out
8. Upper: Sew the upper's side-seam

9. Both: Sew the upper to the sole inside out
10. Both: Soak the assembled shoe in water and then turn it right-side out
11. Both: Let dry, then add laces

Make the Soles

1. Wearing socks or hosen, stand on cardstock placed on a hard surface and trace your foot with a pencil (it is often best to have someone else do this for best accuracy). Hold the pencil snugly vertically against the foot as you trace it.
2. Sketch ¼" seam allowance around the tracing. Smooth out the toe area and add some pointiness there - note that the point should be out front of the long axis of the shoe, not directly in front of the big toe. See Figure 1 for an example.
3. Cut out the sketch for use as a template on the sole leather.
4. Trace the sole template onto the thick sole leather's smooth, grain side with a scratch awl or marker - IMPORTANT: flip the sole template from one side to the other to make a one sole for each foot.
5. Use the box cutter knife to cut out the sole according to the tracing you just made. Keep the blade of the knife as vertical as possible. You may need to make multiple passes to cut completely through the sole leather. Mark each sole on the rough, flesh side with an L or R to reduce later confusion.
6. Encircle the perimeter of the sole snugly using non-stretching thread, then measure and record its length (for best fit you want an upper of the same measurement along the edge that will be stitched to the sole).

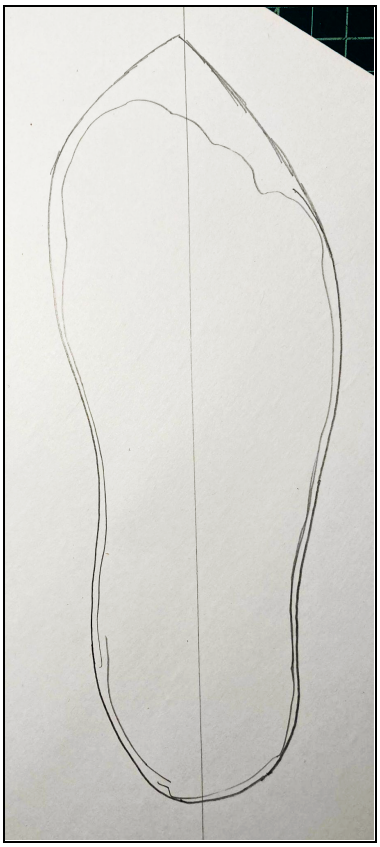

Figure 1: a tracing of a foot with an added seam allowance and a sketched point extending from the toe. Note that the point is aligned on the axis of the foot and not on the big toe.

Make the Uppers

1. Trace just the edge of one of the supplied design templates onto cardstock to form your custom template (don't trace the design itself).
2. Use the string from step 6 above to check the length of the upper's edge that will attach to the sole. (IMPORTANT: do not include the ankle edge nor the two end edges.)
3. The templates are made to an average men's shoe size of about 10 (US), so you may need to make adjustments.
    a. If the lengths match, cut out your template and skip to step 4.
    b. If the lengths differ, sketch out adjustments on your upper pattern so that its sole-seam measurement matches the perimeter length of your sole.
    c. Tweak the pattern across the ball of your foot and/or the length of the toe.
    d. This adjustment process may take some trial and error and possibly multiple attempts.
    e. Once the perimeters match, cut your custom template out.
4. Use your custom template to cut out two uppers from the thin leather, tracing it with a white gel marker or cutting very carefully with a rotary cutter, scissors, or a curved-blade X-Acto knife.
    a. IMPORTANT: flip the upper template from one side to the other to make one upper for each foot.
    b. NOTE: the smooth, patterned "grain" side will be the exterior of your shoe; the fuzzy, softer "flesh" side will be on the interior.
    c. Suggestion: with a white gel pen, mark the upper on the flesh side with an L or R to reduce later potential confusion.

Regarding leather orientation: if you decide to continue making other pairs of shoes and need to cut out your own upper from a larger piece, note that it's critical to align the upper template lengthwise on the hide. You want the leather to stretch side-to-side on your shoe, around your foot, rather than front-to-back along your foot.

Apply a Historical Design to Uppers (See Figures 2-4 or Appendix B)

1. Select one of the historical design templates and position it on the smooth, grain side of an upper, centering it as best you can. If it does not fit well, it will be necessary to consider how best to increase or decrease the size of some of its aspects, remove or add some of them, choose a different design, or make one of your own (see Appendix B).
2. Trace the design onto the leather upper with a white gel marker, going slowly and not pressing hard (to avoid the leather puckering or shifting).
3. Use a white gel pen to X out the areas to be cut away.
4. Flip the template and trace the design onto the other upper. Again, X out the open areas.
5. Cut out the design. Use one or more X-Acto blades. In general, curved blades work best for long straight or curving lines. Short, angled blades and squared-off ones work best for corners and little rounded or triangular projections. IMPORTANT: be sure to cut out the areas you don't want rather than the elements you want to keep. Been there, done that!

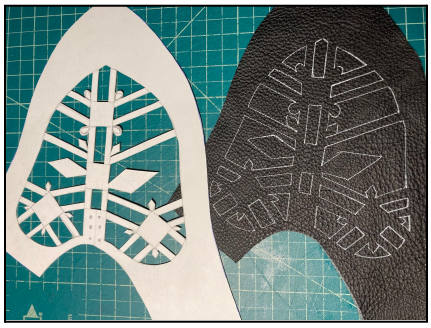

Figure 2: the template and its tracing in white gel pen on the leather upper. (The small nodules will be more completely defined by carefully cutting away the leather at their bases.)

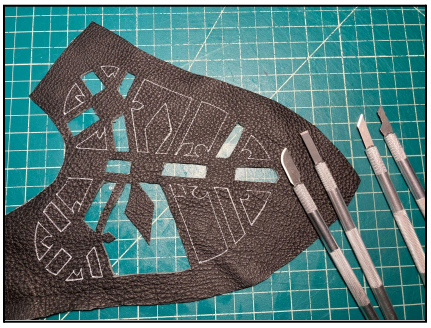

Figure 3: a variety of X-Acto knife blades facilitates cutting the leather: curved blades are best for long lines; short angled ones work well for shorter lines; a square blade is best on corners and delicate parts.

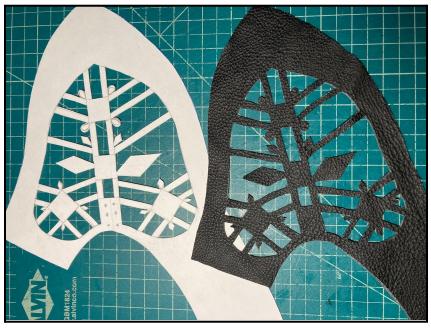

Figure 4: the final result, with the upper ready for stitching to the sole.

Ornamental punches: as apparent on the cover page (D) and in Figure 16, many historical shoes have punched-out holes in the toe area, around the back of the ankle, and/or within the instices of other design elements on the instep. The shapes of these holes vary greatly and the instructor has a few punches that you may use to decorate your shoes if you wish. Please use the hide mallet and Poundo board with the punches to make the holes.

Finalize the Uppers

1. OPTIONAL: use a butane torch to burn off the numerous leather jaggies projecting over the edges of the cut-outs in order to make a much cleaner-looking design - even the sharpest X-Acto blades do not remove all of these; note: do this outdoors because burning leather is not the most pleasant of smells; make quick passes of the torch at different angles and apply it from sides of the leather; it's best to start further away and use quick passes until you find the sweet spot that burns off the bits without harming the main lattice - take care, it is easy to burn off details or cause them to shrivel.
2. Cut a short (~1-inch) slit in the upper, from the ankle toward the toe, to help the shoe go onto your foot.
3. Punch holes for laces (two on each side is the usual number) and design elements, if any.
    a. CRITICAL: if using a hide hammer with a punch, place at least two thick pieces of scrap leather between your shoe and a sturdy surface before hitting the punch. Or use a self-healing cutting board or Poundo Board or similar surface.
4. Sew the upper's side seam using saddle stitch through small holes made by an awl, or use a whipstitch on the fly with glovers needles. Recommendation: start at the top edge and work down for a nicer appearance - any difference in length can be trimmed away along the sole. Also note: the stitch / seam should be on the inside of the shoe, which means that the smooth, outside grain surfaces of the leather will be against each other and project into the shoe a tiny bit (the leather is so thin and flexible that it does not prove to be uncomfortable). See Figures 5-6.

Figure 5: the first hole on the side seam - the leather is grain to grain (smooth sides together) and these edges will project into the shoe.

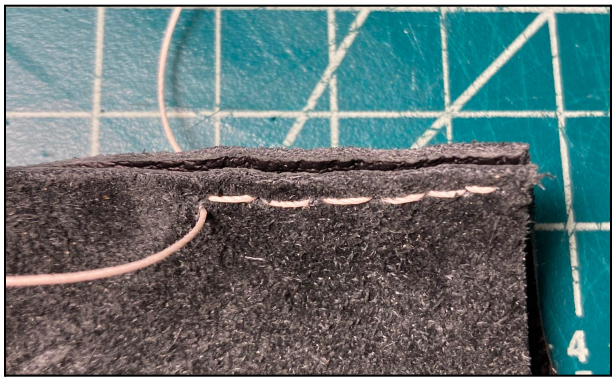

Figure 6: a saddle stitch moving along the seam from the top of the shoe (on the right) toward the bottom (on the left).

Join the Soles and Uppers (See Figures 7-9)

1. Measure out a bit more than a full arm span of waxed linen thread and thread one harness needle onto each end.
2. Dampen the edge of the sole to make the work easier and reduce the chance of tearing the leather during stitching.
3. Align the sole and upper such that the rough (flesh) side of the sole is facing you and the smooth (grain) side of the upper is behind it and facing you as well. The shoe will be inside-out when you're done.

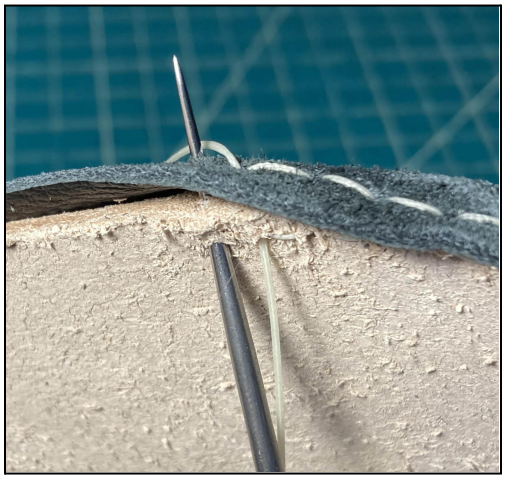

Figure 7: the awl pierces the sole from the flesh side and comes out through the edge, then pierces the upper from its grain side and comes out straight through its flesh side.

Figure 8: a run of saddle stitches from the toe along one side of the shoe.

Figure 9: parallel runs of saddle stitches along both sides of the shoe.

Figure 10: trimming away excess upper, the last step before soaking and turning the shoe.

4. Use the stitching awl to make your first hole in the tip of the shoe: push the awl diagonally through the thickness of the sole leather and then through the upper leather from one side to another; take care to make the sole hole about 45 degrees and not too shallow, so that it does not tear out (if it tears out while pushing the awl through, make a new hole slightly to one side or the other).
5. Push one needle through that first hole and draw the thread to half its length.
6. Make a second hole a few millimeters to one side of the first hole, and then pass one needle through it in one direction, and the other needle through the hole in the opposite direction; pull both threads tight.
7. Repeat this process until you have sewed about two inches of the sole to the upper.
8. Now, make a second arm span of thread and attach two harness needles to it as well.
9. Pass one of the needles through the original first hole (re-open it with the awl if necessary).
10. Proceed down the other side of the shoe for 4-5 inches.
11. Switch back to the first thread and needles and continue down the first side.
12. Repeat alternating sides until the two threads meet up at the heel – the idea here is to work both sides back and forth in short sections so that the sole and uppers stay aligned with each other (this can be done with just one pair of needles switching between threads if you don't like one pair dangling around as you work).
13. When the threads meet, work each one backwards for an inch or so back through its previous holes to form a tight seam without the need for knots.
14. Trim the excess upper leather *very carefully* with scissors or a knife; if you slip and cut any of your stitches, you should get a short length of new thread on and two needles and restitch that section of the seam. See Figure 10.

Figure 11: A pair of openwork shoes "in the style of" for His Majesty King Arnthor. See Appendix B for advice about making your own designs.

Finish Them!

1. After you attach the uppers to the soles, soak them into room-temperature water for about 10 minutes.
2. Remove the shoes from the water and turn them right side out. Take care with the delicate uppers.
3. Add laces to finish (finger-loop braids, thin bits of leather lace, cord, etc.).

Tips

- You may want to wear a felt insole for comfort on hard floors.
- Leather soles can be slippery on wet surfaces, grass, and pine needles!
- Save your sole and upper templates (you may need or want them in order to make replacement pieces - especially the sole if it wears out - or another pair); suggestion: label both templates with your name and date so that if you end up making more pairs they don't get mixed up with others.
- Use a rubbing-alcohol pad to remove excess white gel pen marks if any appear on the outside of your uppers after you have cut out your design.

Historical Notes

The process used in this workshop is not by any means historical, but it should serve to produce a pair of shoes that fit well and look nice.

Medieval shoemakers (cordwainers) used wooden lasts when attaching soles to uppers, and they used boar-bristle needles instead of metal ones. We don't know how they sized the leather or made the designs. As apprentices, they worked for years to learn the craft - we have just a few hours to complete the same kind of project.

The leather for the uppers used in this workshop is not historically accurate. If you buy leather for a similar project, and you want to be historically accurate, you would want to choose vegetable-tanned leather that's thin and flexible. Historically, it most likely would have been goatskin or calfskin.

Although these shoes appear rather delicate, the instructor has worn a pair while moving gear, hauling crates, setting up archery targets, hopping in and out of vans and pick-up trucks, and walking across uneven fields and campgrounds all without affecting them: the leather is tougher than it seems. But your mileage may vary, especially if you use other leather for another pair, so it might be best to reserve these for court or gentle activities.

Making Repairs

If you wear your shoes often for any length of time, they will probably need repair at some point. Most likely either a seam will open up, the sole will wear thin and develop a hole, or one of the delicate lattice attachments will break.

In the former situation, soak the shoe in water and turn it inside out, then restitch the sole to upper, as done originally. There is no need to cut off the sole: just apply new stitches over or amongst the existing ones in the area where the thread has given out, plus perhaps two inches to either side as reinforcement. You can try to use the same awl holes, or just make new ones, or some combination.

If your sole wears out, soak the shoe and turn it inside out, then carefully cut the sole away. You can pluck out the old thread if you want or just leave it in place and stitch over it. Cut a new sole from your save pattern and stitch to the upper as done originally, soak it, and turn it rightside-out.

If one of the lattice connections breaks, you might be able to carefully stitch it back together, possibly needing to turn the shoe inside-out first, although that depends on the location of the break and your dexterity. The instructor has done this with one shoe and the repair is invisible when worn. See Figures 12-13.

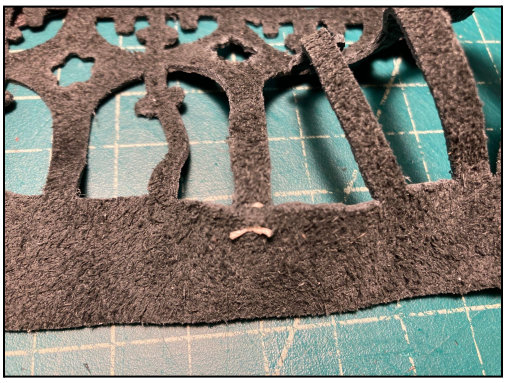

Figure 12: if you slice through or later break a piece of your openwork lattice, use an awl, harness needle, and thread to sew them back together within the thickness of the leather, with the two edges butted against each other.

Figure 13: external view of the repair shown in Figure 12.

Beati sutores in æternum!

Feel free to contact the instructor via email (kps1@cornell.edu) or at an event to discuss shoe projects. Visit www.ShoesByRobert.com for resources etc. This document and related design files can be downloaded at https://www.shoesbyrobert.com/dordrecht/ and used to teach others.

Appendix A: Materials and Tools

Materials needed for one pair of shoes:

- Leather for soles: 9-10 oz. vegetable-tanned leather
- Leather for uppers: thin and flexible
- Waxed linen thread to sew the uppers closed on their sides, and to attach the uppers to the soles (you will need about two arm spans for each upper/sole seam, plus about 18 inches for each upper's side seam); this thread will also be used to measure soles and uppers
- Harness-maker needles (either 2 or 4) for sewing uppers to soles
- Cardstock to trace your foot for sole sizing and to form a template for cutting uppers and making a design
- Material for laces (finger-loop braids, thin bits of leather lace, cord, etc.)

Tools needed (required unless noted):

- Box-cutter / utility knife to cut out soles from thick leather
- X-Acto knife with various shaped blades to cut design out of uppers in both cardstock and thin leather (curved for long lines, angled for short cuts, square for trimming and edging)
- Rotary cutter to simultaneously trace and cut out thin-leather uppers (optional: can use a white gel pen with scissors, X-Acto knife, or box cutter instead)
- Pencil to trace foot and sketch sole shape and to draw a design to be cut out of uppers
- Scratch awl to trace sole design onto sole leather (optional, can also use a pencil or thin permanent marker)
- Stitching awl to make holes in uppers and soles when sewing them together
- White gel pen for tracing uppers for cutting and/or tracing designs from openwork template to uppers (optional, careful knife work can be done directly onto thin leather; also optional: small alcohol cleaning pads to remove excess white gel pen markings)
- Cutting mat or board
- Scissors or knife to cut off excess upper edges after stitching before turning
- Rotary leather punch for lace holes, and/or leather punches, hide hammer, Poundo board or thick scrap leather for punching lacing holes and/or design elements, if relevant
- Small butane torch for burning off jaggies from the uppers (optional, but gives a cleaner finish)
- Bucket for soaking shoes (optional, could be done in a sink)
- Small pliers for pulling needles (optional, useful if the needle is too slippery to pull it through the sole and upper leather during stitching)

Appendix B: Design Your Own Uppers

If you do not wish to use one of the provided historical designs, or none of them fit well onto your uppers, you can design your own. Figure 16 shows a number of other historical designs that may serve as inspiration for your own. Figure 11 shows a design “in the style of” made by the author.

Use cardstock sized to your upper to sketch out your design, following the advice below. Once you are satisfied with your design, cut it out and trace it onto the uppers with a white gel pen.

- ➢ Consider that you will probably need to add a slit from your ankle down the instep for an inch or two – or you might not, if the design itself can open there to allow you to put on the shoe.
- ➢ Consider the addition of 2-3 lace holes along that opening on each side.
- ➢ IMPORTANT: be sure to leave solid at least ¾” runner along the entire perimeter (where the upper attaches to the sole and around the ankle).
- ➢ Leave solid at at least 2 ¼” in the toe area (see cover photos of historical shoes).
- ➢ Suggestion: draw a line from the tip of the toe to the closest part of the ankle along the instep in order to have a reference for help in creating a symmetric design.
- ➢ Suggestion: mark a point on the above line 2 ¼” from to toe and then sketch from there to the ¾” runner line as a way to indicate the toe area that will be solid.
- ➢ Keep the design at least ¾” away from the side seam.

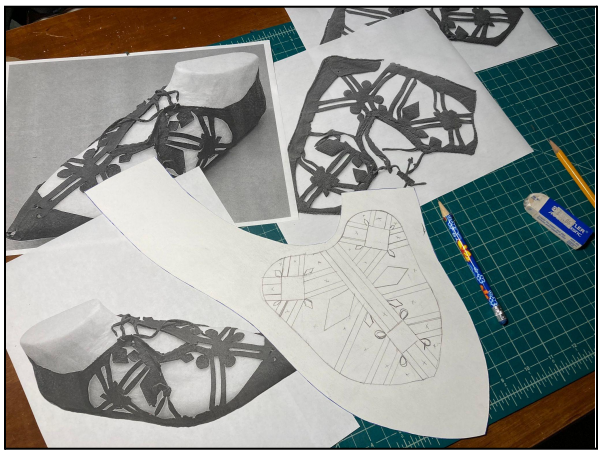

Figure 14: designing the upper’s openwork using photos of a historical shoe. Be patient. The eraser is your friend.

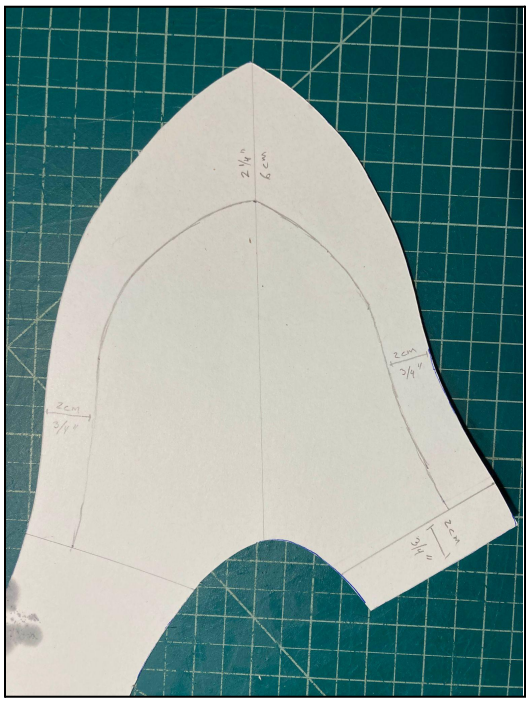

Figure 15 (right): defining the openwork area on the upper, leaving margins along the bottom and on each side, with a reserved area for a solid toe.

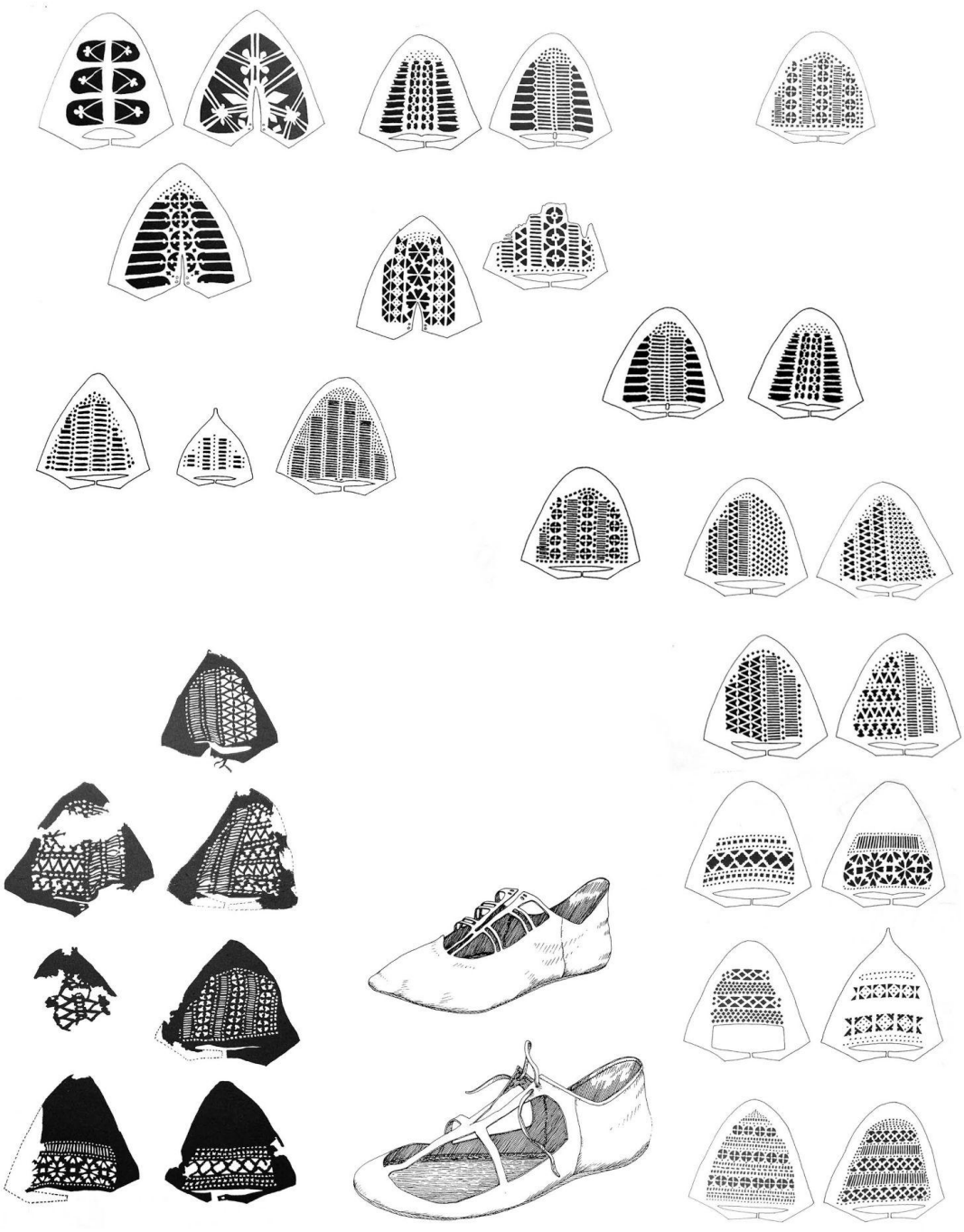

Figure 16: various openwork and punched designs illustrated in *Stepping Through Time: Archaeological Footwear from Prehistoric Times until 1800* by O. Goubitz, 2007, SPA Uitgevers.