Mid-16th Century Tromba Marina

by

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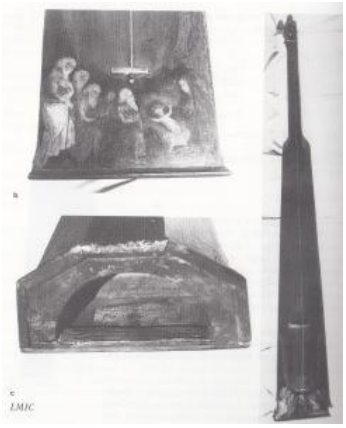
Description

A monochord musical instrument known as a tromba marina, also called a trumpet marine. Body of the instrument is made of sitka spruce. Neck, base trim, geared tuning peg, upper bridge, lower bridge, lower peg made of walnut. Trembling bridge made of white oak. String is gut.

History

A tromba marina is a single string bowed instrument - a type of instrument that is also referred to as a monochord. The earliest versions were first documented in the late Middle Ages, and consisted of a triangular tube of wood which tapered from the wider, open end down to the smaller, closed end. A string was stretched from a notch on the open end to a tuning peg at the closed end. The string passes over a construct called a trembling bridge. Unlike the bridge on a standard stringed instrument that is designed to be firmly planted on the soundboard, the string of a tromba marina passes over only one side of the bridge, leaving the other side free to vibrate against the soundboard as the string is bowed. This is what gives the tromba marina its distinctive sound. Also, the string is bowed *above* the hand that is pressing on the string, not *below* as for most other stringed instruments. A finger of the non-bowing hand is placed against the side of the string to develop harmonics within the string, which produce different notes.

Unlike the earliest trombas, the later period instruments started to have multiple staves on the rear, rather than just two to form a simple triangle. They also began using a separate neck and peg box extending out from the main body of the instrument. The instrument I constructed is based on such a later period piece. According to the inscription on one of the interior braces, it was made in 1530 by Tywersus of Paris, a famous violin maker. It was constructed in the town of Nancy, France, not far from the German border.



Construction

Overall, my instrument is approximately 54" long. This is about 3/4 the size of the original piece, but I was limited by the size of spruce board I could reasonably obtain. I started out with a 1.5" x 8" x 7' piece of sitka spruce. The original instrument was made of German spruce (which is still highly prized to this day for musical instruments), but that is not easily available in such a size. Sitka spruce is an acceptable alternative, and is often used when German spruce is not available. With the assistance of a friend and his table saw, I cut the spruce board down to the sizes I needed - 8" wide by 3' long, 4" wide by 3' long, and 2" wide by 3' long pieces. We then proceeded to cut 1/4" thick slabs - one of the 8" wide for the soundboard, one of the 4" wide for the rear stave, and four of the 2" wide for the side staves.

The instrument I am basing this on is fairly well documented in "A Trumpet by Any Other Name: A History of the Trumpet Marine", by Cecil Adkins and Alis Dickinson [1]. In particular, the width and depth of the larger, open end of the instrument have been measured, as well as the overall length. As previously stated, I made a 3/4 size version of the original, so it was fairly easy to take the measurements of the original piece and work from there. Based on these calculations, I determined my instrument needed be 6.8" wide and 3.4" deep at the open end and 3.4" wide by 1.7" deep at the neck end. Using some basic geometry allowed me to work up the open end and neck end measurements of the soundboard and staves. I then cut the tapers on the boards. One note - the two side staves that are at 45 degrees needed to have both sides trimmed off at 45 degrees so that they could meet up with the vertical side staves and horizontal rear stave.

Here is a picture of the pieces in rough cut form.

The large piece in the center is the soundboard, with two side pieces to the right, two side pieces and the back to the left, the bottom brace and wood for bottom trim below, and the pieces that would be shaped into the neck and peg box to the extreme right.

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1. Adkins, Cecil and Dickson, Alis. A Trumpet By Any Other Name: A History of the Trumpet Marine. Buren, The Netherlands: Frits Knuf Publishers, 1991, pp 347-348

Various hardwoods were used for the necks of the later period trombas, including walnut. I happened to have some black walnut available, so I used that for the neck/peg box, as well as for the bottom brace and exterior trim at the open end of the instrument. In period, English or European walnut would have been used. This wood has more of a brown/honey coloration, whereas black walnut has more brown/purple/black. I have some English walnut pieces currently drying, but they are not ready yet, so I decided to move forward with the black walnut. I did not have a piece of walnut thick enough to meet the overall 1.7" height of the neck end of the instrument, so I glued a smaller block to the end to increase the thickness.

Once the glue was fully dried, I began to shape the neck to accept the staves, as well as carve out the peg box and round off the back side. The first thing I did was to cut down the glued on block to the shape and size to accept the staves. I made some preliminary calculations about the shape that would be required, based on both the expected geometry and measurements from the staves themselves. Once I had that laid out on the end of the block, I made my preliminary cuts. The fit was actually pretty close, and only required minor adjustments.

After that was completed, I began shaping the back of the neck. The piece I used as my basis for design has a half-round neck. In the interest of time, I used a drum sander to remove the majority of the wood until I was close to the shape I desired. I then used a wood rasp, hand scrapers, and some fine sandpaper to achieve the final shape.

The cutting of the opening in the peg box was rather simple. I used a 1/2" drill bit to remove the majority of the wood, and then used my wood rasp and sandpaper to do the final shaping. Finally, I drilled a 1/4" hole through the side of the peg box for the peg itself.

Once the cutting and shaping was completed, I gave the neck one final sanding, and then applied the first coat of finish.

The next step in the process was to seal the interior faces of the staves, as I would not have easy access to them once the piece was glued together. I used a hand applied Varnish Oil made by Tried and True, as it fairly closely approximates a period finish. The difficult part of this process was making sure to avoid getting any sealant where I would later need to put glue.

One touch I wanted to add before I began assembly of the piece was to put an inscription on the inside of the soundboard. The original has an inscription on one of the interior braces that reads:

Tywersus Lutetia / Nuncianum anno 1530

which translates as:

Tywersus of Paris / Nancy year 1530

The inscription I added is:

Marcellus Capoziello da Napoli / Cataractorum Ecclesia / Anno Societatis XLVII

which translates as:

Marcellus Capoziello of Naples / Falls Church / Year of the Society 47

It was just a little touch I wanted to add to give a more authentic look to the piece.

Once the sealant was completely dried, I began gluing the staves to the neck. I used hide glue, which is appropriate for the period. First up, and easiest, was gluing the sound board. Step two was attaching the two vertical side pieces. Step three was to add the back piece. Finally, the two angled pieces were attached. I did find that the back stave "sagged" slightly over its length, and I therefore added an interstitial brace to maintain the proper geometry along the length of the instrument. The original piece also had interstitial braces - now I know why!

In between gluing on the staves, I worked on cutting out the trembling bridge. I had a perfectly sized piece of fossilized mammoth ivory I had picked up a few years ago as part of a bulk purchase. It took about an hour to properly size and shape the bridge.

The next step was applying the walnut trim to the base of the instrument. This serves several purposes. It gives the instrument a more stable base to rest on, and the piece across the bottom of the sound board adds some extra reinforcement to keep it from bowing from the pressure applied when the string is tightened.

The last major piece to be completed was the geared tuning peg. I had originally thought to make this out of black iron as was done in the original, but that proved beyond my skill. Instead, I crafted one out of walnut. I took a piece of 1/4" thick walnut and cut out a 1" diameter circle. I then used a triangular jeweler's file to file the teeth around the edge. Finally, I cut a 1/4"x1/4" square opening in the center. I then took the same piece of walnut and cut out the tuning peg. The shaft of the tuning peg on the original piece was also square, which seemed odd at first glance. However, I was able to slide my gear down the shaft, and then insert the shaft into the peg box. I had to sand down the edges of the tuning peg shaft to make this happen. There was still a little bit of gap between the tuning peg and the gear, and I was afraid that either the edges of the peg or the sides of the hole in the gear would “round off” under tension, so I took some thin pieces of ivory and created some shims to tighten everything up. I then drilled a 1/16" diameter hole in the shaft of the peg for the string to pass through. Finally, I again took my walnut board and cut a small pawl sized to fit the teeth on the gear. This I nailed to the side of the peg box, and then added a second nail as a stop to keep the gear from rotating backwards. If you look at the original piece, you can see the pawl and both pins, although the pawl is shown on the wrong side of the stop pin for the way the string is currently wound. I plan on having a black iron version of this assembly made to replace the walnut one.

Once the tuning peg was installed it was time for the finishing touches. I cut a small bridge for the top of the neck, just below the peg box, and a second small bridge for near the bottom peg. I took a small piece of 1/4" walnut dowel to use as the bottom peg. I took the triangular jeweler's file and cut a groove around the perimeter of the peg to give the string something to seat into. Finally, I drilled a 1/4" hole in the soundboard for the bottom peg. The small bridge on the neck was glued in place. Once it had dried, I tied my string around the bottom peg and inserted it into the soundboard, put the lower bridge in place next to the bottom peg, put the other end of the string through the tuning peg, and tightened things up. I inserted the trembling bridge and gave it a quick pluck - success!

I removed the bottom peg, lower bridge, and trembling bridge so I could do some quick final sanding. I then completely sealed the piece using the Tried and True varnish oil. Once that had dried I reassembled the piece.

Lessons Learned

The walnut geared tuning peg can really only be a temporary solution. It can be very easily damaged, which is why I had to add the ivory shims. Once I added the shims, I was able to increase the tension on the string significantly, which helped produce a much better sound. The increased tension on the string kept the trembling bridge more closely in contact with the sound board, preventing it from just "rattling" on top.

The ivory trembling bridge, while lovely, did not have the mass or surface area to properly excite the soundboard. I had to go back and cut a larger, heavier one out of white oak. Ideally, I would have used ebony for this, but I did not have any available at the time. However, the white oak worked very well.

The heavier, larger trembling bridge and increased string tension made the instrument much easier to play, and produced a sound more consistent with what I expected.

Bibliography

Adkins, Cecil and Dickson, Alis. A Trumpet By Any Other Name: A History of the Trumpet Marine. Buren, The Netherlands: Frits Knuf Publishers, 1991

Bessaraboff, Nicholas. Ancient European Musical Instruments. Boston, MA: Harvard University Press for the Museum of Fine Arts, Boston, 1941