Making the Japanese Shakuhachi Flute

Ken LaCosse The shakuhachi is a deceptively simple Japanese bamboo flute. With only five finger holes and a sharp, angled blowing edge, it is capable of producing both sounds of simplicity and vast complexity. Its efficient design provides a player with a level of subtle tone control found in no other flute. By adjusting the blowing angle or by partially covering the finger holes, its basic pentatonic scale can be expanded to include slides, halftones, quarter tones as well as subtle microtones. Historically, the shakuhachi has a connection to Zen Buddhism. In its religious context, it is played not for entertainment, but as a way of Blowing Zen.

The deceptive simplicity of the shakuhachi can also be found in the experience of constructing one. In it's most basic form, the shakuhachi can be made in minutes. In it's most complex form, it can take months or years of diligent labor before a flute is considered finished. Regardless of approach, shakuhachi making can be used as a tool to practice the appreciation and wonder of paradox in all things.

This flutemaking guide attempts to explain a basic approach to shakuhachi construction. In this approach, the emphasis is on the bamboo and working with what each particular piece has to offer. This method is ideal for beginners because it is concerned with the shakuhachi in its unadorned form. Extra tedious steps, or within this mindset, 'trappings' of construction, such as the blowing edge inlay, lacquer application and middle joint construction, are not addressed. Although basic, it is not necessarilly a crude method. Many experienced makers find endless complexity and challenge within this approach.

History

There are various possibilities as to the origin of the shakuhachi. One explanation is that an ancient six hole version migrated from China to Japan along with the introduction of Buddhism during the Nara period (680-794 A.D.). Another explanation is that an ancestor of the shakuhachi called a hitoyogiri was first played by Japanese begger monks about the 9th-11th century.

In the 17th century, the shakuhachi was played by wandering priests called komuso (priests of empty nothing) who wore large baskets over their heads to symbolize their otherworldliness. Komuso membership greatly increased during the political upheavals of this time. Some were attracted by the free and easy role of the traveling komuso monk. Others were drawn by its developing Zen theology and its utilization of music as a means to enlightenment. The movement gradually developed into a recognized sect of Zen Buddhism. The popular legend of the komuso is that they were granted exclusive rights to play the shakuhachi if they acted as secret informers for the government. They are also said to have originated the use of the dense root section in their flutes as a means of self defense.

Priests of Empty Nothing

Ken LaCosse, of San Francisco, makes Mujitsu Shakuhachi for students, teachers and professional musicians throughout the world. Visit Mujitsu Shakuhachi at: mujitsu.com

Shakuhachi Construction

Tools and Materials List

There are many specialized tools available for shakuhachi construction. They do make most of the steps efficient. However, a quality shakuhachi is mainly a product of patience, attention and subtle adjustments. Often, simple tools found at any hardware store are sufficient. Here is a list of the basics:

Hack Saw
Japanese bamboo saw (optional)
Exacto Blades
Flat file- medium (at least 1" diameter)
Round file- coarse (1/4 to 1/2 inch diameter)
Drill (power or hand)
3/8" Forstner drill bit
Long 3/8 inch wood drill bit
Sandpaper- (coarse to fine)
Measuring Tape (metric)
Wood dowels (1/4-1/2 inch diameter)
Steel wool (extra fine)
Electronic tuner
Bamboo!

Shakuhachi making is a humbling experience. At the heart of this experience is bamboo. I continue to learn the same lesson from bamboo. Work against it and it always wins.Work with it and it just might reveal something. Each piece of bamboo has a unique voice. It is important to listen for it, recognize it, then help it along in the direction of its own sound. Shakuhachi making is difficult when we try to force a predetermined voice into the bamboo. The best flutes are effortless and appear as a result of a good relationship between the maker and the bamboo. With this in mind, let's begin.

Bamboo Selection

A traditional shakuhachi is made from the root section of Japanese medake (phyllostachys bambusoides) bamboo. Only a small number of culms in a grove will exhibit all the characteristics considered essential for a quality shakuhachi. Color, node placement, diameter, feel and density are all important considerations. These characteristics, along with the labor of harvesting, preparing and curing the bamboo, contribute to its high cost. For the novice maker, it may be practical to buy inexpensive non-root bamboo. Mistakes are inevitable and it's easier to make them on low cost bamboo. Plant nurseries often carry culms of inexpensive, cured bamboo which can make surprisingly fine shakuhachi. Search for culms that are cut as low to the ground as possible. The nodes are closer together and the bamboo is thicker at this end. Also, the bore is naturally tapered at this end and resembles the optimum shape for good sound.

Opening the Bore

Cut your bamboo to size using the diagram as a guide. Drill through all the solid nodes with a 3/8" long drill bit. The nodes can then be filed slightly with a coarse round file. At this point, do not grind the nodes flush to the bore. These can be adjusted after the holes are drilled to fine tune the sound quality. Grind open the blowing edge end node to 2cm.

Cutting the Blowing Edge

With the bore still in an unfinished state, it's time to cut the blowing edge. Starting from the bottom end, draw a center line along the length of the bamboo to act as a guide for finger hole and blowing edge alignment. With a hacksaw, cut the blowing edge on a node and file it smooth. File the chin rest area back at a slight angle and round its back edge to make if more comfortable. The blowing edge should be sharp and match the dimensions in the diagram. Test blow and make necessary adjustments until it plays with comfort and relative ease. Sand the filed areas to your liking.

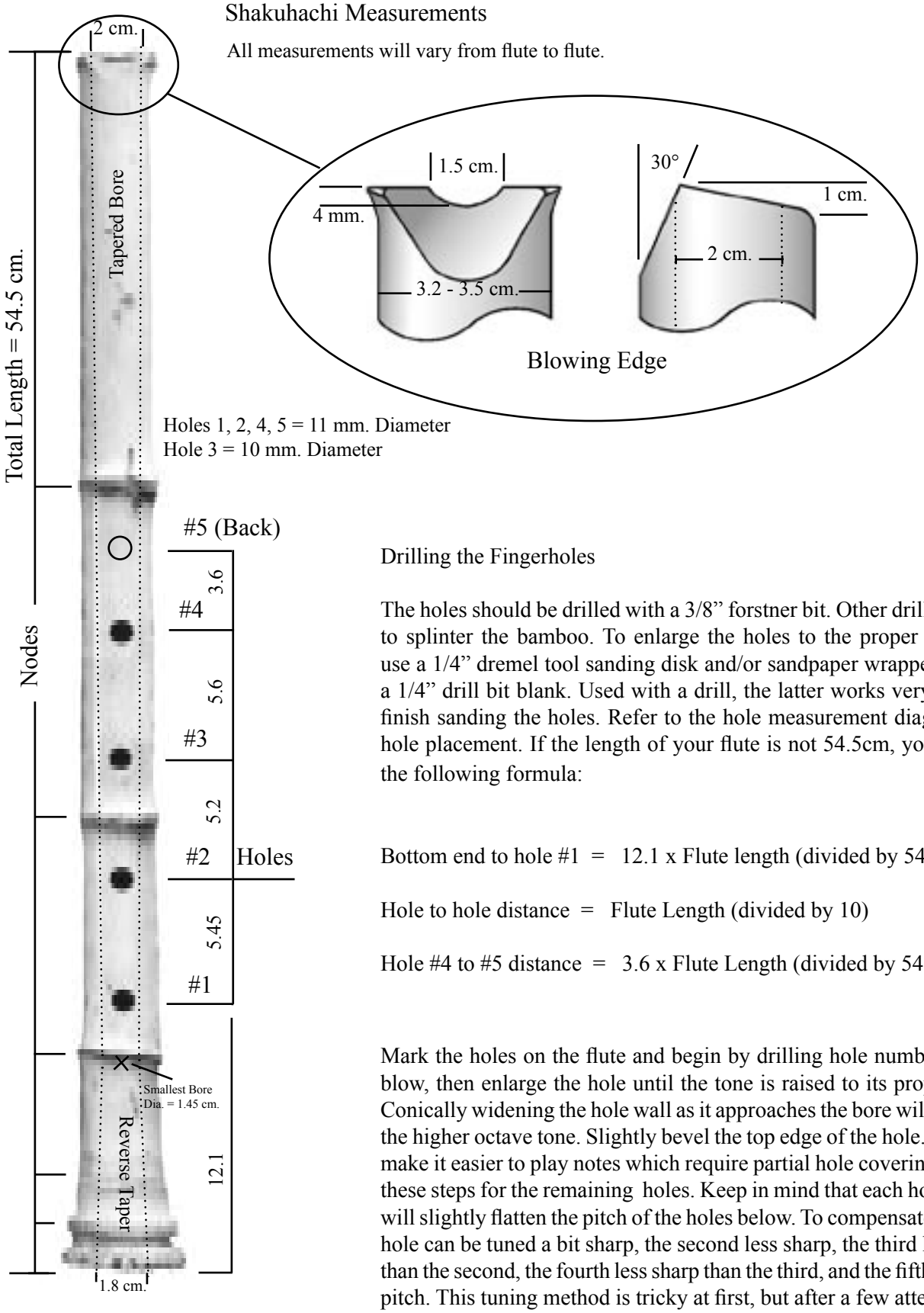
Additional Bore Work

If the flute plays its one low note exceptionally well, leave the bore as is and move on to drilling the finger holes. If you are not satisfied with the sound, some secondary bore work will be needed. Slowly grind the nodes singly or in combinations and test blow frequently. It is important to work slowly and to listen. If you overgrind it is more complicated to add back to the bore. The idea is to get the bore close to where it needs to be before drilling the fingerholes. Then, final bore adjustments can be made.

Hint: If the bore of your flute is tapered like the diagram (which is ideal) you may need to grind the bottom 9cm open slightly to improve the tone. If the bore is cylindrical, no grinding is needed at the bottom.

Shakuhachi Measurements

All measurements will vary from flute to flute.



Drilling the Fingerholes

The holes should be drilled with a 3/8" forstner bit. Other drill bits tend to splinter the bamboo. To enlarge the holes to the proper diameter, use a 1/4" dremel tool sanding disk and/or sandpaper wrapped around a 1/4" drill bit blank. Used with a drill, the latter works very well for finish sanding the holes. Refer to the hole measurement diagrams for hole placement. If the length of your flute is not 54.5cm, you can use the following formula:

Bottom end to hole #1 = 12.1 x Flute length (divided by 54.5)

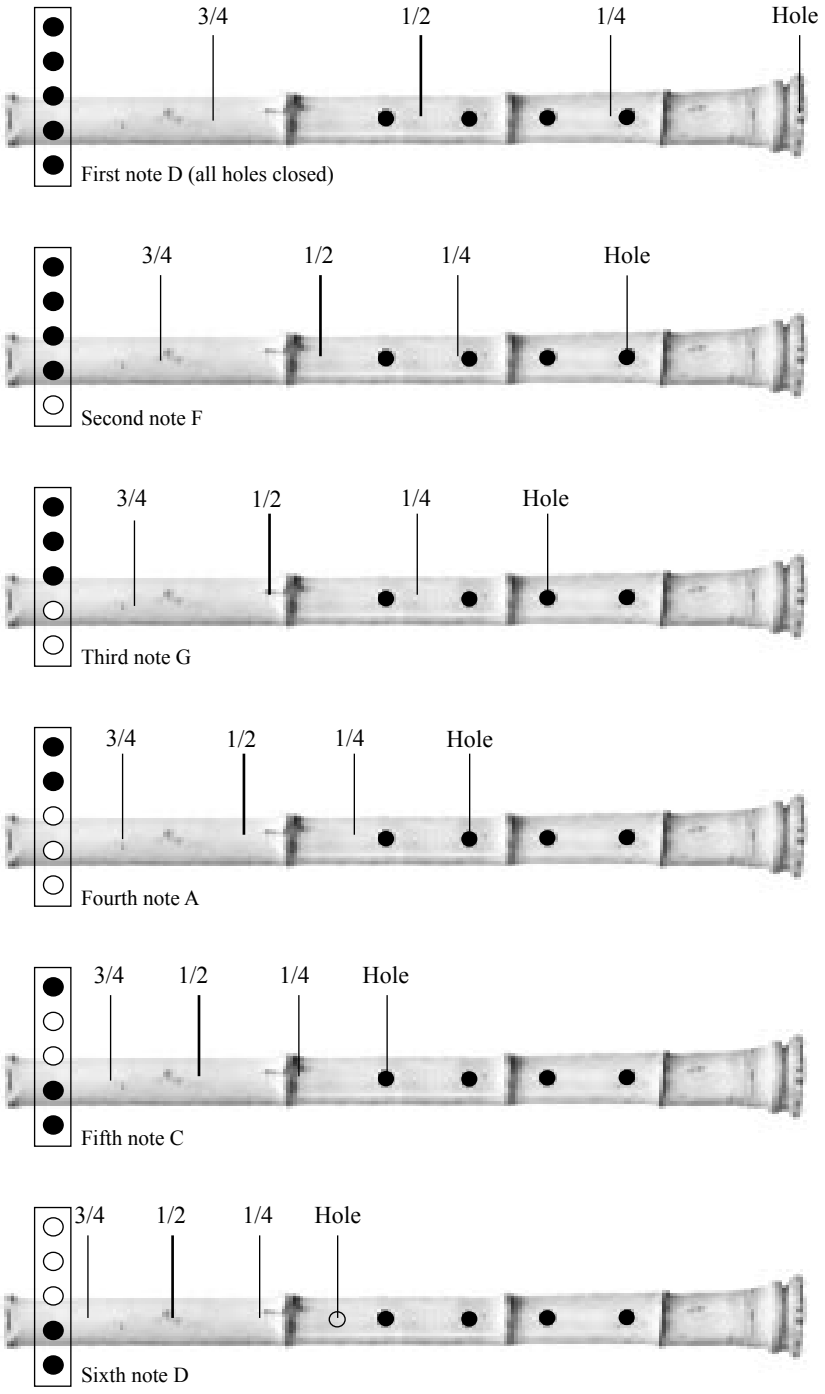
Hole to hole distance = Flute Length (divided by 10)

Hole #4 to #5 distance = 3.6 x Flute Length (divided by 54.5)

Mark the holes on the flute and begin by drilling hole number 1. Test blow, then enlarge the hole until the tone is raised to its proper pitch. Conically widening the hole wall as it approaches the bore will improve the higher octave tone. Slightly bevel the top edge of the hole. This will make it easier to play notes which require partial hole covering. Repeat these steps for the remaining holes. Keep in mind that each hole drilled will slightly flatten the pitch of the holes below. To compensate, the first hole can be tuned a bit sharp, the second less sharp, the third less sharp than the second, the fourth less sharp than the third, and the fifth on exact pitch. This tuning method is tricky at first, but after a few attempts you get the feel of the degree of compensation needed.

If you are happy with the sound of your flute, there is no more work to be done. It's finished! It may be all that you want and need in a flute. It may also inspire you to make another, or experiment with other sizes. If you are inspired to continue making flutes, you may eventually be drawn to enter the soul of the shakuhachi; the bore.

Critical Points along the Shakuhachi Bore



Fine Tuning the Bore

Fine tuning the bore is the main challenge in constructing a quality shakuhachi. It is a combination of mathematics, luck, educated guess, intuition, patience and perseverance.

This process is, essentially, adding and/or preferably removing space along various areas of the bore until all the tones play well. The actual space along the bore that will need to be removed or added will most likely be minute, but nonetheless, critical to the potential sound quality of the instrument.

Each note has corresponding 'critical points' along the bore which can be adjusted to affect the tone. For the low octave notes, these points are found at the 1/2 point between the blowing edge and the open hole of the note being played (1/4 & 3/4 points for second octave), as well as directly under the open hole. If a particular note is not playing well, it can be corrected by adding or removing space at one or more of these areas. To check if space needs to be added, fold up a small piece of wet newspaper (approximately 1 1/2" by 1/2") and apply it to the 1/2 point in the bore. Play the flute to check for tone improvement. (A long split bamboo stick with foam rubber tied to the end works well to slide the newspaper to the desired spots.) If it improves the tone, the newspaper can be removed and the area can be built up with a dab of glue and sawdust or paste resin. If there is no tone improvement, try adding newspaper to the other critical points. Then try adding in different combinations, then at every centimeter along the bore. You can also experiment with smaller or larger pieces. If there is no improvement after exhausting all the possibilities, you will need to remove space at one or more of the critical points. Various tools will work to remove space. You can wrap a thin strip of coarse sandpaper around the end of a dowel or weld a 1/2" section of a bastard file to a metal rod. A dremel sanding drum bit on the end of a long rod also works well. If the tone improves after grinding one or more critical areas, stop and move on to the next note that needs improvement. If there is still no improvement or the tone sounds worse, the areas will need to be refilled. It is also possible that a combination of adding and removing will be needed. This is where experience helps. A good rule of thumb is to exhaust every possible simple solution before attempting the complicated combinations. Altering the critical points for one tone can also affect the other notes as well so it is important to work slowly to get a feel of what is happening to the flute on a whole.

It takes patience and experience to develop a mental map of the shakuhachi bore using this fine tuning method. It may be helpful to work a little every day or two to slowly get to know the peculiarities of each flute. Each is unique, requiring an approach which is beyond pure mechanics. The shakuhachi is much more than physics. Listen to the bamboo.