



Brass Instruments

Historical Craftsmanship

Bob Barclay

Well we're going to have ten people, no actually twelve people, twelve people who are going to come together, they may never have used tools before. I mean they always talk about man the tool user, but there's a lot of people in modern society who've never used tools. And these people are going to, in the space of a week, they're going to make themselves a trumpet using mostly manual techniques, hard work techniques, 'cause these are the techniques that which were used before the Industrial Revolution. So very simple tools, very straightforward tools, very straight-forward techniques and a lot of hard work.

Trevor

For five days in the summer of 1997 the instrument maker Bob Barclay ran a natural trumpet making workshop in Bloomington, Indiana, USA.

Bob Barclay

So basically what we're going to be doing, is doing, with a few variations, what somebody in the 18th century would have done in the workshop in terms of techniques to make an instrument. So mostly hand work, and mostly fairly hard physical work. By the end of the week you'll have realised you've spent a really good week doing this. This is quite hard sheet. If you wanted to work this you'd find it with some difficult. It's quite hard and quite tough. So the first thing we need to do is to soften this, to anneal it.

I've never been a musician, and I've always been an avid listener and an avid enjoyer of music, and have never been a practitioner. What I like to do is to make things so it happened that my enjoyment of music and my enjoyment of making things just sort of fell into place. We have quenching troughs here, which we're going to use for cooling the brass quickly. Three hundred years ago the brass was a little bit less pure than our brass these days and the result of that is, that if it were allowed to cool slowly it would become rather hard. Okay, now do you remember how brittle and hard feeling that was before, well now it's really soft, and you can do anything with it.

What I've done really is to go back to the workshop of the 17th and 18th century to find out what tools were used there and to try to recreate the techniques of the makers of that period. Okay, so they're little square teeth like this. The Nuremberg trumpets, this kind of seam is standard for about four hundred years. They don't seem to have varied it at all. There are /some illustrations of the metal workers workshop, the trumpet maker's workshop. Christoph Weigel for example, the Encyclopédie of Diderot & D'Alembert, several examples of illustrations.

But we have to be very careful with those illustrations because they are illustrations made by somebody recording the processes, not made by somebody who actually did the processes. The practitioners had neither the time, I think, nor the education, to put down what they did. The first way is to examine the original instruments, and to look at them and see the tool marks on the surfaces, to see what you can discern about the methods of manufacture by the surface of the instrument.

It becomes very difficult, it becomes a bit archaeological, because one technique applied to a piece of metal will be obliterated by the technique that follows. So for example, hammering will be obliterated by burnishing, burnishing will be obliterated by polishing. So there's quite a lot of sort of forensic kind of work to find out what was done to the material.

What we're going to do, the next phase is of getting this bell prepared is to start wrapping it around. Now if we were to wrap this round in a circle we'd have a great deal of difficulty in getting this seam to join together because we'd be able to get the tips of the bell joined and the bottom end, but these teeth would be far, far apart. So what we have to do is actually make it flat like this.

What you'll need to do is to get these edges bent round so they come into contact with each other and if your thumb isn't strong enough for this, this brass is a little bit tough actually, if your thumb isn't strong enough for this then use the hammer and bring it around. Okay, so now I'm getting these little seams engaged in each other and we want to be pressing these down like this to get them really well engaged. And then pushing the teeth over, not pushing them too far yet because they have quite a way to go.

Trevor

One of the things us trumpeters hate is what you call joining your teeth.

Tony Coe

What's the most difficult thing so far?

Lorenzo K Greenwich III

[Laughs] Keeping your fingers from getting clipped.

Trevor

I can spend an hour trying to work this out, completely wasting my time, and then Bob comes along and then sorts it all out completely in about ten seconds and I find that deeply depressing.

Bob Barclay

So I'm going to start at this end, so I just heat this thing up and press. And as I press I can chase the solder into it. Soldering is the trickiest operation. I have to watch over people like a hawk to make sure it's going well.

Hammering and burnishing is the most exhausting. For people who haven't done a lot of work with the right arm, they'll find at the end of the day they'll be pretty tired.

This business of hand hammering of metal in authentic instruments is actually nonsensical. The only piece that's hammered is just the very end of the bell. Nothing else. The rest of it is well forming it, so we know how that works. So the hand hammering part of it is really confined just to here. And in hammering we're just going to slowly expand this outwards, thinning it and spreading it outwards.

There is one particular place to hammer and it sounds right and it feels right, and when you get it you know it's there. If you get a dead, flapping sort of sound, it means you're getting inefficient hammering. What you need is a sharp ringing sound, so you know that the metal is being compressed between the hammer and the anvil with no air space in between and no bouncing.

Because this thing isn't round it's not fitting as well on the mandrel as it could do so one of things we need to do is to press this down a bit and get it fitting on the mandrel a little bit better so it will slide on further. Now you see what happens is it comes in contact here and it's completely open here. So what we have to do is to work right here and break its little back. Work it on further and keep doing this. This isn't going to happen all at once. You're probably going to find it'll take a while. Another spate of hammering to expand it more, push it on and breaking again like this.

Chris Whitehead

Every time I think I've made more progress, I look down here and see I've still got that far to go.

Bob Barclay

These are going to become the two bows. We make these up just like one of the yards, and it's eighteen inches long. Then once it's made up we cut it in half. And the reason I've saved this for a bit later is because the solder seam on here has to be very good. So it was a good idea for you to get practice of making soldering seams before you do this one. The reason it has to be good is it's going to be bent around a 180°. So it really has to be a very good seam that can stand that kind of treatment.

Trevor

I wouldn't want the tubing to be any more perfect than it is now, actually. 'Cause I really do think it looks like it's been made by a person rather than by some rather anonymous production system.

Bob Barclay

When the early music revival began they did indeed start making reproductions, copies of early brass instruments, using modern manufacturing techniques. And the result was they found they had instruments which were actually very intractable, they didn't really work very well. And the reason, apparently, lies in the fact that acoustically the earlier instruments, because they're not extremely accurate, because they're not very finely finished on the inside, because there are certain defects and so on, introduced by manual manufacture, that produces an instrument which is acoustically a lot easier to play in tune and that apparently is the physically basis for hand making of instruments rather than machine making of brass instruments.

Mark Erdmann

I'm starting to get some nice detail on my garland there. I used a punch to put the circle, a small engraver to put those sun burst patterns. Next I'm going to use a little file to file some impressions in between each pattern.

Joe Utley

These are the little veins in the leaf that I'm scoring with this engraver.

Rick Seraphinoff

So this is what we have so far. And now before I actually put it together I will polish every thing nicely and then the 3D effect really comes out. It'll really just jump out at you. This is now highly polished with all of its three dimensional cuts

Tony Coe

When did you polish that?

Rick Seraphinoff

Last night. I went home and used my polishing machine. Which is not very 17th century or authentic but it looks awfully nice.

Trevor

Today has been a day in which we've made some progress but because we've been working on very precise jobs, it doesn't really feel as if it's gone as quickly as the previous two days when we were really beating things out. But tomorrow is a crunch day because we've got to bend some tubes and if you bend them properly then you've got a trumpet on your hands. If you don't bend them properly, then it is simply a mess of old tubes.

At the moment it looks pretty good because the Vaseline which lubricates the inside of the tube doesn't appear to be escaping. But the really tricky thing is whether I've poured it in without making any air bubbles because if I have that could prove to be fatal. So there's every chance that you're going to see a grown man cry in a minute.

This one is excellent because there's not a single blemish in it all the way round. I have to confess that even though he doesn't remember it Bob did this bit for me yesterday and this is the bit I did, and this one predictably enough that has the problems.

It's worked out a little better than I thought because as you can see the tubing has bent and it's in one piece. But the, I don't know whether you can see it, there's a little split seam there, and one there, and of course, with a trumpet it mustn't have any holes until the end otherwise the note will think it's a shorter instrument than the trumpet actually is, so I'm just going to seal this and that'll be it.

Will Scarlet

Well you have to assemble the instrument, you know the different parts without solder and they have to have such a tight fit that there's no, that they don't come apart and they don't leak. So that's going to be a big challenge I'm sure.

Trevor

This is what us trumpet makers call shining the bell.

Rick Seraphinoff

The first fanfare (plays a couple of notes).

Trevor

Well this is the naming of parts. It isn't exactly true to say that the entire instrument is here yet, there are some tiny pieces which are missing, but this is almost entirely the content of a trumpet and it does begin to look a bit like a trumpet now, much to my surprise. This is a bell, which is a flat piece of metal that I hammered on an anvil for about two days earlier in the week. And there are two bits that go onto the bell. The first one is this one, it's called the garland and on it my name is gorgeously inscribed. The purpose of the garland is just to strengthen the end of the bell, which has the thinnest metal on the instrument. Then there's a part which goes up the middle, and this is called the pummel. No body quite knows what the pummel is for, but its almost certainly something to do with holding the instrument, there are pictures of trumpet players on horse back holding them.

Then there are a series of little pieces like these. These are called pharaohs. And the purpose of the pharaohs is to quite literally hold one piece of the instrument onto another piece of the instrument like that, so when we shove it in, it's absolutely fast. And then these two pieces are called bows, and these are the bendy bits at either side of the trumpet. And then the two straight pieces are called yards, so in theory at least, when a trumpet player plays this instrument the note is going to start that end in the mouthpiece, which isn't here, it travels all the way down the instrument, back up this yard, round this bow, down that bell, and I'm sure it's going to sound like silk.

Bob Barclay

The first trumpet (CLAPPING AND FRED HOLMGREN PLAYING NOTES ON HIS TRUMPET).

That was great. We're coming right down to the wire. We're just going to hit the end of the workshop exactly when the last few people are finally finishing their instruments. A great feeling, a great feeling. Especially when I see the quality of some of the products, and they're sitting there playing them and having a wonderful time (NOTES PLAYING IN BACKGROUND).

Trevor

Fantastic. One trumpet.

Bob Barclay

Done. [CHEERS]

Trevor

I just found the most difficult thing about making a trumpet was the sheer repetition of the hammering and the burnishing and the crimping. It was physically very hard work. So I hope you think it was worth it.

John Wallace

Yes.

Trevor

There it goes.

John Wallace

Oh well exciting moment. Well I hope it sounds as beautiful as it looks, Trevor (PLAYS TREVOR'S TRUMPET).