HOW TO MAKE A HABAKI

(Notes taken while watching Mr. Muneyoshi Nakajima making habaki)

by James A. Mitchell

Note: The habaki should be made prior to having the blade polished or prior to the no. 5 stone. See sketches on last page.

1. The basic piece of metal (copper, brass, silver, etc.) must be forged into a rectangle approximately 1 1/8"x3"x1/8".

The metal in a rough state is melted in a crucible till molten, stirring gently with an iron wire to expel impurities.

Borax is put in the crucible prior to melting; this serves as a flux. The stirring and flux are used to assure no internal flaws in the metal.

Pour the molten metal onto a board of soft wood--try to create a blob approximately 1"x3". Keep heating the metal as it is being poured onto the wood. Tilt the wood if necessary to create the appropriate size. This is done to save time in the following steps.

The material must be hammered into the above mentioned size. The face of the hammer should be smooth and relatively flat. Do not use the round end of a ball peen hammer. As the material is hammered it will become noticeably harder. When this situation arises heat the metal till red hot to remove the hardness.

The metal can be best shaped when in this red hot condition, edge work is best done when metal is nearly this hot. Do not fold any metal when shaping! Especially on the edges----

Once a desirable sized rectangle is formed, one of the long edges should be thinned a bit; this is to save filing when forming the habaki. See sketch no. 1.

Hammering should be done with a medium sized hammer. The metal is always held with a pair of common pliers. A palm up position is easiest on ones wrist. The anvil should be amooth and at least 4"x4".

2. Taking measurements.

Measurements are taken from the blade and transferred to the metal. If there is an excess of metal it can be chiseled off quite easily.

Measure the entire circumference of the blade at the base of the cutting edge, not at the tang. Transcribe this to the metal.

The center is now scribed, from this point the mune machi width is marked, depth is decided upon and the notch is chiseled out. It is best to make this notch a bit smaller in width than the measurement indicates. Again be sure to take all measurements from the blade and not the tang. See sketch no. 2.

> Note: If the mune machi or the ha machi on your sword is in poor condition it should be filed into shape.. In some cases this may necessitate reshaping the entire tang edge. Use a good quality file to do this rather than grind stones. This is done to assure crisp angles and edges.
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> If the cutting edge will not file the temper must be removed or lessened from the spot to be shaped. Sometimes a very light touch of a fine pointed torch can be used. If more detempering is necessary, such as in the case of lengthening the tang, a different technique is used.
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> A large fresh Japanese radish or a good sized potato should be chosen. Be sure to choose a juicy one. Slice or notch this and then place it around the blade. Tie it securely directly above the spot to be detempered. This old Japanese technique will keep the remainder of the blade from being detempered when heat is applied. Light discoloration is removed by polishing. This should be practiced on a scrap blade several times. It is actually a very simple and safe technique. It just sounds awful.

3. At this point one should choose a medium sized hammer (possibly the one previously used) and a small hammer. Be sure these are clean and sharp edges are removed. A large wooden or leather hammer is also necessary.

Cut out a piece of soft wood approximately 2"x2"x6" and cut a notch on one side in the center. Make the notch about one inch wide and 3/4" deep.

An old sword tang with about six inches of blade is necessary at this step. This is a handy tool when wrapping handles as well. (More about this in later issues) The tang should be in fairly good condition. If not, file it smooth. The blade need not be sharp enough to cut, best if it isn't.

4. Now we can begin the initial bending. The creative mind will discover a multitude of ways to accomplish this. I find, however, that the traditional methods always turn out the best in the long run. Ours is not to question but to do.

Place the notched piece of wood on the anvil. The metal is now placed on an angle in the notch and the old tang tool is used to bend it with the aid of the large hammer. See sketch no. 3.

Place the tang on one side of the mune machi and then the other when hammering to bend. This creates definite and sharp edges on the inside of the habaki. This will save much time in the following steps.

Bend the metal until the opposite ends are about one-half inch apart.

NOTE: Before going any further.....

A handle is now made on the sword. In a convenient position, say 6-9" from the tang, wrap a length of linen cloth several times around the blade. Secure this with string. This serves to protect you from cuts and to protect the blade from perspiration. Give the blade a good oiling at this time also.

In the following steps the metal will again harden from the hammering. HEAT AS BEFORE but quench in water. Hot metal is too inconvenient at this time.

In the next hammering procedure, never rest the tang directly on the anvil. Always use the piece of wood between the work and the anvil!!!

5. Forming the inside of the habaki.

The bent metal is now placed around the upper tang of the sword. The metal must be hammered until its inside is exactly the same as the upper portion of the tang. This process must be done slowly and with caution. Do not work too fast, two to four hours should be taken to complete this.

Do all finished work about 1/4" from the tempered portion of the blade. One will have to start lower and work up to this spot.

When hammering the mune portion of the habaki, be sure not to round the metal. Attempt to hammer the "v" shape of the desired product.

As the habaki becomes hard and must be heated, remove it from the tang with a wooden or leather hammer. The metal should fit so tightly around the tang that it must be removed in this way. This is done so as not to spoil the top or bottom edge of the habaki.

As the metal is hammered and shaped, slowly move it along the tang towards the cutting edge. This upward motion is accomplished with the wooden hammer.

Do not hit the top or bottom edges of the habaki or your tang with the regular hammer.

When hammering the mune, place the tang end on the piece of wood. This will save your tang. When hammering the side of the habaki, the metal wrapped around the tang can be placed directly on the anvil.

6. The final hammering is done with the habaki in its proper position on the blade. Be very careful at this time so as not to chip the ha machi.

Use a smaller hammer with great care at this time.

The habaki should fit so tightly at this point that it can only be positioned or removed with the aid of the wooden hammer.

A minor amount of rough filing to shape the outside of the habaki is allowed at this time. Do not file down to the finished size. Just a general cleaning and shaping is done.

7. With pliers clamp the ends shut on the removed habaki. Hold this up to the light and look from the inside out to be sure the fit is perfect!

Some very fine filing may be necessary to be sure the inside edges are flat. A line approximately 1/32" wide and the full length of the habaki should touch at this time. This is necessary for a proper weld.

At this point place the habaki back on the sword to be sure the fit is still good. A bit tight is better than too loose or an easy fit. After welding the habaki can still be hammered to enlarge it to the final and proper fit.

Iron wire is used to clamp the ends closed. Iron is a bit brittle but will not melt during the welding process. Tighten by twisting the ends. See sketch no. 4.

Two or three wires are necessary depending on the size of the habaki. Use the light test for the fit again. Apply as much pressure with the wire as possible without leaving nicks in the edges of the habaki.

Now slide the habaki up the tang and check the fit again. Don't worry if it doesn't slide entirely up. It would be best if it doesn't, say it should stop 1/8" from the final position. This sliding is not by finger pressure but by medium hammer pressure.

8. At this time a piece of the same alloy metal as the habaki must be hammered and or filed into a long triangular shape. It must be a bit longer than the entire habaki at this stage. The width should be the same as the tempered portion of the blade at the ha machi.

This is to be welded to the inside of the habaki along the ha side. Refer to the inside of any habaki for an example. Also see sketch no. 5.

Once the metal is filed to the proper length and depth, try its fit inside the habaki. It must fit perfectly! No gaps are permitted.

Cut the piece the same length as the distance from the bottom of the habaki to the mune machi. The muni machi should be filed to a crisp shape this time so both sides will be the same length, thus giving proper support to the front and rear of the blade.

9. Welding.

Using charcoal pieces as a supporting agent, place the habaki ha down securely in the charcoal. The small insert should be in the proper position at this time.

Apply a flux and heat to a red to red-orange color, even heat throughout the habaki. Do not heat the insert to the point that it loses shape, only enough to be sure of a good weld.

Allow to cool slightly and then quench in water. The pieces should be as one now.

If the weld looks satisfactory remove the wire. File gently the flat ha side of the habaki. This is to check the weld. No cracks should show.

If a bit of a crack does show or develop at later stages one may attempt to solder a bit of metal into the crack. Be sure not to heat the habaki too much at this time or the metal insert may lose its shape.

It is best to use an off alloy for this, one which melts at a slightly lower temperature than the habaki metal; i.e., make the habaki of coin silver which is harder than pure silver, then solder the crack with a wire of pure silver. The slight variation of metal will be barely noticeable to the untrained eye.

10. Place the habaki on the sword and with the techniques acquired, make it fit perfectly. Remember you can make it too large but not smaller.

11. At this time the outside can be filed to the final shape. Progress from a medium to a very fine file. Each time remove previously applied scratches, similar to polishing the sword. Final polishing can be done with emery cloth and then silver polish.

The Japanese use charcoal for this final polishing process.

When rough filing be sure the bottom is perfectly flat and at a 90 degree angle to the vertical blade. The top edge can be filed round as in old habaki or flat as in the newer ones.

12. Apply a design.
This should be done with the utmost of care. It would be a shame to spoil the past four to eight hours' work with the stroke of a file.

It is best to have a medium rough texture on the ha and machi side of the habaki. This helps to hold the habaki into the saya, and is the only part of the habaki which fits really tight in the saya. The other just touches.

The typical "rain" design is applied diagonally with a saw-like tool. It is pushed and stopped, pushed and stopped to create the design. This pushes and gouges the metal into a small pile as it moves along the habaki. Experiment on a sample piece of metal. The teeth of the blade should not be bent out on the sides.

A metal knurling file can give a very desirable single or crossed effect. Try your local gun shop for this.

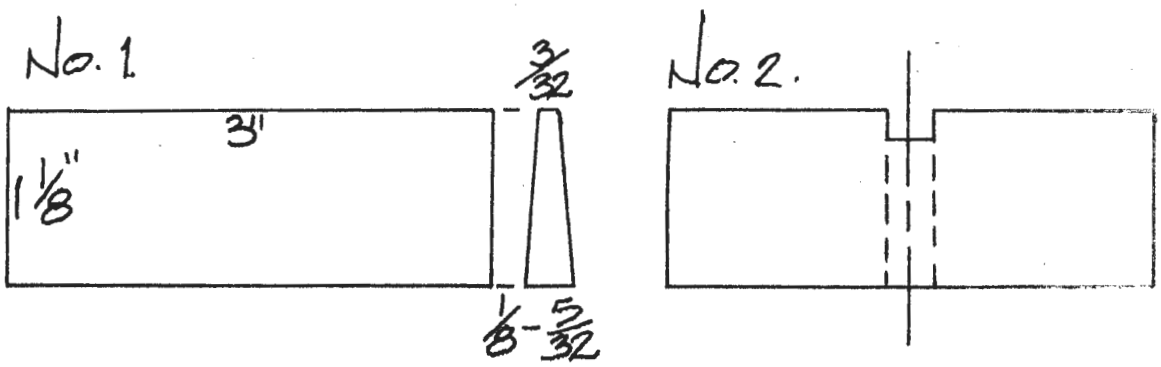
A simple round horizontal groove on a plain habaki gives a pleasant effect.

Some habaki have interesting designs chiseled in them, i.e. flowers, dragons, etc. Try gunsmith chisels for this.

GOOD LUCK!

Note: If any one discovers through trial and error a new and interesting technique, please send it to the author for future additions.

Hopefully, the next bulletin will have an article on tsuka wrapping or shira saya making.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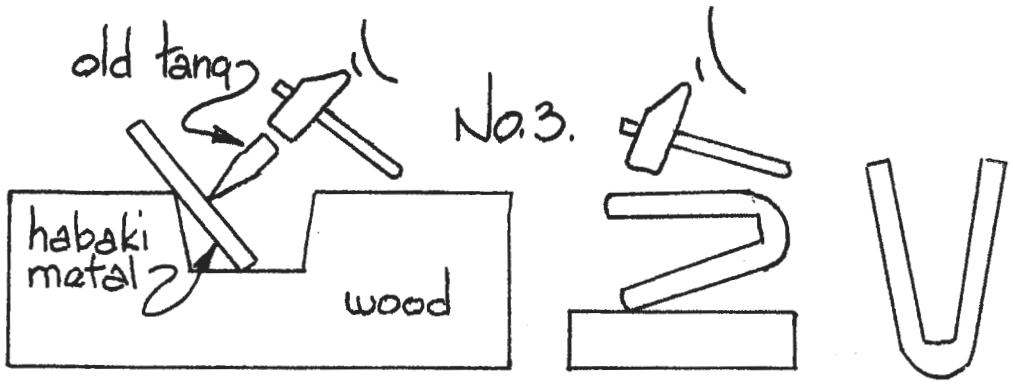
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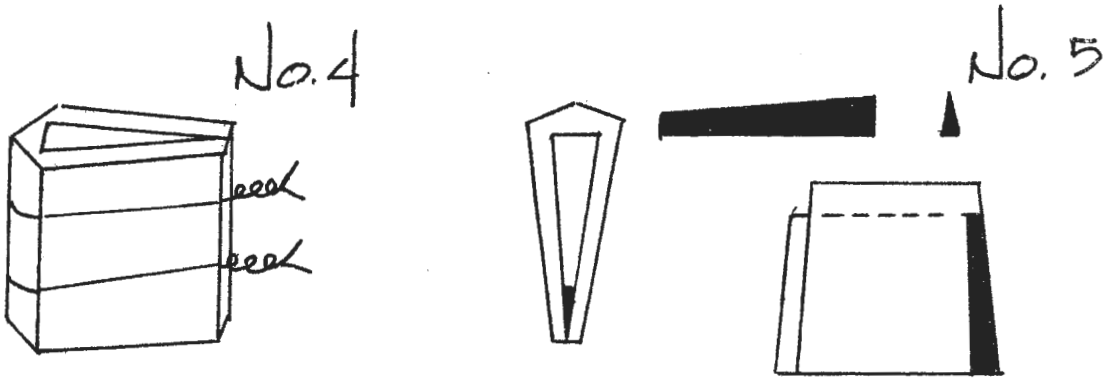
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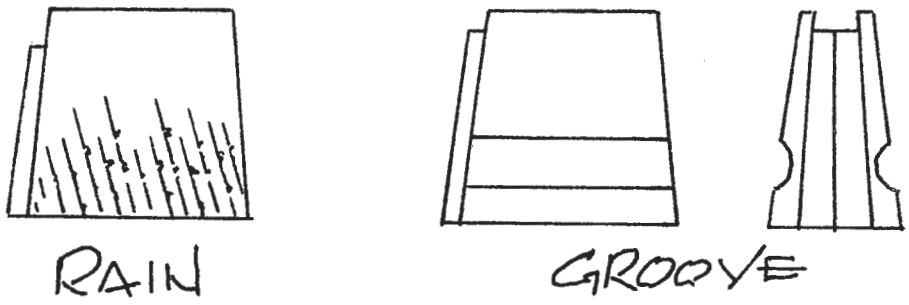
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GROOVE