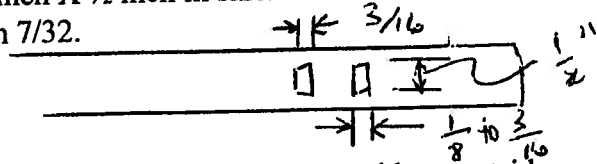


# Flute Making: Continued.

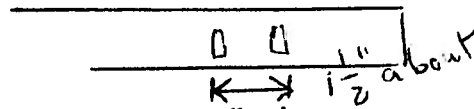
At this point in time you will have questions about various items on the construction.

**Here are additional help aids not in any particular order.**

1. The two rectangular holes should be  $\frac{3}{16}$  inch X  $\frac{1}{2}$  inch in size. The front hole closest to the 6 note holes should never be more than  $\frac{7}{32}$ .

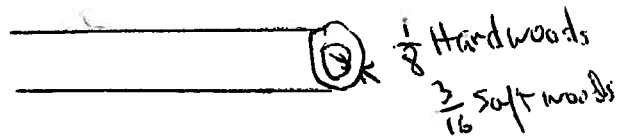


2. The holes if done correctly they should be about 1 and  $\frac{1}{2}$  inch apart outside to outside.

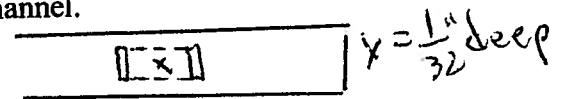


3. Use Tightbond II, or Titebond III glue ; Epoxy slow drying clear adhesive or Carpenters glue. Put it on both surfaces and do not use too much. Use Gorilla glue for exotics and oily woods...wipe first with acetone or Lacquer thinner.

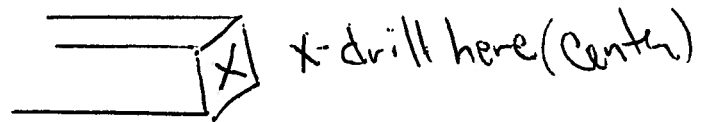
4. You should have a sound chamber wall thickness of a strong  $\frac{1}{8}$  and closer to  $\frac{3}{16}$  for cedar or redwood use  $\frac{1}{4}$  wall.



5. The channel between the two rectangular holes (sound hole and slow air chamber hole) should be  $\frac{1}{32}$  " deep and the same width as the two holes are. This can be hand chiseled, routed, dremeled, milled or any method you feel comfortable doing well. This channel is extremely important to be smooth on the bottom and  $\frac{1}{32}$  inch deep. Too deep and you need to block sand the top flat until you have  $\frac{1}{32}$  deep channel.



5A. Drill a  $\frac{3}{8}$  inch hole for the mouth blow hole with a Kreg jig bit. You'll have sound now with the bird in place.



6. After turning the flute, sand it starting with about 120, then 150, 180, 220 and upwards to 320 and even 400. This includes the internal bore and slow air chamber as well. While flute is on the lathe hand block plane the belly and a little bit of the flat top area. The belly will be hand planed with one darn sharp plane set very shallow. You will have to see a demo or ask as it is too difficult to explain the process on paper.

7. Sand now this belly area, keeping the top perfectly flat as the bird will sit on top and must have a tight seal all around. The bird should have a notch cut out of the front about 3/16 to 1/4 deep and the same width as the sound hole. It needs to have a saddle on top to keep a leather lashing or lace in place. Perhaps 6 to 7 wrappings then tie a knot. The bird should be the same width as the flat surface on which it will rest. It'll be about 2 inches long. It may be thick, with a carving or whatever.

8. The 6 drilled and reamed holes will be different in diameters. The farthest away hole from your mouth will be hole #1. It'll be small. Hole #2 will be medium ; hole 3 larger. As the first 3 holes move closer to the south end of the flute the larger the holes will end up being.

9. Now for the finishing aspects. Oil finishes are easy to apply, and so is a 2 or 3# shellac. I like a varnish as well, but not an exterior type. The inside of the true sound hole and slow air chamber also needs a finish again. I use 2# cut shellac and seal the hole with my finger while dumping in about a teaspoon full into the mouth hole. Rotate your hand and arm and coat the inside before dumping out the excess. If no excess drips out then you may consider adding 1/2 teaspoon more. Same for the large sound chamber ..add about 4 teaspoon full and rotate or shake it around to coat the inside evenly. Dump out excess and allow it to drain. For those who are ambitious. Sand after the shellac dries with 400 grit paper wrapped around a dowel. Apply a second coat. I myself will have three coats in all.

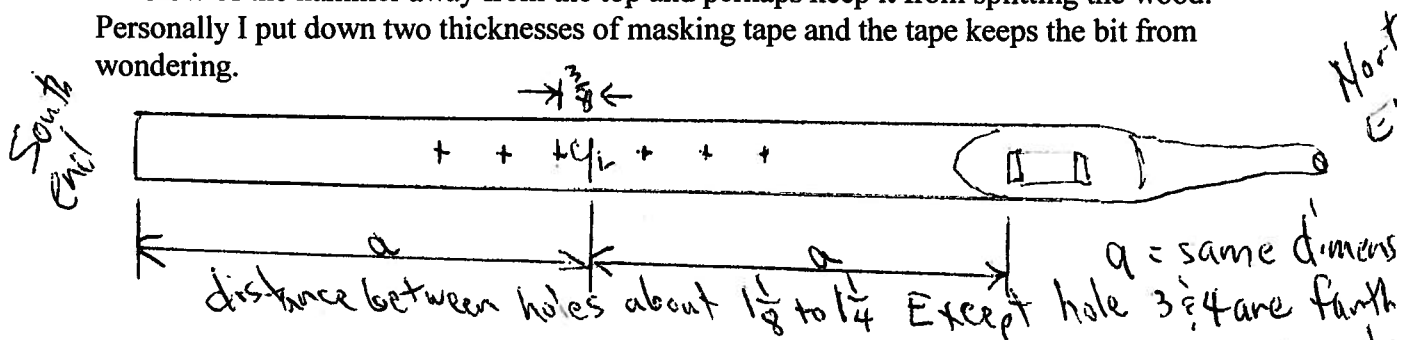
10. You are now ready after a good days drying time to locate the 6 sound holes. First you will need to borrow a chromatic(spelling) tuner. Likely the local high school may borrow you one. It will take about an hour to tune it correctly for a first timer.

11. With the bird in place you will blow gently and hear one sound...if you hear a high and low sound ( over blow) and it does this after two or three tries then you need to check things such as a. adjust the bird, b. tighten the strap over the bird. C. Check that you have a 1/32 inch depth for the channel between sound holes. D. Be sure the cutting edge of the true sound hole is also 1/32 in thickness and it must be equal in thickness the full edge. Finally be sure that the true sound hole is not too wide ( more than 7/32) Call after all that the HELP LINE at 608-487-3285 ask for Growling Bear or Joe.

12. You will blow and watch for an F#. You will slowly wafer off with a band saw the end of the flute reducing its length. After every cut you need to also remove splinters and shavings and burs left by the cut as this influences the sound by disrupting the air flow. You will eventually hit the note. My final cuts are often 1/16 inch thick is all. ***Once you get an F# you need to do one more cut...take off a 3/16 inch wafer.***

The flutes typically with a 1 inch bore will be about 22 to 23 inches total in length So the 24 inches you started with won't be much less than that in the end. A 7/8 inch bore will yield about a 16" bore length.

13. With a piece of white masking tape you'll lay out the 6 holes. Place the masking tape on the top of the flute. Now measure from the true sound hole (up by the bird)  $\frac{1}{2}$  the distance from the front of the true sound hole to the south end of the flute. This should vary but will be around 7.5 to 8 inches. Mark on the tape this center distance. Now measure  $\frac{3}{8}$  inch from that mark towards the south end of the flute. This will be the location of one of the sound holes. (actually the third from the end or the 4<sup>th</sup> from the true sound hole. See diagram. The 2 holes in front of that towards the end are to be what ever you find comfortable in terms of distance apart. My finger tips don't stretch apart much further than 1 and  $\frac{1}{8}$ " So the front two locations are that distance. The back 3 holes towards the true sound hole begin by locating the 4<sup>th</sup> hole. It will be placed 1 and  $\frac{3}{8}$  inch away, followed by the remaining two at that comfortable spacing we just talked about. Again see diagram. ALL HOLES ONCE PLACED ON THE TAPE should be double checked then you may drill these with a  $\frac{3}{16}$  inch sharp or new drill bit. Push down gently so you do not break through the whole inside of the thin wall you have. Let the bit cut slowly but do keep pressure on the bit or it will wonder off the rounded top of the flute. Some people think they should prick punch the hole first. If you try that I'd say place the flute on a thick layer of rolled up bath towel. This idea will take the shock from the blow of the hammer away from the top and perhaps keep it from splitting the wood. Personally I put down two thicknesses of masking tape and the tape keeps the bit from wondering.



Now you are nearing completion, you will need reamers to enlarge the 6 holes to meet the notes. Reamers need to be seen in action or explained verbally as there use is difficult to explain in written form. You will start by closing off all the holes with your fingers or with a good tape that will not allow air to travel through BUT THE TAPE COULD ALSO TEAR YOUR FINISH OFF.. So I use blue or green frog tape and double it up over the holes. With the hole farthest away from your mouth you will ream it a few turns and check for an "A". When you get the note move to the next hole remove the tape and leave the tape removed on the first hole so with two holes open blow and achieve a "B" ream until you get it. (couple of important things...1. Each time you ream you leave it rough inside and the hole also is rough. So have a dowel with sand paper on it (180) and knock off those fibers. Yes you'll damage the finish a bit but that's the way it goes. The third hole is a C# and the first two holes are left open while the remaining are closed. The 4<sup>th</sup> hole is a "D" and you need to cover up the C# as well as the E and F#, then to get E

a part by 3/8"

you will cover up the 4<sup>th</sup> hole and of course the 6<sup>th</sup> hole. and finally an F... cover the 4<sup>th</sup> hole.

Overall the holes are likely to be around 1/4 to 3/8 in diameter. There are many variables which determine these holes and include the type of wood; How well or not you sanded it; How well you finished it internally; How well you matched the halves in your original glue up and finally how well you followed directions regarding the making of this piece of art. NOW ALL YOU NEED TO DO IS ENJOY IT or give it to someone who will.