



How to Make: A Replica Native American Arrow

By Dave Brewer
A Friends of Archaeology volunteer

The bow and arrow were added to the Southwestern hunting kit only about 1,500 years ago. The principle is simple; the energy of a bent bow is transferred to the flight of an arrow by the bowstring. Arrows are short (compared with spears), straight, and rigid. Two general types of arrows were made: (1) Solid-shaft arrows were made of the shoots of virtually any plant that produced a usable shaft, such as chokecherry, gooseberry, fruitwoods, ash, dogwood, willow, and Apache plume. (2) Cane arrows made use of the light stems of river cane (native bamboo) for the main shaft, with a solid wooden tip whittled and inserted into the front end of the cane.

Willow is generally available, and I will take you through a step-by-step process in the creation of a willow arrow. The same process is followed with any solid-shaft arrow, and the steps can be adapted easily to the making of a cane arrow. We will use modern tools,

but there are ancient analogs for all of the tools (such as a flake of stone instead of a knife; a piece of sandstone instead of sandpaper).

Safety Tips!

Making an arrow involves cutting and heating. Both activities require **ADULT SUPERVISION** to minimize risk of injury or damage to property.

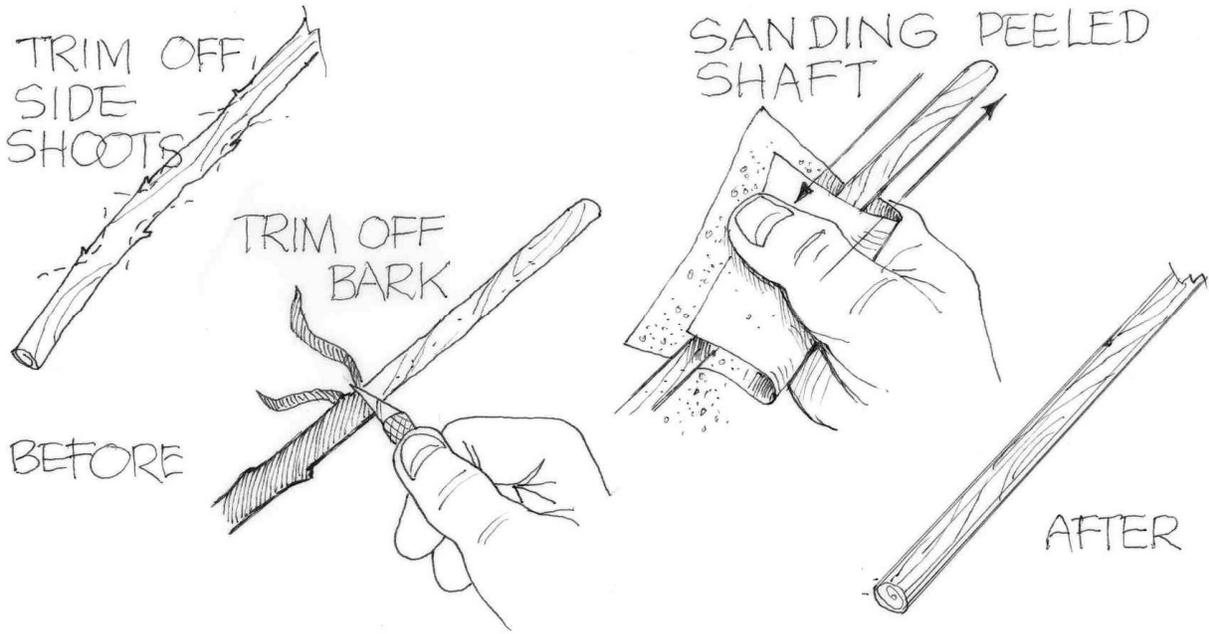
Knives are **SHARP**, and if they aren't used properly and carefully they can cut both people and things. First aid supplies should be handy.

Heating is dangerous, both from the source of heat or fire and from the material that has been heated. Heat sources must be monitored so that they are off when not needed and so that they can't accidentally catch anything on fire. Heated shafts and pitch can also cause burns if they come in contact with skin, even though they don't look hot. Gloves, hot pads, and tongs can help protect the arrowmaker, but supervision is still needed because these protections can also making handling hot items awkward. Any time fire or heat is used, water or a fire extinguisher should be handy.

The best time to harvest willow for arrow shafts is in February, when the sap is in the roots and the wood is still relatively easy to cut. However, harvesting at other times of year works, even if it is a bit messy due to the sap. Look for stands of willow along creeks, rivers, and irrigation ditches. Always ask landowners for permission to trespass and permission to harvest the shoots.

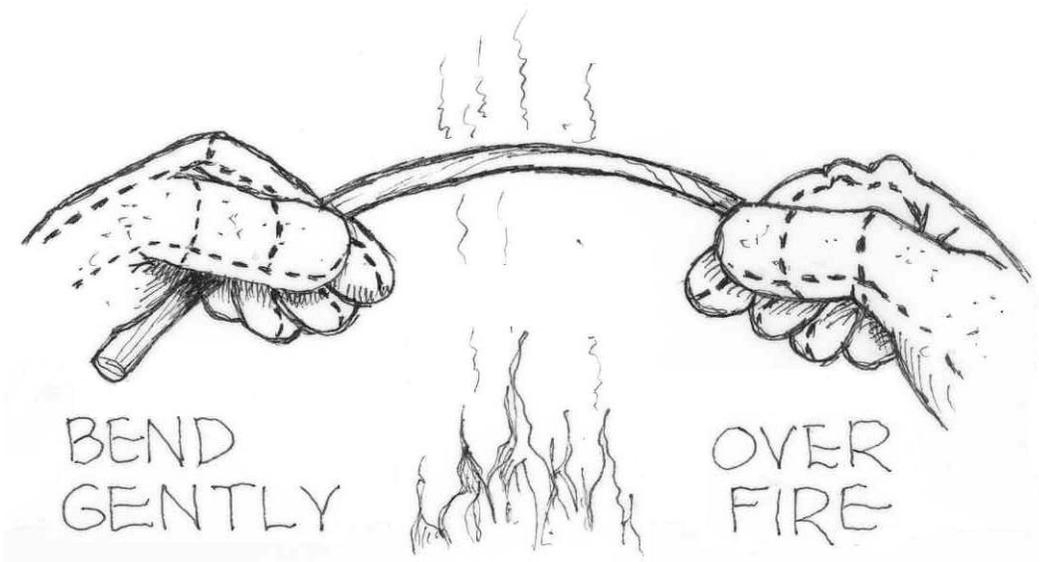
The willow shoots should be between one-fourth and three-eighths of an inch in diameter and have a usable length (within these diameters) of at least 18 inches. Look for the straightest shoots, and trim off all side branches and twigs, but you don't have to have a perfectly straight shoot (I'll show you how to straighten a shaft later).

If you aren't in a hurry, you can spread out the shoots on a flat surface in a warm room and allow natural drying to occur. In a month or so, the shoots will have dried out to where the outer bark may be stripped away easily with a pocketknife (see Figure 1). If you are in a hurry, the bark can be carefully whittled or peeled from the shoot, but don't cut deep into the wood. If you've harvested while the sap is flowing, this process can be sticky, and the peeled arrow shafts will need to be dried for a few days before it's possible to sand the shafts.



After peeling, the usable portions of the shoots will be about one-quarter inch in diameter. The peeled shafts will need to be sanded smooth with a piece of medium-grade sandpaper. You don't need to make the shaft as smooth as a dowel, but you don't want any big bumps or jagged projections on the finished arrow.

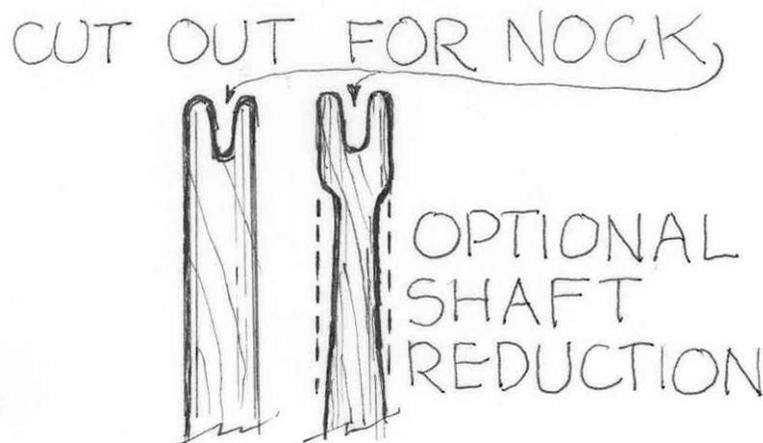
Most shafts will require some straightening. Even shoots that were straight when they were harvested can warp after they have dried out. You will need a heat source for the straightening process, either a hot plate, an open flame on a gas stove, or a few charcoal briquettes (heat straightening should be done by an adult or with close adult supervision – see Safety Tips!). Wear gloves to grasp the shaft, as the wood can get hot enough to burn your skin.



Grasp the shaft, holding it above the heat source so that it doesn't catch on fire (be prepared for accidents with an extinguisher handy). The straightening process is a matter of feel. The idea is to heat the area of the shaft that needs to be bent. Once heated, the shaft should be “unbent” a little more than “straight” and held in that position as it cools. The shaft will slowly assume the new shape, but it may take several cycles of heating, bending, and cooling to straighten each segment. Start at one end of the shaft, and don't expect to straighten more than a few inches of the shaft at one time. This takes some practice to master, but it isn't difficult. A patient attitude really helps here. Getting in a rush will only bring grief (and a broken shaft) with it!

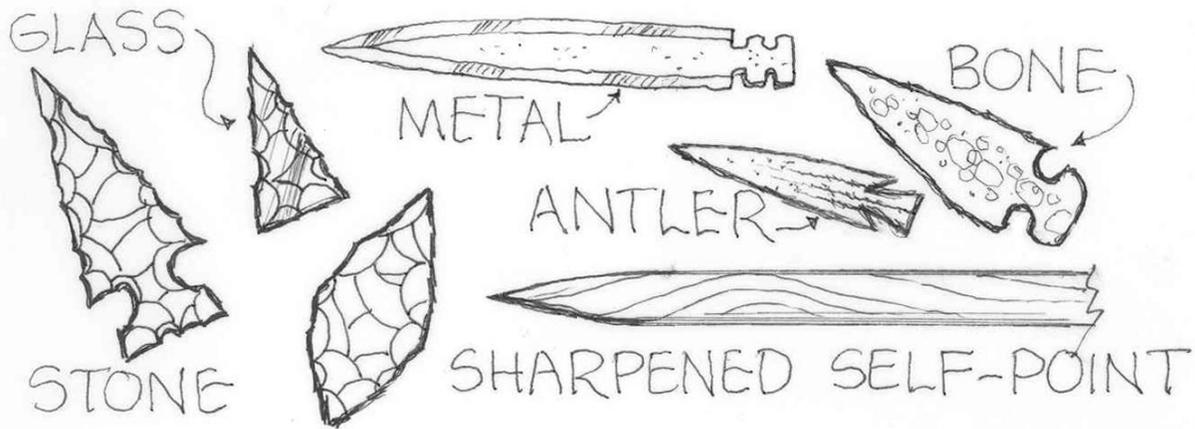
The shaft can be trimmed to its final length at this point. If the arrows are being made for a specific bow, the shafts only need to be a couple of inches longer than the draw of the bow. If the arrow is for display, it can be anywhere from 18 to 30 inches long. Another sanding would be a good idea after the arrow shaft has been straightened, as often, minor discoloration can occur from scorching.

The type of point determines the next step. Many arrows were made with a “self-point” that was created just by sharpening one end of the shaft. In this case, the narrow end of the shaft can be the point, and the wide end of the shaft can be the “nock” end. If you want to attach a point of a different material (stone, bone, metal, shell, or even plastic), it's often easier if the wide end of the shaft is used for the point and the narrow end for the nock.

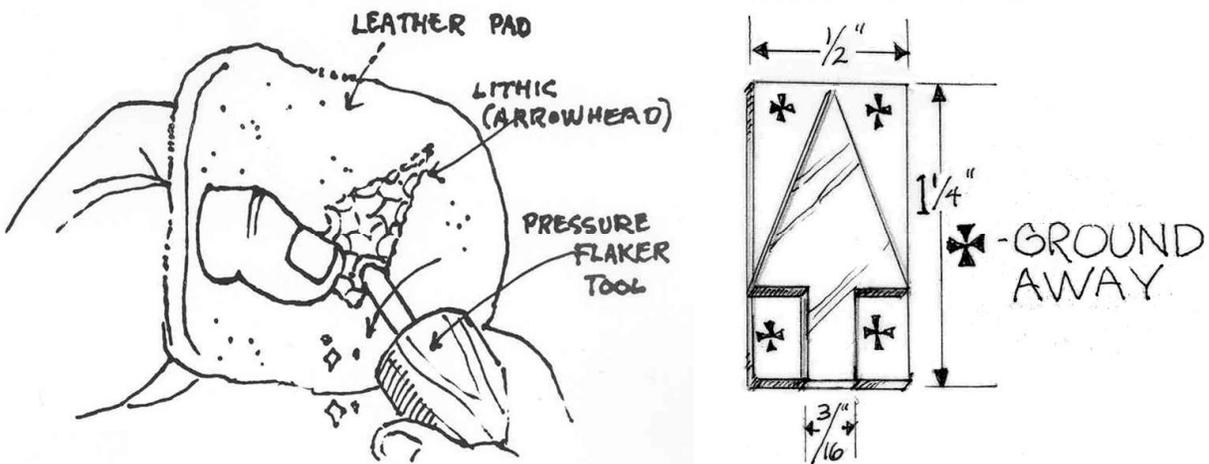


Care must be taken when cutting the nock not to split the shaft. It can be carefully whittled into the end with a knife, or it can be made with a file or saw. The nock (or notch) doesn't need to be deeper than one-eighth of an inch, but it should be centered and should have a rounded or flat bottom as wide as the bowstring (usually a little less than one-eighth of an inch). Some arrow shafts are thinned just before the nock.

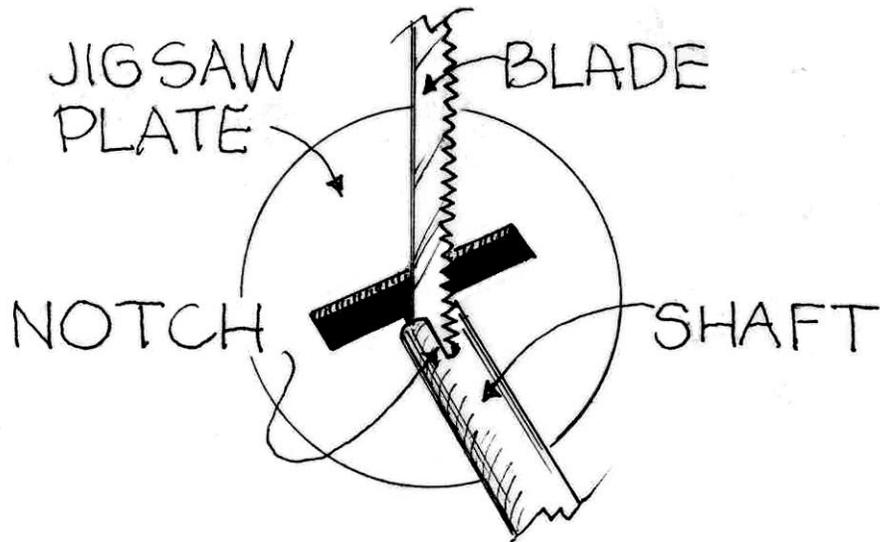
Arrows don't have to have points at all, but even a blunt end can cause injury or damage. If you are creating a self-point, the shaft need only be tapered to a point by carefully whittling the last 3 to 4 inches of the shaft. The point can be sanded smooth.



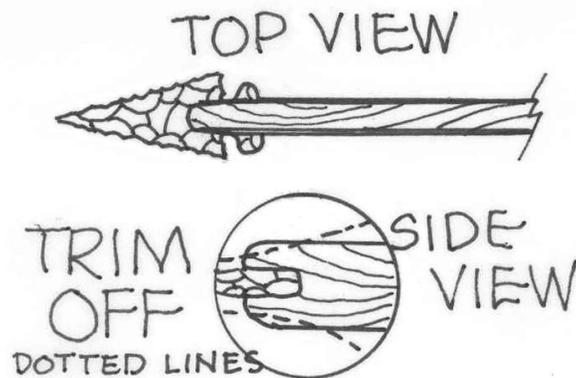
Arrowheads were made from stone, bone, or shell and were fashioned from scrap iron (often cut from barrel hoops) or glass during the historic period. Flaking a stone (or glass) point is called “knapping” or “flintknapping,” and it is both a skill and an art. Flintknapping is best taught by a master rather than being learned through experimentation. In addition to the complex skills involved, there is real danger of serious injury to both the flintknapper and bystanders. I have knapped the arrowhead that I will use for this demonstration, but simple arrowheads can be cut and shaped from flat and thin raw materials such as iron or Formica™ samples.



Arrowheads come in many shapes, but they are small (less than one and one-half inches long) and thin. Here, we focus on the base of the arrowhead where it attaches to the arrow. The base should be two-thirds the thickness of the arrow shaft or thinner. Notches or tangs on the base of the point make it easier to attach the point to the shaft. Large “arrowheads” (longer than about 1 ½ inches) are actually knives or “spearheads” and not arrowheads at all. They were used with a throwing stick called an atlatl (a term from Mexico and a good subject for another “How to . . .”).



A notch needs to be whittled, sawn (a bench jigsaw works well), or filed into the end of the arrow shaft for the point. The size of the notch (both depth and width) needs to be sized for the point base. The point can spread the ends of the notch apart a little but not a lot, and you may need to have patience preparing a custom notch for each different point. The fit should be close but not too tight. When the notch is complete, the ends of the shaft that embrace the point should be reduced or trimmed by whittling or sanding.



If you want the arrow to look “old,” a wood stain can be applied to the shaft at this stage.

The point is secured in the notch with sinew and pitch (or glue). Native peoples used sinew for permanent nonflexible bindings. Sinew was obtained from deer, elk, or bison tendons that were harvested from freshly killed animals and prepared, dried, and stored for later use. Narrow strips of sinew were softened in water, applied wet as a binding, and allowed to dry tight. A modern substitute is “artificial sinew,” available at most hobby and craft stores. It is best described as nylon dental tape that has been impregnated with a colored wax, and flat “artificial sinew” works better than round sinew for arrows.



Pitch is natural glue that can be found on pine trees where the trees have been wounded in the past. It oozes out of cuts, breaks, or beetle holes and solidifies as a resin. Fresh pitch is a liquid, but it thickens and hardens through time until it is a solid (rosin). If you are just making an arrow or two, you can hunt and collect a small amount of thick, sticky pitch in a small jar. If you need more pitch, you can gather the full range of lumps, from solid-and-dry pieces to soft-and-sticky pieces.

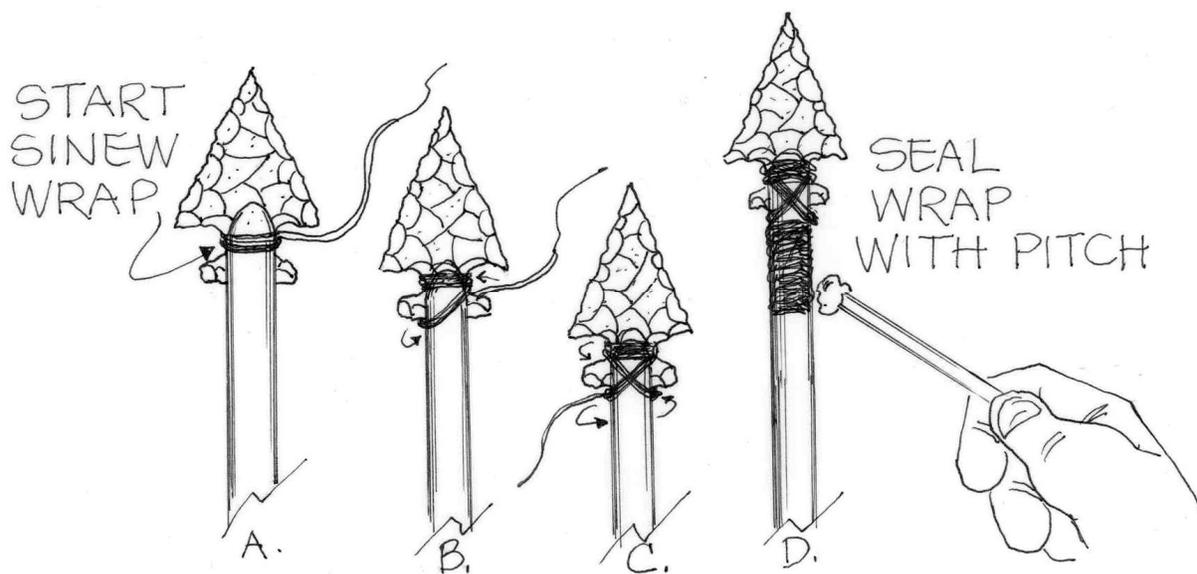
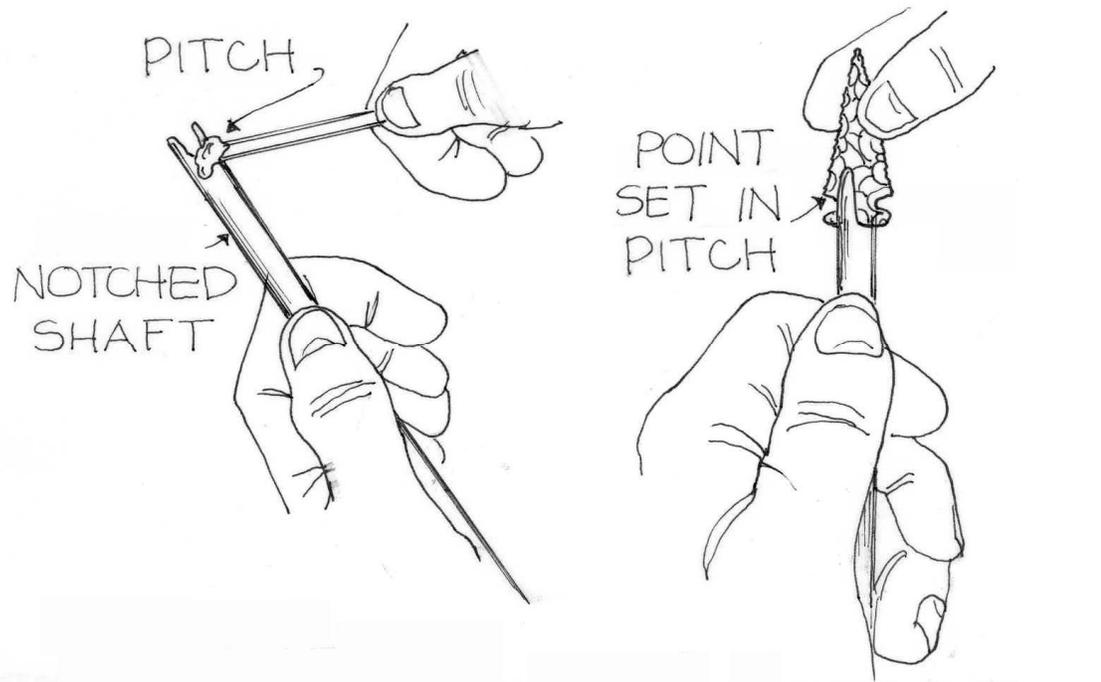


The pitch lumps can then be refined by gently heating everything in a tin can, where the softer lumps melt and dissolve the harder ones. The melted pitch is flammable, can cause burns if spilled, and is very difficult to clean up. Overheating will scorch the pitch, making it unusable. If bark, sticks, bugs, and pine needles contaminate it, you can filter the warm-to-hot pitch through metal plastering lath to remove most of the impurities. The finished product should resemble caramel and can be kept at room temperature between uses. If it is too solid, it may have to be reheated at a low temperature on a hotplate before each use. It's easier, and safer, to just find a small amount of pitch on a tree and use it as is.

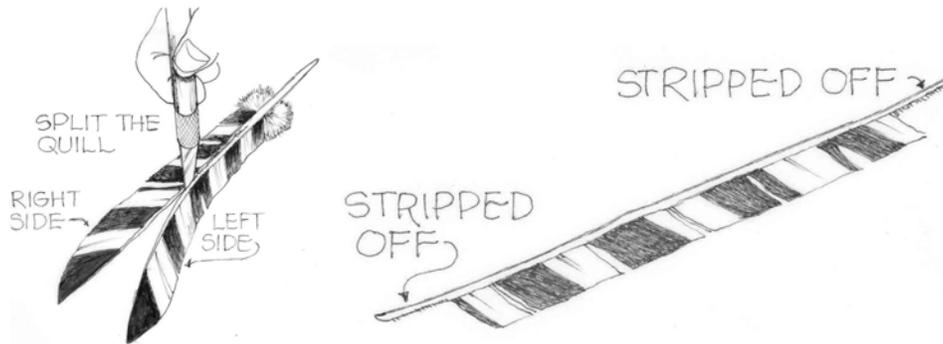
Using a small stick, dip out some of the pitch and push some into the notch where the point will go. Push the point base into the notch and smear the excess pitch around the shaft where the sinew will be wrapped. If you need more pitch for the sinew, apply some from the container. [NOTE: If the pitch isn't hot, fingers work well for this, but you then have a sticky mess. The pitch can be cleaned off your hands or clothes using cooking oil, which then can be cleaned up with soap and hot water.] Although clear-drying wood

glue can be substituted for the pitch, it works better for holding the sinew in place than it does for seating the arrowhead in the notch.

With the pitch in place, cut a length of the sinew about twelve inches long. Wet your fingers before you touch the arrow, and less pitch will stick to your fingers (see note above for cleanup). Now wrap the sinew around the point and pitch. Keep some tension on the sinew as you wrap the sinew around the shaft. Finish the wrap by securing the end with a blob of pitch or wiping a thin layer of pitch (or glue) over the entire binding.

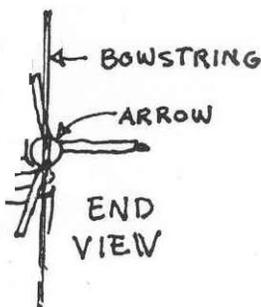


Setting three feathers along the shaft at the nock end (fletching) is the next to last step (most tribes use three feathers, but some use only two for the fletching). Fletching takes some practice, and depending on shape and size, you need to have three or four nearly identical wing or tail feathers available for each arrow. Feathers can be purchased from hobby stores, collected as you find them, or you can get turkey feathers from hunters or farmers who raise them. Wild turkey feathers were commonly used for hunting arrows, but in some Native American traditions, feathers from birds of prey were used for war arrows.

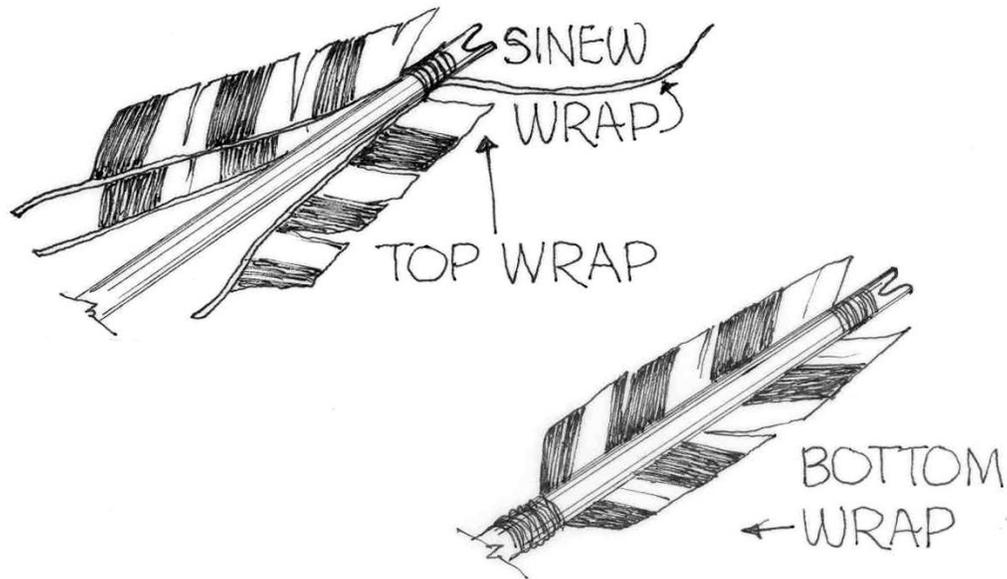


First we cut each feather down the center of the main quill with a sharp knife or utility blade. The strip of quill then needs to be whittled carefully until the feather portion is attached to a thin and flexible strip of quill. The portions of feather are arranged side by side, and the three most similar in curvature are selected for the fletching. The three must be similar for four to five inches of length, but the width of the feather portion of each can be variable as long as each has at least one-half inch. Each of the three selected feather portions is then trimmed to the same length (465 inches), and the feather portions are carefully cut off the quill for one-half to five-eighths of an inch from each end. This requires a sharp blade and careful handling, and the ends will be where the arrows are tied to the shaft.

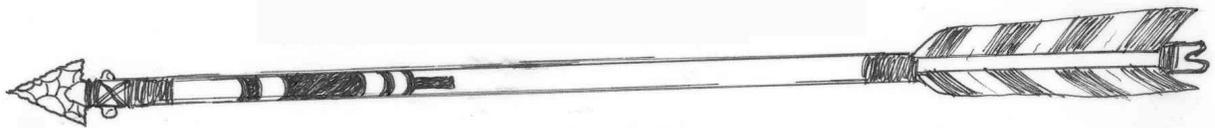
Attaching the feathers is the most difficult part of assembling an arrow. Unlike modern archery arrows, which have the fletching glued down over the entire length of the feather, most Native American fletching are secured only at the ends. The ends can be secured temporarily with a band of pitch around the shaft or with tape. The first feather is placed perpendicular to the nock, and the other two feathers are placed symmetrically around the shaft.



Once the three feathers are held in place by the pitch, a 12616 inch length of sinew is wrapped tightly around the shaft to hold the fletching ends in place. It's a little easier to start on the nock end of the fletching, then repeat the process on the front end of the fletching.



A thin layer of pitch or glue over the top of the sinew will hold it in place without having to tie a knot. The feathers can now be trimmed to a standard width (at least one-half inch) with a pair of scissors.



The final optional step is to make the arrow distinctive. Native Americans began their use of bows and arrows as very young children. Usually each person's arrows had markings so that hunters could recognize their own arrows and those of others as well. This was important in recovering arrows that missed their targets or when the community tradition included "ownership" of kills. When the hunters of their families dressed out the slain animals, they could tell at a glance whose arrows killed the animal and to whom the hide and meat belonged. You can add your own personal markings with paint or markers.

Hey! We're done.

But, there's more you can do if you want to . . .

Cane arrows are special, and if you have access to river cane (*Phragmites* sp.) or thin bamboo, cane arrows are pretty easy to make. Cane arrows are more fragile and lighter, but they travel faster and farther when shot from the bow.

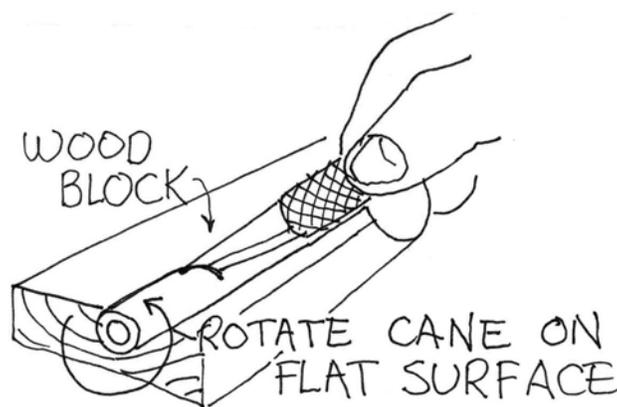
What makes cane arrows special is how the tips are created. The cane itself is too fragile to survive crashing into a target, so a foreshaft is inserted into the point end of the cane shaft. The foreshaft is usually a short wooden shaft, tapered to slip inside the cane on one end. The other end of the foreshaft is a self-point or is notched to hold an arrowhead.



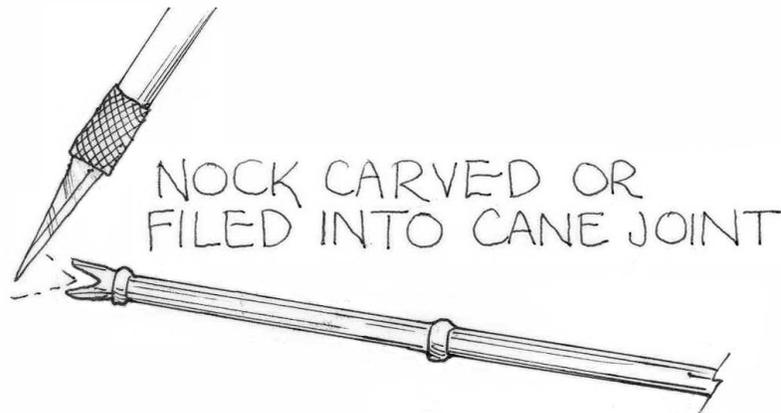
Cane should be harvested in the fall or winter when the previous season's growth, now dead, is dry. The hard part is finding relatively straight segments that are at least 16 inches long. Unlike solid shafts, cane shafts can't be straightened with heat. Cut the cane (with landowner permission) and bring a handful back to your workshop area. You'll need more than one, because they can break easily while trying to make the arrow.

The top (narrow) end of the cane segment is for the nock and fletching, and the bottom (wide) end of the segment will hold the point assembly. Trim the nock end with a very sharp knife or blade by cutting through the cane about $\frac{1}{8}$ to $\frac{1}{4}$ inch outside of the nearest joint segment.

NOTE: Practice cutting on some scrap cane. You don't want to crush the cane or break it. Cutting against a scrap piece of wood works best, and depending on your blade, it may be best to cut part way through from four or five positions around the circumference of the cane or to roll the cane, cutting a little deeper with each roll.

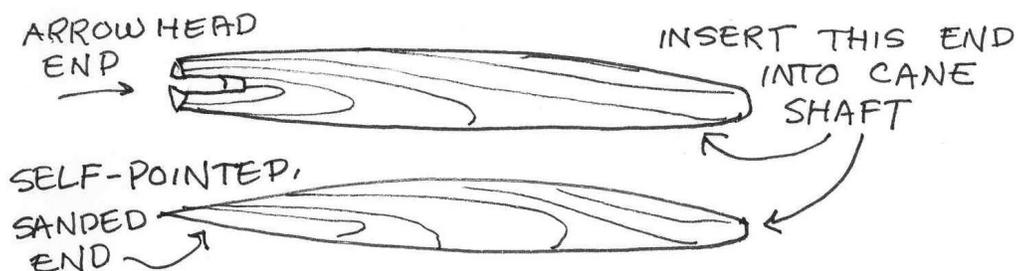


Carve, grind, or file a nock into the end, with the bottom of the nock at the partition between the cane segments. Be careful not to crush or split the cane while handling the segment.



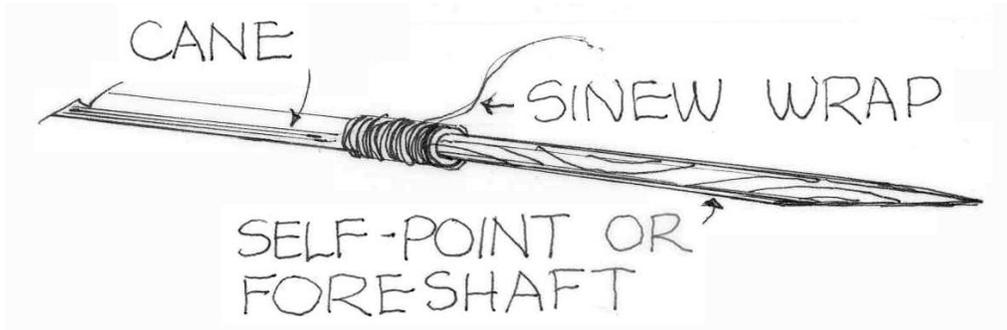
Cut off the wide or thick end of the cane shaft to receive the foreshaft, cutting so that about $\frac{3}{4}$ of the joint length is preserved on the shaft. Several cuts should be made, each part way through the shaft, beveled toward the tip of the arrow. The length of the cane shaft should be between 3 and 6 inches shorter than the desired length of the finished arrow.

Whittle or sand a solid wood foreshaft to slip $\frac{1}{2}$ inches inside the end of the cane, but be careful not to split the cane while testing the fit. The foreshaft can be made with a self-point or can be made to receive an arrowhead. If you attach an arrowhead, the arrowhead should be attached to the foreshaft as described for the solid arrow before you try to attach the foreshaft to the cane shaft.



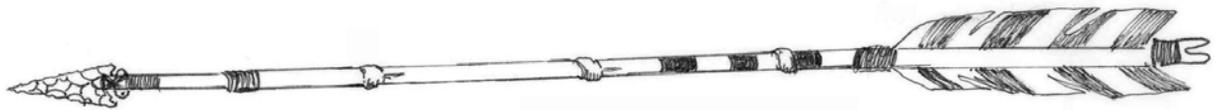
When the foreshaft fits snugly and is straight with the length of the shaft, you glue it in place with pitch. A dab of hot pitch is scraped off on the inside of the cane end, another dab is placed on the very end of the foreshaft, and the foreshaft is carefully slipped into end of the cane shaft. Often it helps to rotate the foreshaft as it is inserted to spread the pitch all around the joint between the two pieces.

Smear a little pitch on the outside of the cane shaft just back from the foreshaft and wrap sinew moderately tightly around the pitched cane for 162 inches to reinforce the cane and keep it from splitting when the arrow hits its target. Wrap carefully, because you can accidentally crush the cane shaft while simply holding it.



Prepare and attach the fletching (feathers) the same as if it were a solid-shaft arrow, but be careful. It's easy to crush the cane if you handle the arrow too roughly as you wrap the sinew.

Once the feathers are tied on and the sinew is covered with a thin layer of pitch, you can customize the appearance with cresting.



Now we're done!

(Except, of course, for the bow. But that's another story.)



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