Transcript – patterning Obenaltendorf shoes.

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Sometimes you get lucky and find a picture of the shoes you want – maybe it's a reconstruction, maybe it's a flat pattern you found on Pinterest. Odds are, it's more schematic than anything and just scaling it up or down with your printer settings isn't going to get you there. The goal of this class is to go through a detailed process of how to take something in a photo or book and work through the steps involved to adapt a pattern 'unfolded' from a historical example and make it fit your feet. I'll post links at the end of the class – one will be a pdf of this powerpoint, and the other (give me an hour's lead time) will be a tidied up transcript of everything I've said. It's a poor substitute for an in-person workshop, but feel free to get in touch if you have questions once you start working on your own – I can help you troubleshoot if you send pictures, or we can video chat to figure stuff out together. For those of you who already were at the Before They Wore Turnshoes class, there are a lot of variables that come into play and the process will depend on the exact design you're looking to replicate – is it a symmetrical or asymmetrical pattern, what does the instep design look like, and is it a single or double lace. The example I will be using will be sort of the 'worst of all possible worlds' design so we will cover all of the 'extra' steps that may or may not be necessary if you choose a style that doesn't incorporate them.

Some of you might be familiar with the sacrificial sock, duct tape bag, or other similar methods for patterning shoes if you don't have a shoemaker's last. Those methods can sometimes provide a really good shortcut to a shoe pattern – you basically just encase your foot, draw the shape of the finished shoe, and then cut along the lines to get a pattern. That can sometimes get tricky with this type of shoe for a couple of reasons. Firstly, it is really easy to draw a line that looks like it's in a good spot, but then when you cut along it, it doesn't flatten out in a way that transfers to a sheet of leather. Some of that can be overcome by soaking and stretching, but not always. The other important factor with these shoes is the toe area, where there is usually a fair bit of overlap. The sock/bag/tape method doesn't really work in overlapping areas, and getting the toe area to look right is actually the hardest aspect of this shoe style. The other thing is that instead of basing this tutorial on a really generic pattern and just saying 'this is how to scale it up or down,' I wanted to show how to adapt the pattern for any specific example you might run across. No two finds of these shoes are exactly alike, and there might be a specific one that is just right for your persona or really speaks to you on an aesthetic level, and I want to try to give you some tools to apply to whatever particular shoe you want to replicate and how to go through some trial and error stuff before getting to the point where you're cutting up actual leather. So the method I'm going to walk through today is not the fastest or a quick and dirty solution, but in going through it some of the discussion is also just about looking at how these shoe patterns work, how things wrap around the human foot, and will hopefully leave you with a more detailed holistic understanding of what affects what so you can continue to refine a pattern. I'll also share some things I learned the hard way about how to make a shoe that moves nicely with your actual feet instead of feeling like you're walking around in a Kleenex box. (show very first pair)

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We will start with some measurements and sketch a rough pattern, then will wrap that around the foot and fine tune it. As you work, cut away any excess material. If you cut too much or didn't have enough to start with, build on extra using duct tape and paper. Eventually, you'll transfer this much-fiddled pattern to a fresh bit of paper to use when cutting out leather. So make all the mistakes and

experiments you like at this stage – it is totally risk free unless the world runs out of paper bags and duct tape, in which case we are in big trouble anyway. Once this pattern is pretty close, if I'm making a style I haven't done before, I also like to do a trial run using leftover bubble mailers – they are about the right thickness and elasticity to give you a pretty good idea of whether your pattern is going to work before you waste any leather. You can trace your draft paper pattern, cut out a bubble mailer shoe, and then just tape the heel seams and lace up the shoe to check the fit before you commit. Since we can't be together in person, this is class will focus on steps 1 and 2 and getting you to your bubble mailer test shoe. The stitching required for this isn't especially complicated, but that's sort of another class and is really not something I can do via zoom – ideally I would have some scraps for you to practice on. But for those of you who do want to try this at home, I would love to see what y'all come up with, so if you've got a bubble mailer test pattern and have questions, if you want to send photos or video chat, I'm happy to help you troubleshoot or fine tune and can try to point you to some youtube tutorials for the stitching.

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To work through the basics of the pattern draft, you'll want string that isn't too stretchy (you want to be able to get an accurate measurement), a pencil, some tape, some heavy paper, and a pair of scissors. Also, just an FYI, if you plan to wear insoles or extremely thick socks that will require increased internal volume of the shoe, you may want to incorporate them into the measuring process. Trace your insole rather than your foot and make sure your circumferential measurements are made around the insole and foot together. I pad mine with a bit of 6mm felt and wind my legwraps down into my shoes and don't find I need to adjust the pattern to accommodate them, but the pattern itself is really quite forgiving. Similarly, if you know your feet spread out a lot when you put weight on them, you'll want to make sure you trace your foot while standing rather than sitting down. This may require a buddy depending on how flexible you're feeling.

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And you'll obviously want to have whatever photo or simplified pattern sketch you want to model your shoes on. In this example, I'm using the pattern for a pair of 3rd or 4th century shoes from a bog in Obenaltendorf. I was able to find a reconstructed drawing of the flat pattern online, I've seen photos of the shoes on the bog body's feet, and I've seen a reconstructed pair – none of this means I can just doodle something on paper and have it fit – so I need to use this as a starting point to draft my own pattern.

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I just want to go over a few items of terminology first – these are the parts of the foot that are relevant for when I'm talking about where we're measuring. I'll try to use 'inside' and 'outside' of the foot when talking about the medial and lateral sides, and then there's the ball of your foot, which is usually the widest, and is where your feet bend. The instep is where we have to think about the height of the shoe, and the achilles notch is that spot above the heel where you get blisters if your shoe rubs against the tendon. We want to make sure that doesn't happen.

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And here's the terminology I'll use for the shoe itself. The toe fan is the whole area made up of these narrow strips that will fold up to become the toe box. Individually, I refer to those as toe fingers – weird- or toe petals – also weird, maybe less so. The instep loops are the longer tabs that come up over, you guessed it, the instep, and the heel cup is the area formed by the curved back of the sole area and the two back flaps that are sewn to it – this is the only part of the shoe that is sewn. You'll also see here that the dotted outline of the foot is a little smaller than the part of the shoe that looks like it will become the sole. The reason for this is that we actually want the edges of the shoe to pull up around the foot a little bit because we don't want those notches to touch the ground. So we leave an allowance: the example allowances I use here (for the distance between the traced outline of the foot and spots like the base of the toe notches and the back edge of the heel seam) are based on my own fairly narrow Men's 8 foot. If your feet are bigger than a Men's 10/Women's 12 or if you wear EE or EEE width shoes, I recommend increasing this distance beyond my suggested amount as much as double. Similarly, if making shoes for a child or person with very very small feet, reduce this distance up to half. Part of the exercise of making this pattern is to determine what works for you, so the suggestions here are intended as a starting point only. When you get to the point of wrapping your pattern around your foot to test it, you'll see whether you need to trim more off or add more on with tape. SO:

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Trace your foot, being sure to mark the base of the notch between your big toe and second toe. Other toes are not important.

if you know your feet are the same size, do this once and you'll uses the same pattern reversed to make the opposite shoe – if you know your feet vary (more than a half size difference), go through steps 1-x for both feet separately.

Sketch a generalized curve around where your toes are, just to smooth out the line. This will form the general shape of the shoe.

Sketch a generalized heel slightly beyond your initial tracing. We want this seam in a spot where we won't be walking on it, so not directly under the heel, but too far away and it will make the shoe too large. 5mm allowance works well for me.

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Put a quarter (if you have very wide or large feet, try something larger in diameter like a milk jug cap, the empty core of a roll of electrical tape, etc. – this is just a visual aid that will represent the loop formed by the lacing when the toe fan is drawn together) near the base of the second toe (for an asymmetric pattern) or third toe (for a symmetric pattern). You want to make sure this is inboard of the bony joint at the base of the big toe. Paying attention to where this lands in relation to the toe notch, trace the same object onto the outline of your foot on your pattern paper and put a dot in the center.

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Now we need to get some measurements to help us proportion our sketch and get us from a not-to-scale drawing to an actual pattern. Now, you'll notice on this schematic, some of the lines are curved. This is because our feet aren't perfectly symmetrical (and some shoe patterns have the lacing closer to the outside edge of the foot rather than dead center), so to wrap a flat thing around a sort of conical

object means that points that correspond across the instep aren't going to be directly across from one another on paper. This gets more exaggerated the further up the instep we go. More on this in a minute.

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Using a piece of string, measure around the widest part of the ball of the foot. This dimension will give you the instep strap width (blue).

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Measure around your instep at its tallest spot – this is usually a finger width in front of your ankle/foot junction. This will determine the width of the flaps from that wrap over here (purple).

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Measure from the ground to just below your anklebone on both sides of the foot. This will determine the width of the two heel flaps (green). I like to make a knot in the string so that I can stand on one end and measure from the knot to my endpoint.

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Measure from the ground to the deepest part of your achilles notch. This will determine the height of the vertical heel seam (red).

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Toe fan:

Starting in the center of your circle, draw a line extending straight ahead. Draw another line at 90 degrees toward the inside edge of the foot. Add one more at 45 degrees, then fill in two additional rays on either side. Repeat this process on the other half of the toebox.

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Now sketch a 1cm buffer from that generalized toe line and put that quarter or bottlecap back on your foot. Use your string to measure from the ground up and over your foot to the edge of the bottlecap. You don't need to do this for each ray, just the ones at 90, 45 degrees, and straight ahead, but if you want to do each ray that's fine and won't hurt. Transfer that measurement from your buffer line out along the ray and mark that point.

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Connect those points in a sweeping curve – this is now the general shape of your toe fan and each of your petals will need to be at least this long.

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Using the rays you just drew as the centerlines of each petal, sketch them in. Leave the base of each space between petals rounded and taper the petals so that they're about 10-12mm wide at the tip. When it comes time to cut these out, leave them slightly oversize just in case.

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Now remember what I said about feet not being symmetrical? Because of that, we will need to rotate a few of the outermost petals we've sketched. For now, take the ones at 90 degrees and tweak them so that they are more parallel to their neighbor rather than radiating evenly from the centerpoint. One effective way to do this is to find the center of your foot tracing and draw new rays emanating from there, reorienting your two outermost petals to these lines. Doublecheck your string measurements and see if these need to be lengthened slightly. Add one more petal on each side, again parallel.

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Now we need to figure out the instep loops. Using your measurements for the ball of the foot and the instep (or your piece of string), you can put your foot back on the paper pattern and pinch the string together or you can use the slip-of-paper method. Using a strip of paper about 1.25 inches wide and six inches long, fold the last 1.5 inches down with a nice sharp crease. You can slide this along the edge of your foot, marking where you want the top edge of the shoe to hit every inch or so.

- For symmetrical patterns, use an imaginary line down the inside of your foot and leave an inch gap along it.
- For asymmetric patterns, move this line over to run parallel to the medial edge of the foot, starting at the space between your big toe and second toe.

By positioning this paper with the crease on the traced edge of your foot and unfolding it outward, you can transfer these marks to paper. You can essentially use it as a simulation of each instep loop and work your way down both sides of the foot. I suggest doing opposing pairs of loops together to make sure they actually meet (show what happens as you move up the instep). It crashed my powerpoint when I tried it, so I have no crappy video as a substitute for what I would have demonstrated in person. But basically, I lay the paper so that the crease follows my foot outline, then wrap it over my foot, mark where I want that loop to end, and fold the paper back down to transfer the mark onto the paper where I want the top curve of that loop to be. You can really see here what I was saying earlier about how the instep measurement is not a straight line on paper. You can use your string measurements to check your overall width at this point and see if you're on target – if you run your string under your foot to connect the marks where the outer edges would be, you should be pretty close. The other reason to use the slip of paper is that it will show you what the angle is, so you can mark along both edges of the slip if you want, this will be useful if you want to orient any cutwork patterns. Most shoes I've seen have two or three instep loops/tabs on the medial side – if you have small feet, make smaller tabs, and if you have very large feet, you can add a tab.

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This is where it becomes important to consider the exact style of shoe you are trying to create – you will need to know if it is a single (zig zag) or double lace (crisscross) closure, and you'll need to know what the tabs across the instep are generally shaped like. If you have a simplified diagram you're working from, you can connect the dots you made with your paper slip on the lateral side and then sketch the approximate shape of the loops. **For a double lace design, your dots will correspond to the spot where the lace emerges. For a single lace design, your lacing will run in a zig zag not balanced out by an opposing lace, and you want to place the tabs so that they alternate or are offset.** My sample pattern

has three big loops on the lateral side, plus a small attached tab where the lace is anchored. For now, I'm going to use my paper slip to distribute the three big loops across my instep. I'm going to draw in that extra lace anchor tab, and then add a corresponding short tab on the other side. Because it's a single lace pattern, I'm laying out my tabs to alternate, not match at the top of my foot. So I have three big tabs on the outer edge, two short tabs on the inner edge, and then the tab that is actually the corner of the heel cup.

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For some styles like the Obenaltendorf example there is one long tab that comes across the ball of the foot just behind the toe fan and meets its opposing tab with no gap (it overlaps instead where the thong will pass through both tabs tightly). For these, you'll want to ensure that the total distance across your paper pattern from tip to tip of these tabs is slightly longer than your ball of foot measurement AND that you have positioned these tabs so that when joined, they will sit far enough back from your toes that they won't flex with them. Here's how I check the width with my string.

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You can double check this by placing your foot on the pattern and lifting just your heel so that the ball of the foot and toes flex. The first notches back of the toe fan should be right at the line where the rest of your foot lifts off the paper or slightly behind. Basically, you want your toe box (enclosed by the toe fan) to articulate separately from the rest of the shoe. This will keep things from chafing and avoid creating a weak spot on the sides of the shoe where the leather flexes. Think about where cracks sometimes develop on mistreated leather boots – you want your whole toe fan to be forward of where that spot is.

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Now we get to the 'draw the rest of the owl' part – you know more or less where your loops and tabs need to go, so now it's time to play connect the dots and draw in more details based on your example pattern. It's never going to look perfect since your foot is not identical to a dead bog person's foot, and sometimes a flattened out historical example will have oddities due to the way the leather stretched over time. So do your best to capture the details, but don't change the location of any of your marks at this point – err on the side of your own foot. Here you can see I've sketched in my tabs a little more, but still will need to refine them. I'm going to hold off on adding all the details until I know that I'm in the ballpark.

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The last thing left is the heel cup. Now we mark the ends of the heel seam on either side – this would be where the curve of the heel transitions to a straight line on both sides of the foot. From that point, draw a line straight back, parallel to long axis of shoe, on either side. You can tinker with this too, but it will affect the shape of the heel cup. Having those lines angled so that they would converge somewhere past the point of the shoe will make for a snugger ankle, and having them angle the opposite direction to make a v somewhere past the heel will make for a wide ankle opening. This could be useful if your ankles are thicker than the part of your foot just below, but this shoe style is really forgiving enough that a straight line should work for most situations. So leave that nice and long for now, and measure perpendicular to that line and mark two additional parallel lines that indicate the bottom of the ankle bone and the height of the achilles notch. This gives you the minimum and maximum heights of the side

panels – you want it to come up high enough in the back but not rub against your ankle bone. This part will get fine tuned when you cut out your draft pattern and start folding it around your foot.

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Now we get to my favorite part – you have a pattern that might be pretty close! At this point, you can cut out your pattern, leaving the toe petals long, and put on your sock or whatever and try wrapping your paper pattern around your foot. You'll almost certainly find some things that you want to change, and this is a great time to do that, by cutting off parts that don't seem like they are in the right spot or adding more paper if you cut off too much. In this example, there was one toe petal that I wanted to rotate slightly, so I cut it off and taped it back on in a spot that seemed to work better. You can see from the exemplar I was working from that there's one toe petal that does come out of the radial alignment and there's a reason why – the tip of your foot isn't a perfect semicircle. There's no easy way to account for this since everyone's feet are so different, so you will almost certainly have to do this to one or two bits of the toe fan and it won't be the same as what works for me or what shows in the original. This is also a good time to check the toe fan for the positions of the lacing slits. I usually stick the quarter back on my foot right where I want that opening to be and then fold the toe petals back one at a time, creasing the paper where it hits the edge of the quarter. That mark represents where I want the tip of them to be, and then I measure down about 3/8 of an inch and mark that as the top of the slit for the thong. Once you've made any adjustments, it's time for my secret weapon – the bubble mailer pattern.

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Leather is expensive, but those plastic bubble mailers come free with Amazon packages. Regular bubble wrap can also work, and if you cover heavy paper like a grocery bag with a layer of duct tape, that works too. The main thing is that you have a flat sheet of something that won't tear like paper and will have just a bit of stretch and flex to it. For any shoe pattern I try for the first time, I like to do this as one last step before I commit to cutting leather. Trace the paper pattern carefully, and cut it out cutting to the inside of the line – otherwise you end up making everything slightly larger than you want.

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Once it's cut out, use duct tape or packing tape to simulate sewing up the heel seams – you might make a few alterations at this stage too – and use a piece of yarn as your thong to lace up the shoe. This is also a really good step because you can figure out where to put the slits in the toe petals. If you need to adjust it, you can just put tape over the slit you cut and make a new one in the right place. I screwed up two of these and had to do exactly that.

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Materials: I highly, highly recommend raw veg tan leather. While initially quite stiff, it becomes very pliable and stretchy when wet but holds that form when allowed to dry, which means you can more easily form the shoes to your feet. This is especially important for getting the heel to cup your foot – soak the shoe and stand on something that conforms to your foot shape, like a sandbag, beanbag, couch cushion, or you can use a darning egg to stretch the heel downward a bit so that the sole isn't completely flat all the way back to the heel seam. You can also round edges over and create stamped or

incised decorations like the originals and create a polished, period appearance. It will also darken nicely when oiled and fatted and will continue to darken in sunlight [image comparing new and old belts]. I would recommend not going wild with oil – veg tan starts out very dry, but leather wants fat more than it wants oil, and too much oil will cause it to break down. Modern products like Sno-Seal are good, with a mix of wax and oil, and I usually just rub mine with beef tallow any time they've gotten wet. Although it's tempting to go with the thickest possible stuff so the shoes are sturdier, period examples are actually fairly thin and they are much more comfortable that way. A mid-weight veg tan around 6-7 oz. will be quite durable for indoor wear or on grass, and even asphalt or gravel aren't bad if you use soft material as a liner like felt/wool, moss, grass etc.

Note on modern insoles inside period shoes: If you use a modern insole that has any rigid portions, you may see more rapid abrasion since the leather is caught between a literal rock and a hard place. You can also consider adding extra leather insoles or attaching a modern rubber sole. My anecdata is this: I walked 8 miles per day for a week at Pennsic and while in two days I wore halfway through the soles of one pair of shoes that I put my Superfeet insoles in (they have a hard plastic exterior to the heel cup), the shoes I wore with felt insoles on other days did not acquire any noticeable wear or damage. One solution I have not yet tested is to have modern insoles separated from the shoe by a layer of something that has give to it – neoprene, felt, 6mm closed-cell crafting foam etc.

The Marx-Etzel example preserves some of the stitching [image] and we can see that it used a single thread or very thin thong/sinew in a spiral – think whipstitch. The holes are punched 'edge-flesh' so that the seam is butted together tightly with the stitching hidden on the outside. to do this, I like to set the workpiece on a bit of scrap wood. You can lightly mark off a line about 3mm in from the edge on the flesh (suede) side and hold the awl at an angle, then poke the stitch hole to enter at your line and emerge from the cut edge right below the face of the grain side [diagram showing cross section]. Practice this on some scraps and if you find you aren't able to get a tight seam, you can always just punch your holes straight up and down and whipstitch that. As long as your stitches are evenly spaced and not too far apart (marking them off on the 1/8" marks on a ruler can be helpful), the end product will look tidy. When stitching, I like to start at each corner and work toward the middle. That way I can trim the vertical edge if I miscalculated.

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Factors that affect things:

Make sure the sides don't interfere with your ankle bone

Curving the vertical back seam slightly helps to create a nice heel pocket and stabilize the foot, but don't overdo it or it might pinch the achilles tendon.

If your heel seam is dragging on the floor, soak the shoes and make more of a heel pocket.

You can leave more space between the petals than you might think– historic examples use thinner leather, narrower fingers, wider finger spacing/less overlap, and don't necessarily eliminate hide the toes completely. Too little space or too many petals results in a bulky toebox and if you look at the extant finds, they don't actually need a lot of overlap like some modern 'ghillie' shoes have.

If the toe fan won't lie smoothly, make sure to use slits rather than holes for the thong and make sure they are slightly wider than the thong. This will help mash down one side of the petal so the neighbor can sit nicely alongside it.

If you're getting some puckering or gapping at the base of the toe fan notches, round the base of the notches between the petals – use a hole punch or cut a tight curve if you are able. This gives the leather space to stretch rather than creasing.

A lot of these issues, if they are minor, will sort themselves out if you wear wet shoes around for a while. You can also use a soft mallet to hammer the toe box flat around your foot while it's wet. Veg tan can forgive a lot of sins.

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For comparison, here's the very first pair I made after watching a youtube video about two years ago, and here's the pair I made after figuring out the method I just ran through. Hopefully it will save y'all from some of my early mistakes.