## Summary by Catherine Haug

# **Presentation by Luc Tunkel**

It was a lovely evening, and we sure learned a lot! Well, at least I did - a whole new language. Hopefully I've spelled everything correctly...

Luc made his first bow at 13 years, and kept up this hobby for a few years, then put it aside until about 6 years ago, when he resumed his old hobby. He's especially interested in the primitive aspect of the craft, preferring to make his bows from a log, than from milled hardwood.

His philosophy, or goal, from year to year, season to season, is always to have something going: looking for appropriate wood, antlers, feathers, etc.. A cycle of creative life.

## Types of Bows

He described two general types of bows.

**Long Bow**: is tall and not significantly recurved. Its rounded limbs are relatively narrow so that they are circular or D-shaped in cross section, and it is usually widest at the handle, (1) which flexes with the limbs. Also has more shock when you shoot.

**Flat Bow**: has "non-recurved, flat, relatively wide limbs that are approximately rectangular in cross-section. Because the limbs are relatively wide, flatbows will usually narrow and become deeper at the handle (or riser), with a rounded, non-bending, handle for easier grip." (1)

### Wood for Bows

- **Chokecherry**, a white wood dense enough for bows, is very abundant in our area, and perhaps the one he uses most frequently. It's also Luc's recommendation for a starter project.
- **Pacific yew** is his favorite; it is strong, beautiful, and of lighter weight.
- **Birch** is also abundant here. It tends to break where you have a taper.
- **Hawthorne** (take care to select specimens that don't have a lot of spiral. This is seen in the bark.
- **Mountain maple** is sometimes used, but is not usually strong enough, and is prone to hysteresis, or cracks/splits.
- Vine maple, from the west coast.
- **Fruit woods**: apple, cherry, etc. is good for both bows and arrows, and available here because we have so many orchards
- Fir heart wood
- **Hickory**; much better than birch for strength at a taper.
- **Juniper** is a great bow wood, but you must back it with sinew or another wood.

Best wood for a first project: Chokecherry, vine maple, hickory or elm.

# Bow Design

Luc used chokecherry for his example. The challenge is to find the bow hidden in the piece of wood. First, select a good piece of wood, something that won't spiral and is free of big knots, especially on one side, which will then be the back of the bow (away from you).

The growth ring under the bark (on the side without knots), will be the surface of the back of the bow.

If the wood slightly bows opposite to the way it will be when strung (called 'reflex'), that's good. While too much reflex is not good, sometimes you can steam it out. You can also add reflex by steaming. Because of the way it grows out of a slope, then curving upward, yew can have a lot of reflex, but is otherwise an excellent wood for bows.

The handle is centered, and typically about 4" wide. It should fade out to either side of the handle, into each limb, which are thinner and wider than the handle.

## Bow Size

The minimum length is based on the draw length of the person who will use the bow. Physically, arm length and shoulder width determine a person's draw length. Measure using a light weight bow and a long arrow.

Then use this formula to determine the length of the bow:

Minimum length = 2 times the draw length + 10%.

For example, if a person's draw length is 28":

2 x 28" = 56"; 10% is about 5.5", for total of 61.5 inches tip to tip

# **Bow Strength**

Poundage of bow is partly determined by width, and by taking wood off the belly. Rule of thumb:

2-times wide = 2-times strong;

2-times thick = 8-times strong.

# **Bow Construction**

### Preparing and seasoning wood

Strip off the bark. This is easiest when just cut. Use a little draw knife to scrape off shavings of the cambium layer (growth ring), taking care not to cut beyond the growth ring (photo shows a handmade drawknife from instructables.com).

Next you want to quarter the wood (lengthwise), to make the seasoning go faster. Use a few wedges along a grain line (very important); pound with hatchet, to split the wood,



then let the moisture content settle (season), to as dry as it will get). Around here, it will be about 8 - 9%. Measure by hefting the wood.

Put some glue or wax on the ends, to deter splitting as it dries. You may also wax the cut sides, to control moisture loss and avoid "checking" (unwanted cracks/splits).

If the wood dries unevenly, it will warp. So best to size it down to near finish size after it is first cut and de-barked.

### Rough-shape the bow

NOTE: These instructions are for a long bow, unless noted otherwise.

When the wood is thoroughly seasoned, sand the back of the bow lightly to make the grain visible.

On the back, follow one grain, end to end, to be the center of the back. Mark center along this line, for handle. At this point, you are only roughly shaping, so just leave enough thickness for the handle; the fade-out will be refined later.

Two-thirds up each limb, it should begin the taper to the tip, and be about 3/8" wide at the tip. (Except for birch, you want to keep the bow wide until about 6 - 7" from the tip, then begin the taper. This is because it tends to break at a taper).

Begin the shaping of the width by using a hatchet. Also reduce the thickness (belly).

Then set it aside to dry fully.

### Refine shape of the bow

Draw line each side of the center line, to mark the width of the bow.

Using rasps, take down the shape of the belly and sides. NEVER remove thickness on the back. Treat the back tenderly, babying it, as you don't want anything that will cause a split. You might want to pad it to avoid scratches. It should just be the growth ring. If you find a knot, dig out the harder wood.



First work with a coarse rasp (half round) on sides, away from the back. Then the belly. Work just up to the width line, making a bevel. (photo of a half-round wood rasp is from <u>Wikipedia</u>).

Work on the fade-out in the handle area: it should take 1.5 - 3" to get from the thick handle to full width of each limb.

Then use a finer rasp; Luc uses a #49, or a pattern-maker's rasp, to eliminate the width line. Or you can use a spokeshave

-- like a hand plane, but with handle at both ends.

Then switch to cabinet scrapers, glass, or chunks of bone, to remove fine layers of wood at a time, for the final shaping.

# Tillering

This is for fine shaping of the bow to get even, strong flexing of the bow. Luc uses "floor tillering," which means holding the bow vertical, with one tip on the floor. Holding the bow with one hand, and tilting it slightly to the side, push outward on a section of the bow with your free hand, to get a feel for the amount of flex and curve.

Watch for a consistent curve through most of the bow (flat bow): you don't want the handle to bend, and you want the flex to increase as you go out, then less toward the tip (long bow).

"Set" is how much curve it holds when not under string pressure. Ideally, you don't want any set, but the stronger woods can handle a little bit.

To determine where and how much wood needs to be removed from the belly for proper curve, use a tillering string, or any good string. Attach it end to end, but not under tension. Holding bow horizontal, push on the string with your foot to observe flex. Flex gently, 20 - 30 times.

## Backing

Rawhide or other durable materials such as combed flax (linen), bamboo, or other hardwood can be used as a backing along the back of the bow, for added strength and durability.

For example, glue rawhide along back of bow; if need two pieces, overlap them in the handle area, where there is no bend. The backing should be wider than the wood, so it goes a bit over the sides. Then wrap with string to hold in place. Leave for a few days to dry, then remove string. Use rasp to smooth backing where it comes over the edge.

Backing is especially important when you use a milled board for the bow. It won't have the growth ring, so check carefully for straight grain and for no places where it will splinter. Then back the bow with rawhide.

Sinew or a hardwood are recommended to back a juniper bow.

## Determine Weight

Use a bow scale to determine a specific weight. Hook the scale on the string, then draw to desired weight and ??? (I didn't get this part)

## Other Tools, Supplies, Techniques

- Small chainsaw file, about 5/32" to cut string nock (where the string attaches to the bow). The string nock is at an angle, on both sides of the tip.
- Needle files can also be used for this, or to refine the nock.
- Backing material (see above)
- Hide glue or tightbond glue is used to secure the backing to the bow
- String: Luc uses B-50 Dacron. he has also tried rawhide, nettle fiber, processed and spun Irish linen. For bows up to 35 pounds, use 12 strands; use 14 16 strands for heavier bows. Divide into 2-plys, then reverse-wrap. Coat with beeswax regularly.
- Nocking point (where arrow nock rests against the string: Luc uses serving material??(didn't get this part)
- Arrow rest (where the arrow shaft rests next to the handle): Luc uses two layers of tooling leather, in a tear-drop shape, then wraps it in place as he wraps the handle (for cushion).
- String-muffle and handle padding: use wool or animal fir. Attach to string or to pad the handle, to muffle sound.

#### Arrows

The arrows must be right for the bow: heavy and stiff enough.

### Traditional Arrow

These are made with cedar, sitka spruce, birch or fir dowels, cut to length.

- 1. Use taper tool (like a pencil sharpener) to make nock end. Dab on hot melt glue, then add plastic nock.
- 2. Repeat for point, but has a different taper and the point is metal.
- 3. A fletching jig is used for attaching feathers at desired angle. It includes a clamp to hold the glued feather to the shaft.

#### **Primitive Arrow**

Cut branches or shoots of red-osier dogwood, cherry, mock orange, or crab apple. It should be a little bigger than the finished size, and doesn't have to be straight.

1. Work out bends with fingers as it dries, a couple minutes each day. This also helps loosen and remove the bark.

- 2. Scrape off bark and then smooth.
- 3. The fatter end is for the point; skinny end for the nock.
- 4. Make the nock with a small needle file at the end (not a separate, glued-on piece).
- 5. For point, make a groove to hold the point. To attach the point, Luc uses a glue made of pitch, egg shell ground to a very fine dust, and ash. Then wrap with sinew to secure.

## Feathers

You want all feathers on the same arrow to be from he same wing, so all will have the same curves. if they curve differently, your arrow won't fly straight.

Luc demonstrated with a turkey wing feather, but goose, or duck feathers will work. Native Americans liked to use feathers of a hunter (raptor), on their hunting weapon, but these are now protected by law (Wild Raptors Act). He also told about using a peacock plume tassel if shooting up. Goose feathers have an oil that resists water.

To prepare the feather:

- 1. Carefully strip body of feather from ridge.
- 2. Using a knife, trim away feathers at each end to leave a tag for wrapping.
- 3. To attach, go once around first feather, then once around second, then third. Continue wrapping several times down the feathers to the tag at the other end, then wrap around the tags, to secure without glue. Wraps are about ½ inch apart down the feather. These wraps cut a space in the feathers, but Luc says this doesn't slow down the arrow.
- 4. Then trim the feather with knife to desired shape, after securing to shaft.

#### Points

Antler, bone, stone, glass, and oceanspray (a native plant) can be used.

#### Books

Luc recommends: *The Traditional Bowyer's Bible*, in 4 volumes, available from <u>Amazon</u>, <u>The Woodworker's Library</u>, or special order from Books West in Kalispell.

### Sources

I augmented Luc's descriptions with information and photos from the following sources:

- 5. <u>en.wikipedia.org/wiki/Flatbow</u>
- 6. <u>en.wikipedia.org/wiki/Rasp</u>
- 7. www.instructables.com/id/How-to-make-a-drawknife/