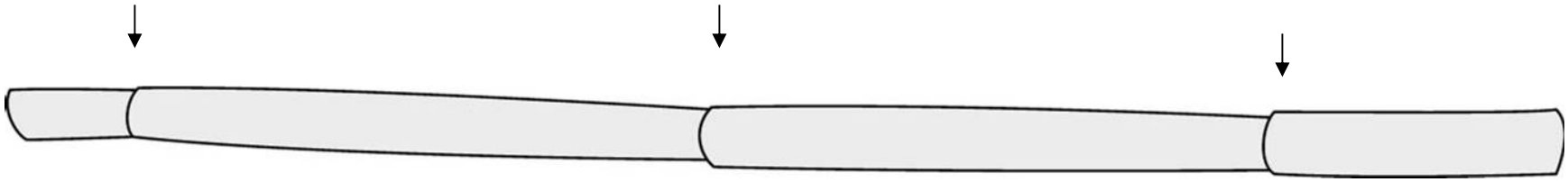
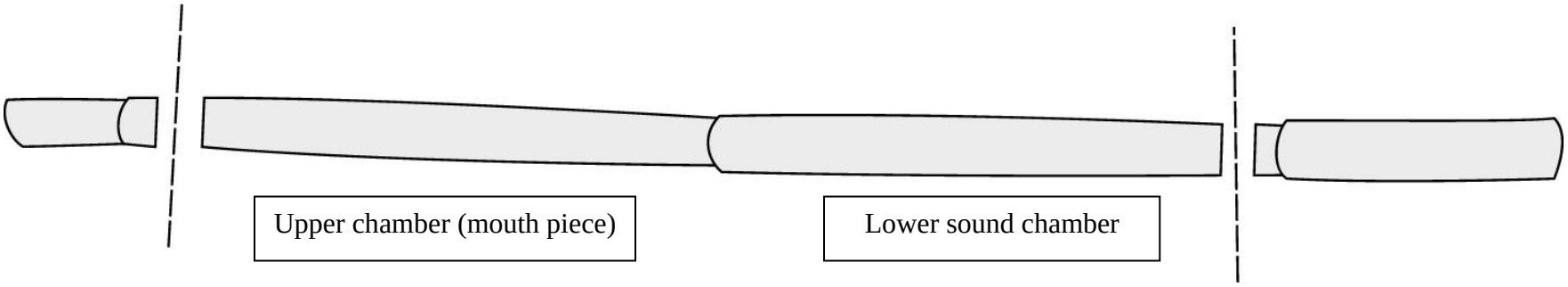
Wilwil

The traditional flute of the Piipaash is made of Xtha (river cane). This plant is ideal because the interior of its stalks are long, hollow, and divided into separate chambers. These chambers are divided by a natural membrane at the nodes. The location of these nodes is obvious when looking at the exterior.

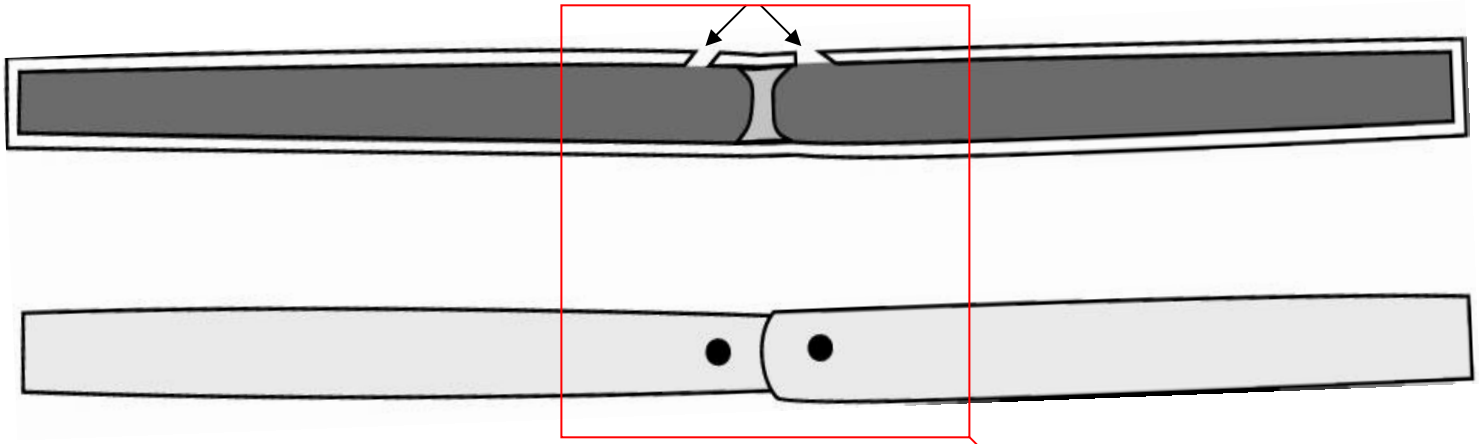


The first thing you need to do is cut the reed so that you have two separate chambers, divided by a node. The length of the chamber that will become the mouthpiece (upper chamber) is unimportant. However, the length of the lower sound chamber is extremely important, because its length will (in part) determine how high or low the sound of the flute will be (the key). In general, a longer sound chamber will produce a lower tone. A shorter sound chamber will produce a higher tone. The width of the sound chamber is also a factor. Imagine blowing across the top of a bottle. A small bottle will produce a higher note, and a larger bottle will produce a lower note. The same concept applies to the flute.

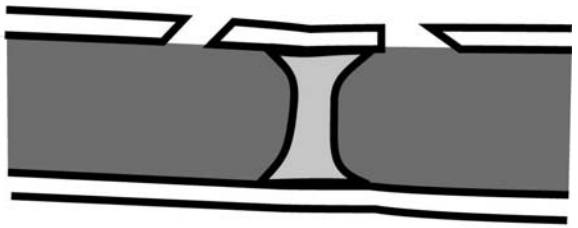


At this point, you have a piece with two separate chambers, divided by a single node (note: you can make a longer sound chamber by including the next section of the reed, but you will have to puncture the dividing membrane). Both ends are open. Both chambers will be a little dirty with plant material and should be cleaned out before proceeding **(Warning: Do not penetrate the membrane separating the two upper and lower chambers!!)**. You may also want to sand around the edges at both ends so that they are relatively smooth.

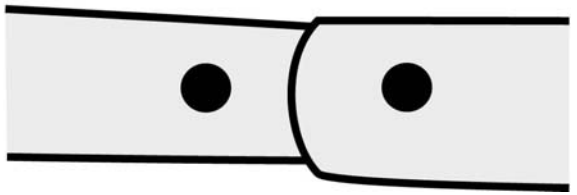
Now that the flute has been cleaned, it is time to take on the most important step. This is the step that actually makes the flute produce sound. This step should be executed with patience and care. First, you need to drill or burn two holes…one on each side of the node. You may carefully angle the holes at approximately 45 degrees as you drill or you may file this angle after the holes are made.



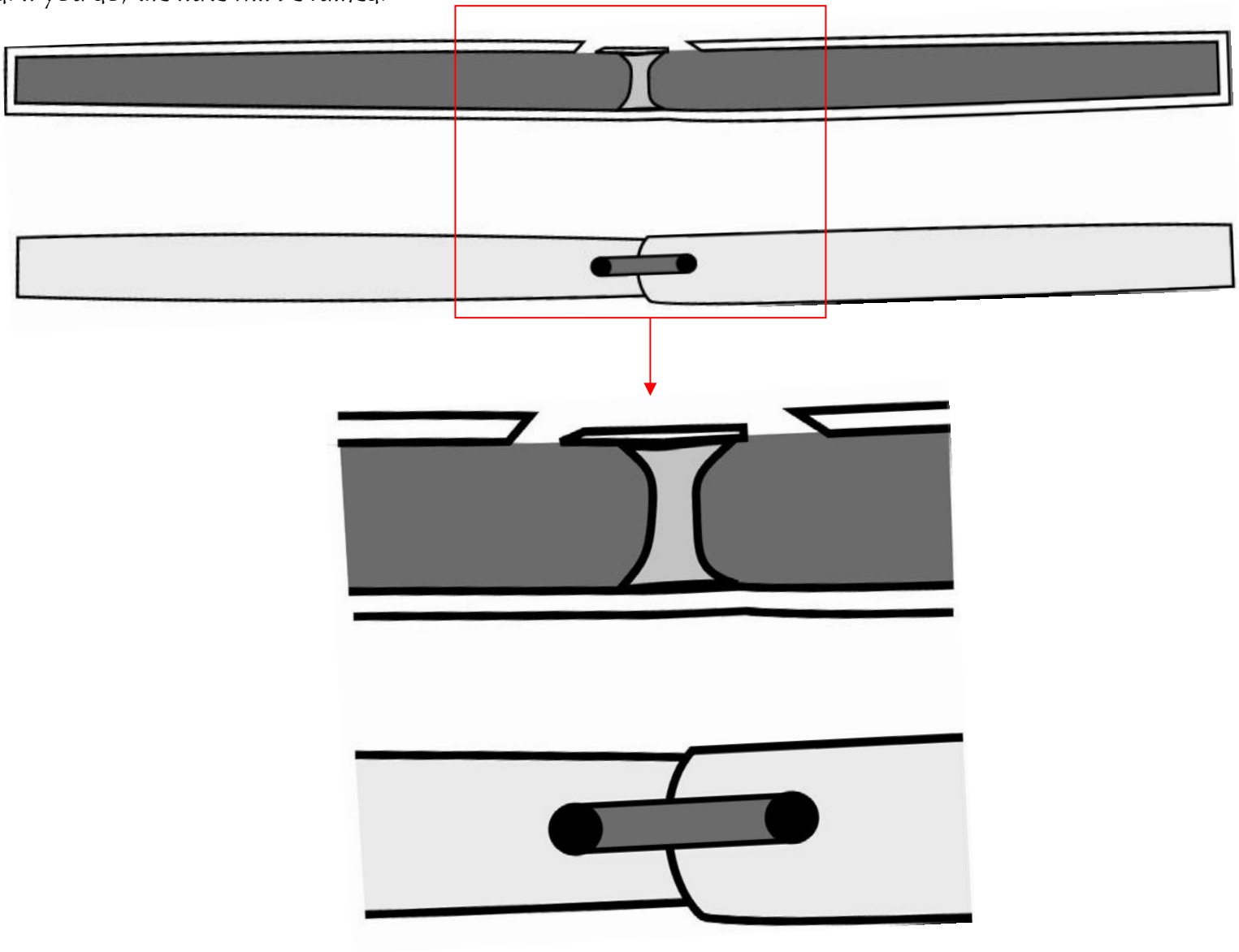
The quality of the sound may be more crisp if the holes are filed square (at least the hole in the sound" chamber). Holes left round, however, will play music just the same.



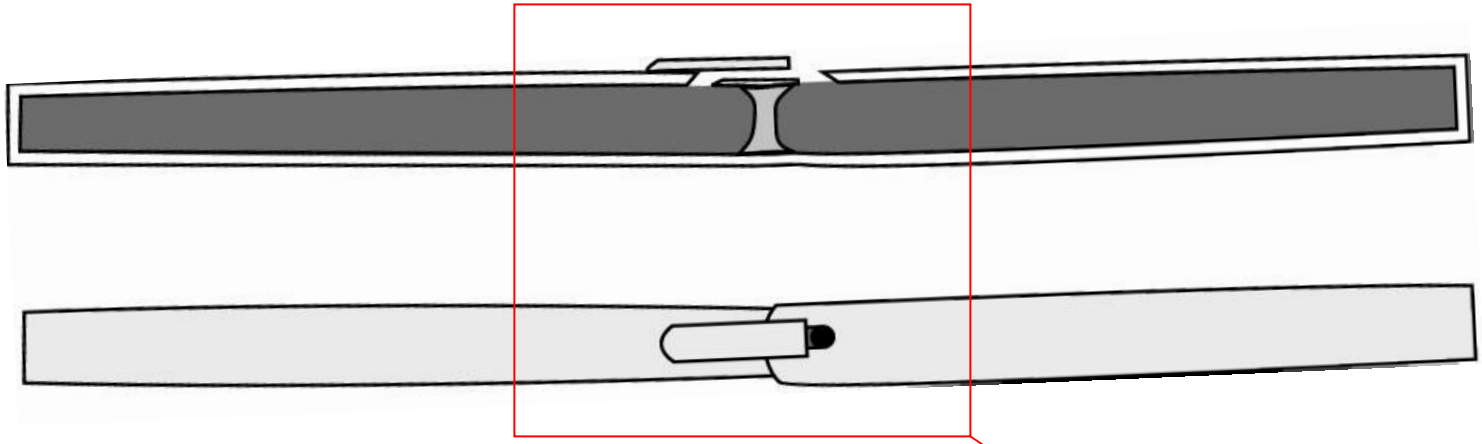
The close-up illustration on the right clearly shows holes on either side of the membrane. Note the angles of the holes. The angles will most likely be altered later by filing in order to get the perfect sound.



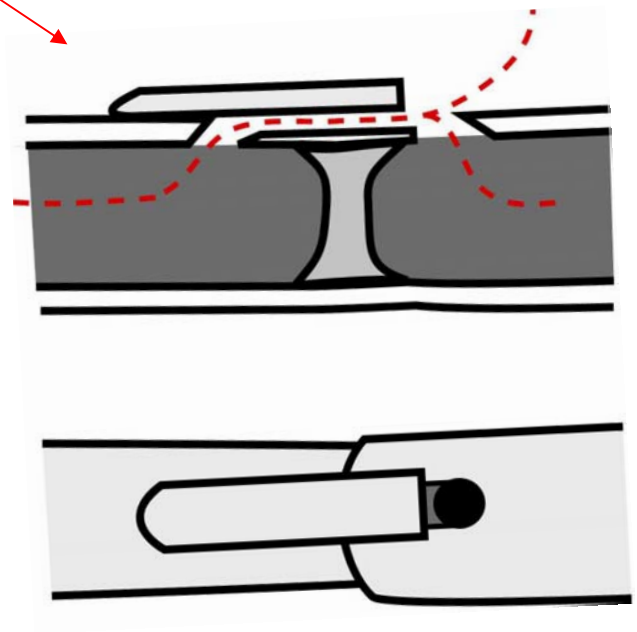
The next step is to carve a shallow channel between these two holes. This channel will be recessed from the surrounding surface. Later, when covered, this channel will serve as an air flow between the two holes. You must be careful not to carve all the way through the wall of the reed. If you do, the flute will be ruined.



After you have carved out a shallow channel between the two holes, you can test you work. Cover the channel with something such as ribbon, a small scrap of reed, etc. Position this piece so that it completely covers the hole drilled into the upper chamber and most of the recessed channel, but so that it does not cover the hole on the sound chamber. Look at the illustration below for clarification.



Blow lightly into the mouthpiece and adjust this piece until it is positioned as such that a note is produced. The illustration on the right shows how the air should be flowing through the flute. If you are unable to produce a note, it is most likely that you need to adjust the angle of the hole in the sound chamber. This hole needs a sharp edge that splits the flowing air. The problem may also be with the channel that you carved out. Or, the holes may need to be sanded to get rid of any rough spots. Slowly experiment with each of these variables until you have successfully produced a note.



Upon successfully producing a pleasant sound, you are to be congratulated. You have successfully completed a one-note flute!

If you want to be able to play more than one note, you must make more holes along the sound chamber.

Note: The air channel between the two may be created in different ways. Instead of carving into the flute, a piece of thin leather cut into a U-shape can be used.

First, you must decide how you want to tune your flute. There are different musical scales that exist. Most of us are familiar with the ones most frequently used in American and European music (e.g., DO-RE-MI, etc.). However, other cultures use musical scales that are quite different. A scale is simply an arrangement of notes that somehow "go together". You may choose to tune your flute to one of the familiar scales or tune it according to your own scale. There really is no wrong or right way to do it. Birds sing beautiful songs that don't necessarily fit into any scale, so you can do the same.

Traditionally, the flutes of the O'Odham and Piipaash only had three or four holes. Flutes of other tribes might contain five or six holes. The Native American flutes that are used by contemporary performers usually have five or six holes.

Once you've decided how what kind of scale you want to use and/or how many holes you want in your flute, you will probably ask, "Where should I place the holes and how big should they be?" Unfortunately, there really isn't an easy answer when working with pieces of river cane that can vary greatly in quality and characteristics. The following factors affect the sound or pitch of a flute:

- Length of sound chamber
- Width of the bore in the sound chamber
- Wall thickness of the sound chamber
- Hole position
- Hole size

Taking all things into consideration, I'm sure there's a mathematical formula that would calculate all these measurements and give a precise answer. The other alternative is to get a feel for it through trial and error. It is most important to remember two principles:

1. The larger the hole, the higher the note will be.
2. The further away the hole is from the end of the flute (on the lower section), the higher the note will be.

Usually it's best to tune one hole at a time. Play your flute with no holes and think about what you want your next note to sound like. The next hole might be… oh let's say ¾ from the end. Make this hole small at first. Blow the flute with the hole uncovered. If the note you hear is too low, you can make it higher by slowly widening the hole, testing with each adjustment. **Be careful…if you make the note too high (by making the hole too big), there's really no way to bring it back down.** You'll just have to live with it or start over. Or, you may partially cover it with a piece of tape to tune it back down (kind of ugly, but it works). Continue tuning the other holes in the same manner, one by one. If you're careful and patient, you'll end up with a beautiful sounding wilwil.

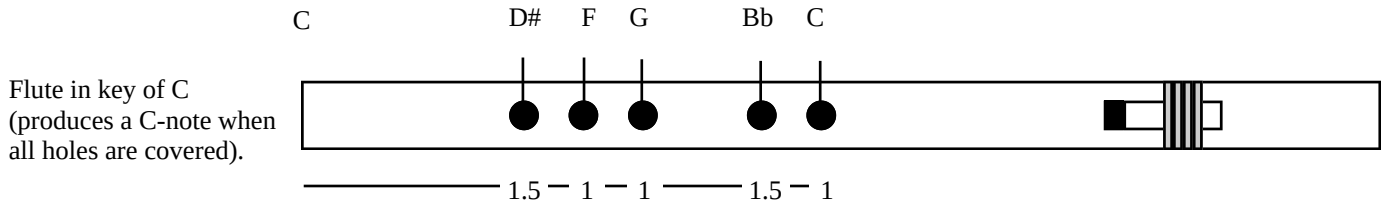
Tuning a Flute to Scale

Traditional O'Odham/Piipaash flutes had only 3 finger holes. Less frequently, a 4-hole flute might be constructed. Most contemporary Native American flutes now have either 5 or 6 holes. The size and location of these holes are important, as they dictate the notes the flute will play when they are uncovered. Usually, they are arranged in some type of scale of notes that naturally sound pleasing to the ear. Over time, certain scales have become standardized because they sound good and are easier to play. Here, we will share one of the common scales for contemporary 5-hole flutes. If you want to make a 3-hole flute, you can use the same instructions, disregarding the information on the last 2 finger holes (or tune it however you want).

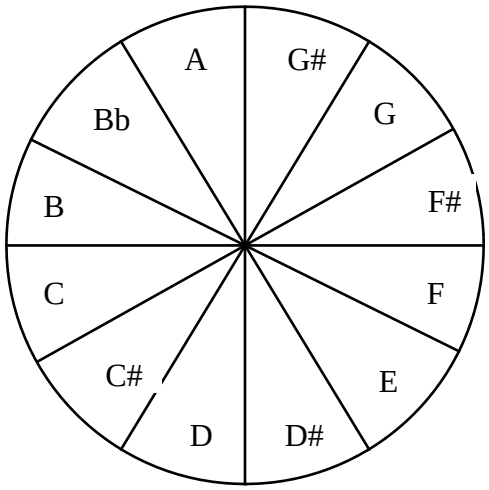
After you have completed the sound mechanism (the nest) on your flute you should have a flute that plays one note (because you haven't yet made any finger-holes). That one note you hear is the key of your flute. If it's a C-note, you have a flute in the key of C. If it's a little flat (not quite a C), you can carefully cut a bit of length off the end of the flute. Shortening the flute will raise it's pitch. Be careful. If you cut off too much, you can't reattach it and you will have to settle for a flute that is sharper than what you were striving for.

Tuning a 5-hole flute

Regardless of your flute's key, you will follow the same scale. Use the pie diagram at the bottom of the page to visualize the instructions here. The standard scale for a five hole flute is **1.5** -**1**-**1**-**1.5**-**1**. To better understand this scale, find the note of C on the chart below. According to the scale, the next note (the first hole nearest the end of the flute) should be 1.5 steps higher than a C. Moving 1.5 steps counter clockwise on the chart puts us at D#. The note we are trying to produce from the fist hole should be a D#. According to the scale, the note produced by the second hole should be 1 step higher than the note produced by the first hole. Using the chart again moving 1 step up from a D# shows us that F should be the note produced from the second hole (from the bottom) when it is uncovered. The flute diagram below shows the entire sequence of a 5-hole flute in the key of C.



Flute in key of C (produces a C-note when all holes are covered).



Moving counter-clockwise, this chart moves up the scale in 1/2 step increments.

Example 2 - If the flute is in the key of D the notes would progress as such: D-F-G-A-C-D