BOW MAKING with Justin Sutera

PART II





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About the Author

Justin Sutera first got interested in primitive living skills when he was 14 after being introduced to 'The Tracker' written by Tom Brown. Since that time Justin has explored primitive skills deeply (often by trial and error in the early days). He graduated S.U.N.Y. College of Environmental Science and Forestry with a B.S. in Conservation Biology.

While still a student Justin founded ESF Primitive Pursuits Club. Additionally Justin has studied at the Tracker School and worked as an instructor at The Children Of The Earth Foundation before joining Primitive Pursuits as a full time instructor. Justin is particularly passionate about primitive bow (and arrow) making, flintknapping, and hide tanning but truthfully all skills for living with the Earth are of great interest to him.

As a lead instructor with Primitive Pursuits, Justin focuses on teen and adult programming including Wilderness Weekends, the Wilderness Skills Intensive, and the Wilderness Year program.

About Primitive Pursuits

Primitive Pursuits is a non-profit program in partnership with Cornell Cooperative Extension. We provide leadership and wilderness skills education to hundreds of toddlers, youth, teens and adults throughout the Finger Lakes region.

Since 2002 it has been our mission to steward the health of our community by fostering life-long relationships with the natural world through exceptional mentoring and nature education.

Through our mission, we work daily to achieve a cultural intervention that will bring back into our modern lives a necessary and healthy relationship with the natural world and within our human communities.

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Introduction

First of all, I want to mention that there are tons of fantastic books and other resources out there on bow making. Many bowyers have done extensive research and really explored bow making as a detailed science. These are amazing resources, and I highly recommend you utilize them.

The information included here is from direct experience and has proven to work, as both my colleague Sean Cornell and I (pictured below) both successfully hunt deer with our handmade bows and arrows.

The intent of this e-course is to make bow making accessible and simple, and provide you with enough tools to put hatchet to stave, but is in no way complete.

Justin Sutera March 2016



Part II Finding the Back of the Bow

This week we are going to look at the tools we will need to continue on with bow making. We are also going to explore the anatomy of a bow, and learn how to find our first reference point-the back of the bow.

Tools of the Bowyer

Here are some of the tools I most commonly use while making bows. There are definitely other useful tools out there, and alternatively this entire process can be done with stone tools; so don't go crazy buying every bow making tool you can think of. Having access to the tools listed below will really help you be efficient and guicken your learning curve.

Grain, what is it? Why should we care?

The grain of the wood can be thought of as strings that run the length of the log.

It is the orientation of wood cells, being laid down annually with the growth of the tree. Some tree species such as elm have interlocking grain. Upon splitting a piece of elm you will see these "strings" weaving back and forth, holding the log tightly together. White ash on the other hand can almost pop apart when it is split, and it usually does so precisely straight.

When making a bow, we need to follow the grain of the wood. This is why making wooden bows and arrows is such an art. If you cut a log to the exact dimensions of a finished bow with a band saw, it would likely break. The grain has to be followed



Hatchet

Carving knife



Drawknife



Ferrier's rasp

on the back of the bow, as well as the sides of the bow. Think of the grain as what gives the wood strength, those strings running the length of the log. If we cut through a growth ring on the back of the bow, we have severed the strings. When force is applied, the wood will not hold together, it won't have its strength.

So that brings us to understanding the forces that a bow must undergo. There are two opposing forces simultaneously acting on a bow that is being drawn. The back of the bow is under tension and the belly of the bow is under compression. Imagine the fibers on the back of the bow. As the bow bends, the tendency is for the wood to want to splinter apart. This is tension. And it is up to the outer growth ring on the back of the bow being in tack to handle this force. When the belly is under compression, the tendency is for the wood to want to fold. Wood does not handle either of these forces too well, though it handles tension better than compression. But more on that later when we look at bow design.



PARTS OF THE BOW

Handle - middle of the bow, where you hold onto as you shoot
Mid Limb - halfway between handle and tip- part of bow that is doing most of the "work"
Back of Bow - side of the bow that is away from you when you shoot
Belly of Bow - side of the bow that is facing you when you shoot
Tips/nocks - grooves that the string sits in on either end of the bow
Brace Height - distance between the string and the back of the bow when the bow is strung
Nock Point - point on string where arrow sits adjacent to when shooting



Close-up of handle with arrow rest cut in. View from the belly side of the bow.



Profile view of the handle area. The back of the bow is towards the top of the picture. The belly of the bow is towards the bottom of the picture. Notice how the bow goes from the thickness of the handle into the limb thickness. This is known as the fadeout.



Picture showing close up of brace height- distance between handle and string. Usually a "thumbs up" is an appropriate distance.

Finding the outer growth ring

So the back of the bow (the side of the bow that is away from you when you shoot), is the first part of the bow we are going to find. Once we have the back as a known, it will serve as a reference point and inform us on where to remove wood during the rest of our bow making journey. The back of the bow sits directly underneath the bark because when bark is removed carefully, there is a growth ring. The growth ring is important because when the back of the bow is under tension, the outer growth ring must be in tact to be able to handle this force.

There are certain woods like Osage orange and black locust in which the bow is actually made from heart wood only. In



Close up view of the fadeout- where the handle blends into limb thickness on the belly of the bow.



Using a drawknife to start removing the bark. Both using the tool as a carving tool and as a scraper (right).

this case, directly underneath the bark is not a suitable back of the bow, so we must carve through the sapwood to reach one growth ring of heartwood. This can be tedious and take time to get good at. For "white woods" like hickory, ash, and elm, there is no need to chase growth rings. All we have to do is get underneath the bark carefully, and we are there.

Peeling bark vs. Carving bark

If you harvest a relatively young tree of hickory, ash, or elm, in the late spring or summer, the bark will likely peel off with ease. This is simply bonus. The bark can now be used for projects such as baskets or lashing, and we have found our outer growth ring without any carving. Any other time of year, or if you let your stave season with the bark on it, you will need to carve off the bark. Carving the bark off can be tricky, but is great practice using your drawknife and can teach us a lot about how the wood behaves.

Using your knife or drawknife as a scraper

Your carving knife will serve another function here, and that is as a scraper. By holding your knife at 90 degrees to the



Close-up of bark removal on an elm stave. Notice color and texture differences showing us outer bark, inner bark, and wood.



Close-up of bark removal on a white ash stave. Notice the layers of the bark, and the final dramatic color change indicating we've reached wood.



Since this elm stave still had some moisture in it, the inner bark oxidizes, and provides another indicator for finding the back of the bow.

wood and dragging it over the wood, we can remove very precise amounts of wood, without creating tool marks in the bow. There is a tradeoff between control and efficiency with the woodworking tools we use. A hatchet can remove wood really efficiently, though it can't be done with precise control. On the other side of the spectrum, sandpaper is extremely controlled but does not remove wood efficiently. A draw knife, carving knife, and Ferrier's rasp lay in-between sandpaper and hatchet on that spectrum.

When to call the back done

If we are hoping to get the back absolutely perfect with no tool marks at all, we will likely carve until we have no wood left. A certain amount of imperfection on the back of the bow is totally acceptable as long as there are no major breaks to the growth ring. When working on the back, it is important to know when to switch between carving and scraping. Typically when I see signs of wood I will switch to a scraper. If we start scraping too early, it may take us a long time to find the back. If we carve too deep we can ruin the stave.

The Back as a Reference Point

Why is the back of the bow so important? Hopefully this seems redundant to you at this point. I'm emphasizing it so much because it is really important. The back of the bow is under tension, and the grain



Peeling Bark to carefully remove inner bark without damaging wood

Using the drawknife as a scraper

2 staves (ash and elm) with backs finished!



Using a knife as a scraper

and outer growth ring must be intact to hold this tension. Imagine if we made the rest of our bow first and then tried to find the back? It may work, but if we ran into any problems with our back we would be out of places to run. There would be no extra wood to buffer our mistakes. So we make the back first, and it becomes a fixed point. From here on out as we make our bow thinner and more flexible, approaching a tiller, with all the wood we remove is from the belly and sides.

So what to do before next week? Well it may seem simple, but it is tremendously

important. Find the back of your bow. Take your time, listen to the wood. If it is your first time using wood working tools perhaps practice on a smaller stick first.

If this is easy for you, try finding a branch of a tree and carving it to one growth ring. Can you notice where the growth rings begin and end as you carve? Can you carefully remove all of one ring while leaving the ring below it intact? If you get good at this you are well on your way to advanced bow making.

If you like, check out this video from YouTube of a bowyer finding the outer growth ring of an Osage orange stave.

https://www.youtube.com/ watch?v=z8aRngdXxE0

Enjoy and good luck! Remember it is ok to make mistakes. Did I mention I broke 10 bows before I made one that worked? Hopefully with some good instruction your learning curve can be a little quicker than mine, but seriously expect to make mistakes. This is how we learn.

When you are not working on your stave be sure to store it in a cool area such as a garage. As wood dries out it shrinks, and this can cause the wood to crack. By keeping your stave near a wood stove or putting it in a hot attic, your stave may crack. It ought to be safe, though, in your garage. Once we work the stave down further to where the limbs are less than an inch thick, we will actually work towards drying out the stave by keeping it in a warm area. But for now, make sure to store it in your garage.



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