

SHAFTS: Sitka spruce is absolutely the best arrow wood. German spruce is also good. Port Orford cedar used to be the standard, but recently quality has slipped. Many cedar shafts are crooked and bleeding pitch. Other woods are available, each with good and bad characteristics. Save experimenting with them until you have more experience.

Shafts are sold in dozens by spine weight, a measure of their stiffness. The shafts will have a random spread across six pounds, for example 30-35 lbs. This is fine for our level of shooting. Spine weight is keyed to the draw weight of your bow. A 35 lb. bow usually requires 35-40 lb. spine weight shafts. The higher the spine weight, the more dense the wood, and so the heavier the arrow. Never shoot arrows with a spine weight below the draw weight of your bow. They won't fly well, and might crack.

Shafts for target arrows are sold in four sizes. The smallest generally available is 5/16" diameter, fine for bows up to 40 lbs. The medium size is 11/32", which is appropriate for bows of 40 lbs. and higher. Larger 23/64" shafts are preferred by hunters, though some SCA archers also use this size. Very light children's bows use 1/4" diameter arrows with very low spine weights. Recently ramewood shafts this size have become available. Aluminum and carbon fiber shafts are **NOT** allowed for SCA use.

Sand your shafts lightly with 320-grit sandpaper to prepare the grain for stain and sealant. Your shafts should be cleaned outdoors with nail polish remover/acetone/lacquer thinner to remove sanding dust and any remaining pitch. Wear vinyl gloves. Straighten the wood by sighting along the shafts and bending the shaft in the opposite direction of any curves. Do this slowly, and very carefully or you could break the shaft. No shaft will ever be perfectly straight.

Taper one end of the shaft for the nocks. Use a taper tool to give the correct angle. This tool is similar to a child's pencil sharpener. Some nock brands have a very short cavity. Test fit your first nock for a tight fit. If it isn't tight, cut about 1/16" from the pointed end of the taper.

Measure the shaft to your proper draw length plus two inches, and another 3/4" for the point. The length begins at the "valley" of the nock where the string will rest. Measure twice! Cut the shaft to length using a fine-tooth saw (a hacksaw will work). **DO NOT SAW STRAIGHT THROUGH THE SHAFT!** Make a single stroke and turn the shaft for the next stroke, working your way around until the slot meets the first cut. This will prevent breaking off long splinters on the last stroke. Now gently saw the rest of the way through the shaft.

Taper the point end using the correct slot in the taper tool. Test fit your taper with one of your points for a snug fit. If the point isn't tight, trim about 1/8" from the tapered point.

SHAFT COLORING: Be as creative as you wish when coloring your shafts. I rarely use paint because it covers the grain, and we will need to see the grain to align the nocks and cock feathers. Stain lets the grain to show through, and is also very attractive. Water-based stains sold for leather come in wild, fun colors. I usually use wood-toned oil stains such as Minwax or Zar.

Shafts can be a single color, bi-colored, or colored only on the nock end (9-10" looks good) with the point end left bare. The bare lower shaft lets you clean or repair your arrows without having to restain them. Re-applied stain will never quite match the original. For bi-colored or half-length staining, wrap the shaft tightly with a piece of blue painter's tape to give a clean edge.

You can brush on stain, but this leaves heavy streaks. Instead, rub the stain into the wood with a soft cloth. It might take two or more coats to get a deep enough color, especially with water-based stains. Use vinyl gloves, and work outside, especially with oil stains. Apply stain to about the first 1/16" of each taper, just enough to be inside the nock or point and not leave a bare ring. Leave the rest of the tapers bare for better glue adhesion. If you are doing a bi-color or half-length design, always work the stain away from the tape to keep it from being forced under the edge and leaving "fingers" of color.

Any bi-color or half-length design will probably require a crestring band to cover the joint and any mistakes. This is usually done with a crestring lathe, and is beyond the scope of this first project. Other possibilities include colored tape, decal stripes, and computer designs printed on special gummed vinyl "paper". Any of these will need 5 or 6 extra sealant coats to smooth down the edges of the tape or paper.

Shafts should be sealed with at least three coats of polyurethane. I prefer wipe-on Minwax gloss finish applied with a cloth pad, just like the stain. Once again, do this outdoors and wear vinyl gloves. Minwax also makes a water-based product called Polycrylic, really a super-thick floor wax. Polycrylic is useful for sealing oil-based crestring paints, which can be dissolved by the solvents in polyurethane. Once sealed, polyurethane can be used for further coats. You can use Polycrylic for all your sealing coats, but it is not as durable as polyurethane.

A drying rack is a really useful tool for arrow building. Use a 24" length of 2 x 4. Starting 1" from each edge, and 1" each end, draw two parallel lines. Make a mark on each line every two inches. Drill holes just a bit larger than your shafts at each mark. Make each hole about 3/4" deep. A drill press will give best results, but a hand-held drill also works (though my holes are pretty crooked).

THE NOCKS: Plastic nocks are available plain, or with special features. These features are indexing tabs that align your arrows on the string, and a "snap-on" feature that keeps your arrow from falling off the string. I recommend the Bohning "Classic Nock", which has with both these features.

Clean the nock cavities with rubbing alcohol and cotton swabs to remove any mould release compound. Don't bother with cleaning the outsides. Allow the nocks to dry thoroughly. I usually use Duco Cement. Apply the cement to the taper with a cocktail toothpick. Push the nock firmly onto the shaft. Wipe off the excess cement that squirts onto the shaft with a small piece of paper towel. Check your nocks in a few minutes. If there is compressed air in the cavity, the nock can rise up, causing a weak glue joint and a crooked nock.

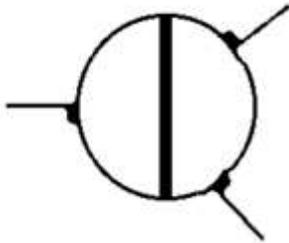
You must align the nock slot so that it is across the grain. The top and bottom of the grain will show on the shaft as long pencil-shaped structures. See below:



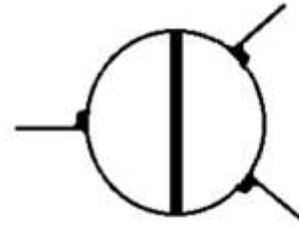
FEATHERS: This is the most fun! Truflight, Gateway, and AMG all sell high-quality feathers. The brands vary slightly in shape and length, and should not be mixed. Feathers may be "rounded" [aka "parabolic"] and "shield-back". Both shapes fly equally well. For arrows up to 28", 4" feathers are fine. Arrows above 28" will fly better with 5" feathers. Plastic vanes are **NOT** allowed for SCA use.

Feathers can be any color you like. The *general* convention is that the "cock" feather (the feather at a right angle to the bow) is white or some other light color, and the "hen" feathers will be darker. Both hen feathers can be the same color, or two different colors. What is important is the cock feather should be distinctive to help with proper nocking.

Feathers come in “right-wing” and “left-wing”. Right-wing feathers will make an arrow spin clockwise, and left-wing feathers will make an arrow spin anti-clockwise. Despite folklore to the contrary, which wing you choose makes no difference in shooting. The two types should not be mixed on the same arrow. If you wish to use an AAE Fletch III fletching tool like mine, you must buy right-wing feathers because it is a right-wing-only tool. Using left-wing feathers with a right-wing tool will twist the feather base against its natural spring, possibly causing the feather to come loose.



RIGHT WING



LEFT WING

FLETCHING: Begin by mounting your arrow in the fletching tool with the side face-up where you want the cock feather. Insert a feather into the clamp. The nock end of the feather should be about 1” from the nock slot to give you enough space for your fingers when you draw (the correct distance is marked on my tool). Gently press the feather down in the clamp by running a smooth tool (say the handle end of tweezers) across the feather base.

I use Bohning Fletching Tape or similar Bear Paw Fletching Tape for all my arrows. Both are easy to apply, and need NO drying time. With a bit of practice, you can fletch an arrow in about six minutes. Unroll about 1” of tape and touch it down to the nock end of the feather base. Roll more tape onto the base, keeping it centered, and smoothing it with your finger as you go. When you reach the point end, cut the tape. With that smoothing tool, press the tape onto the feather base to make sure you have complete contact. Peel away the pink carrier strip, starting at the nock end.

Push the clamp into the holes in the tool base and press it firmly down onto the arrow shaft. Open the clamp and pull straight up. Run the smoothing tool along the feather base five or six times. Press down firmly to seat the feather in the glue. **THIS IS SUPER IMPORTANT!** If you don’t press feather down well, the shaft will make poor contact with the glue, and the feather may come loose later.

Rotate the shaft and the nock collar 1/3 of a turn to bring up the next feather position, and so on.

When all your arrows are fletched, squeeze a shirt button-sized blob of Duco Cement onto a jar lid or other disposable pallet. With a toothpick, apply a dot of glue to both ends of each feather where they meet the shaft. Let the glue dry for 24 hours. This will stop the feather from being torn loose if the arrow blows through a soft target.

POINTS: The best points for beginners are PDP brand or similar field points. Buy the diameter that matches your arrow shafts. Generally, for arrows up to 26”, a 70-grain weight is fine. Arrows

27-28" need 100-grain points. Choose 125-grain points for arrows above 28", especially with 11/32" shafts.

Other types of points are allowed, such as bullets, med-heads or mod-bods (the latter two are imitation medieval points). Hand-forged replica bodkin points are allowed, but not recommended because of their weight. Broadheads or any other points with fins are **NOT** allowed for SCA use, except in special cases.

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Point cavities should be cleaned with acetone and a cotton swab to remove any oil or metal shavings left from the milling process. Let them dry thoroughly. Cleaning the outside is not important.

Mount the points with epoxy the same way you did with the nocks. My preference is 3,600 pound J-B Weld 3600. Clean any excess epoxy from the shaft with a paper towel. Press the points down firmly onto a wooden block. More epoxy will probably ooze out. Clean again. Allow the glued arrow to dry in your rack in the "points up" position for 24 hours before shooting.

USEFUL TOOLS:

320 Grit Sandpaper or Sanding Block	Vinyl Gloves
X-acto Knife	Tweezers
Craft Saw or Hack Saw	Small Scissors
Fletching Tool	Drying Rack
Taper Tool	Hardwood block (oak works well)

MATERIALS:

Acetone/Nail Polish Remover	24-Hour, 2,400-Lb. Epoxy
Wood Stain	Polyurethane or Polycrylic Sealer
Bohning Fletching Tape	Duco Cement
Blue Painters Tape, 3/4" or 1"	Rubbing Alcohol
Cotton Swabs	Cocktail Toothpicks

SOURCES:

3Rivers Archery: <http://www.3riversarchery.com/> (shafts, points, feathers, fletching tape, nocks, etc.)

Kustom King Archery: <http://www.kustomkingarchery.com> (spruce shafts, feathers, points, nocks, etc.)

FS Discount Archery: <http://www.fsdiscountarchery.com> (shafts, points, feathers, nocks, etc.)

Lowes, Home Depot, local hardware stores: stains, sealers, glues, sanding blocks

NEED HELP? If you get stuck, or need advice, contact me at sarhsan@embarqmail.com .

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