

## Raising a Bronze Raven's Skull

By David Robertson

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I recently had a commission come in for a forged funeral urn. For such a small object there is a great deal to consider with it. I sat down with the client to discuss appropriate ornamentation for it and it was decided that a raven's skull would be the primary ornamentation. The box itself made out of steel with the raven out of copper or bronze as a contrast.

The material I used was sold as sheet bronze approximately 1.3mm thick. I will call it bronze but I do not know the exact alloy. If you are trying a similar sheet metal raising project, start with sheet copper that way you know what you are working with.



Nearly finished raven's skull. I have planishing, polishing, and some detail work to finish off but rough form is there.

This project is a combination of hot dishing and forming and cold dishing and raising.

Most of us have done some hot dishing of sheet steel. This is pretty straight forward using a bottom dishing form and a rounded hammer appropriate size and shape to hammer the curve in from one side and smooth out. This is basically what I started with. Then I got into the detailed sheet metal work



The Image above I first cut a basic paper plan of what I guessed the shape was that I needed. Leaving a bit extra as it is always easier to cut away than add on.

Next comes the hot dishing. The next photo shows what roughing it out hot is like and the bottom tool I used for this and a small ball peen hammer. This was the fastest operation of all. Essentially generating the depth I wanted and working out any small wrinkles hot.



Once the dishing was as deep as I could take it I had to tighten the curves by raising.

Previously I have only done a very small amount of raising just to sort of learn the technique. Raising is light work but takes a very long time.

The general concept of raising is that you support the sheet material on an angle with a stake and then use a hammer roughly the shape of a blunt cross peen to hammer the sheet down (maybe 1/2 to 1 mm ) so that it contacts or near contacts the bottom stake.

Hopefully the diagrams below will make it a bit more clear. You then repeat in arcs starting from the centre point of your circle and working outwards. You work in overlapping rows until you reach the edge then you anneal and repeat until you have the desired curve. One piece of advice I got was to think of it as slowly working a wave of the metal out to the edge of the piece. Changing the angle of the hammer up and down and left and right changes the shape of the curve developing. Work out any wrinkles as soon as they develop.

Raising is tricky and takes some practice. I would suggest starting with something simple like a bowl.

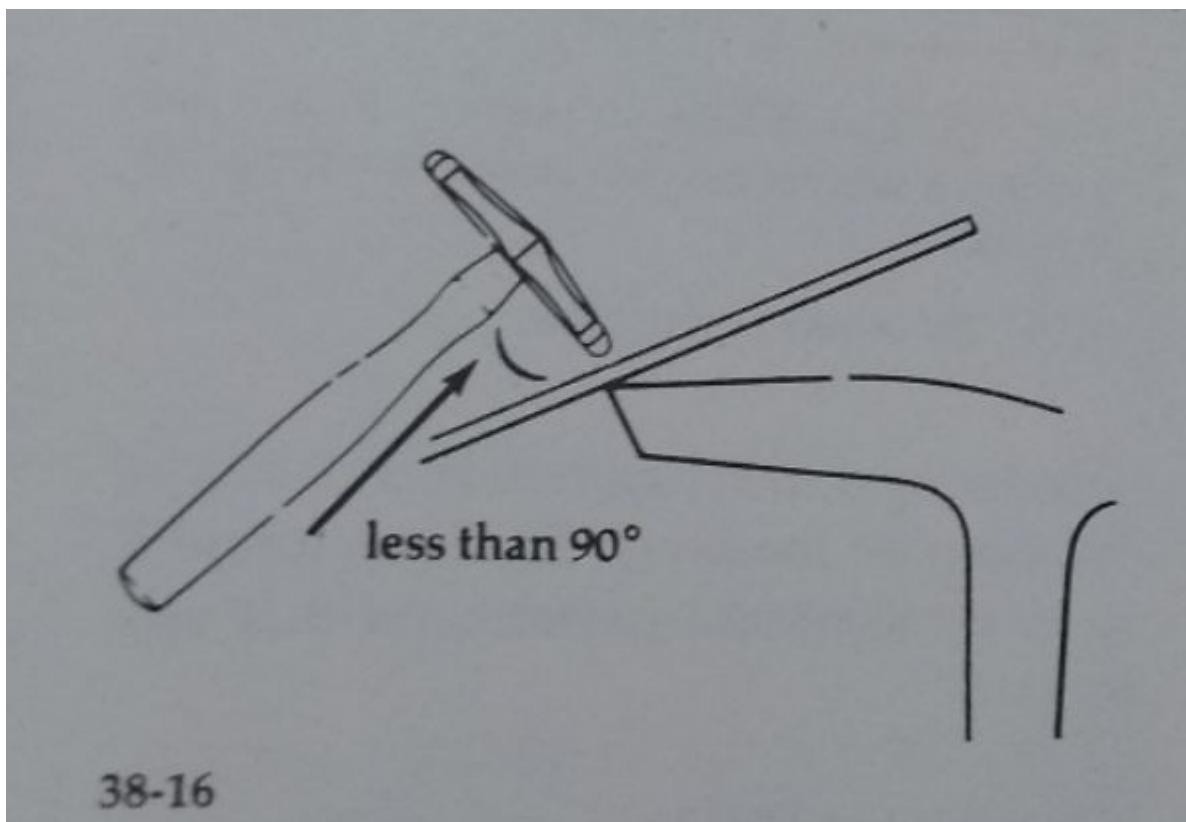


Image from Silver Smithing by Rupert Finegold and William Seitz, 1983, page 339.  
ISBN 0801972329

With the hammer striking at less than 90 degrees to the angle of the metal the sheet thins. This is mostly considered incorrect in raising the form. If worked too far it is possible to start poking holes in the thinner sheet when starting to use the punches for the chasing.

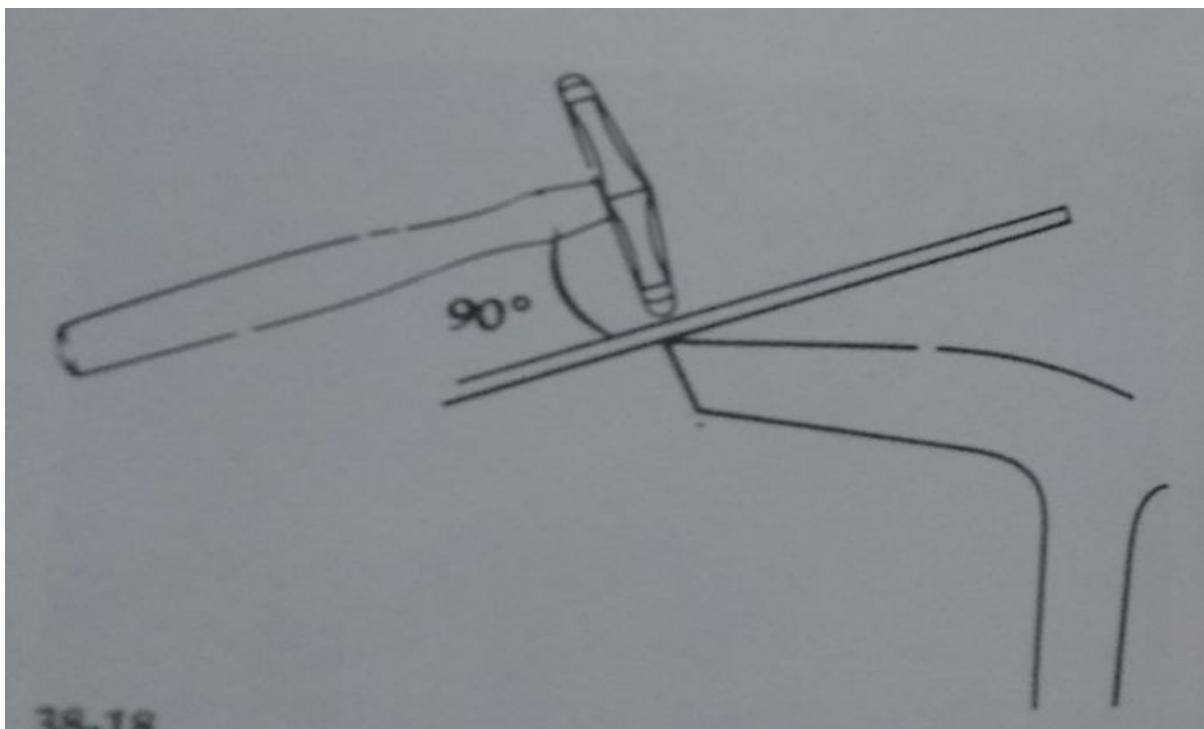


Image from Silver Smithing by Rupert Finegold and William Seitz, 1983, page 340  
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When the hammer strikes at 90 degrees the metal is just displaced not stretched or upset. This is the most common way to do raising and is considered the correct use of the technique.

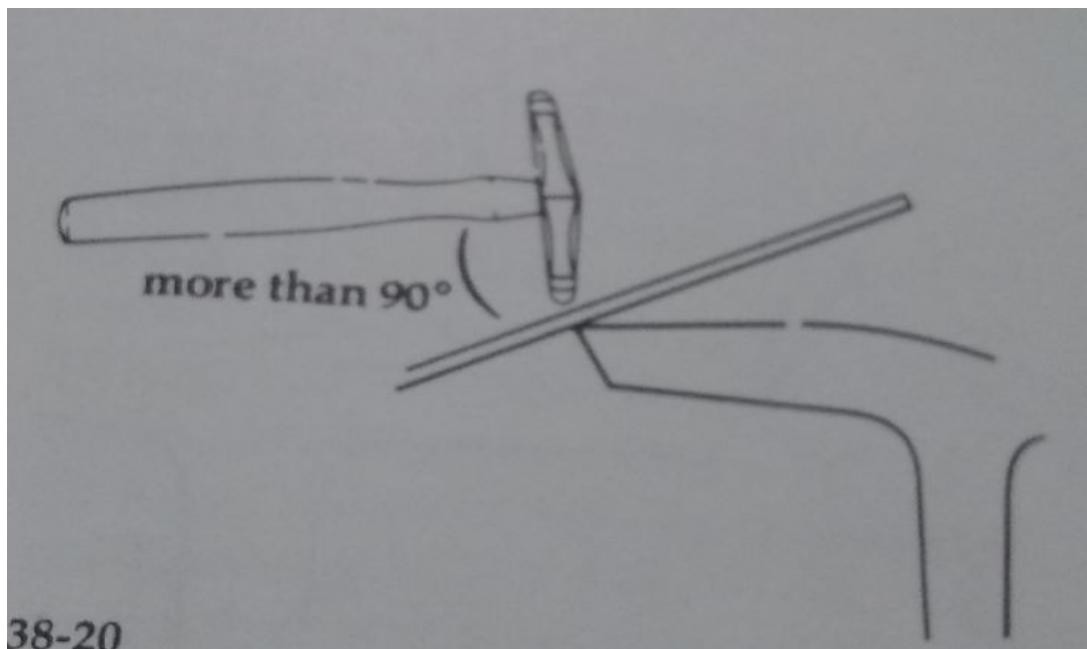


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With the strike angle greater than 90 degrees you end up upsetting the metal and shrinking your piece. If you have extra metal upsetting may not be an issue and may be important if you have more detail work to do in one area, that will later cause thinning.

It turned out that I did not have a stake the right shape for the raising that I needed to do. The beauty of blacksmithing is just make the tool that you need.

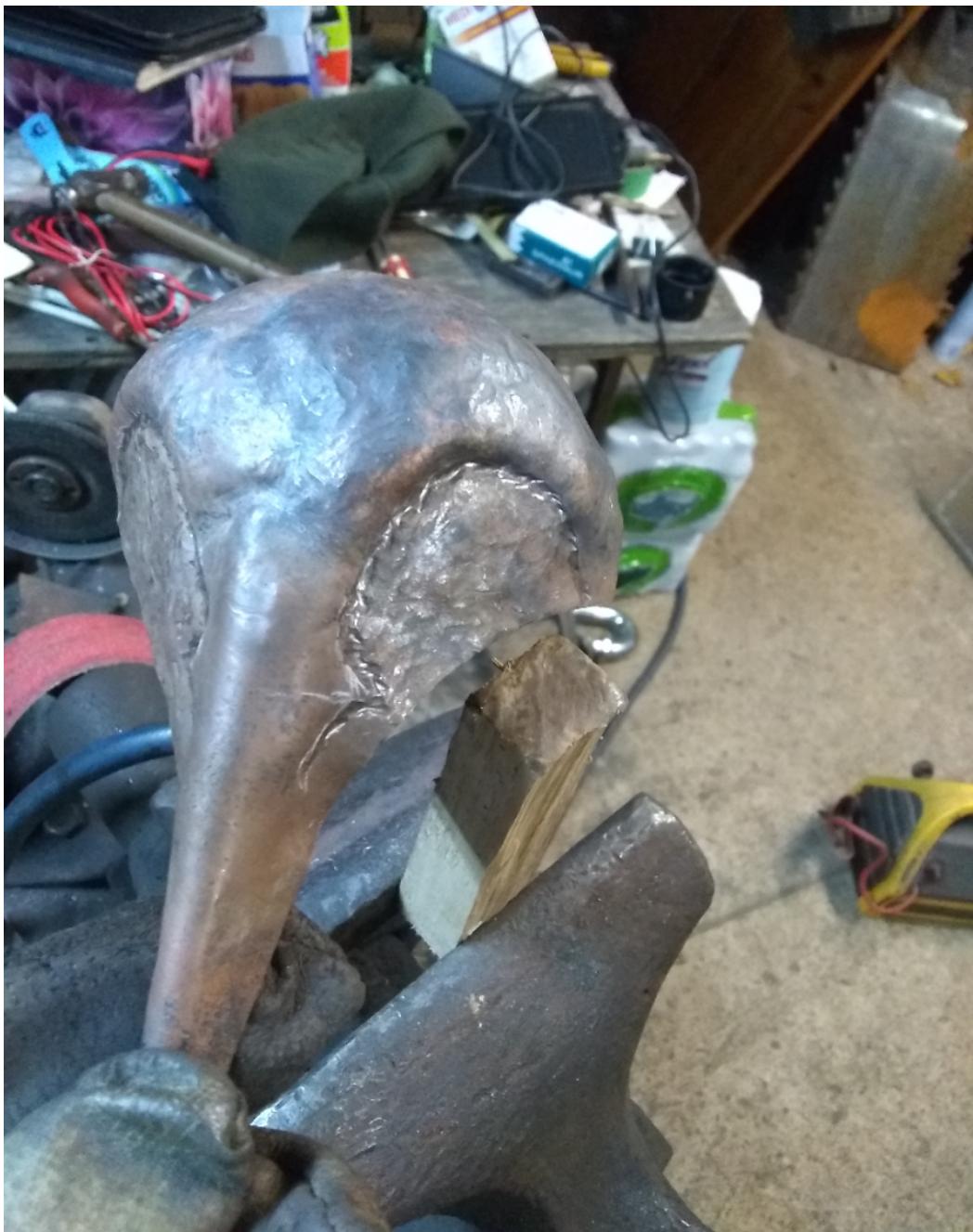


This is the stake roughed out from a piece of Nascar axle purchased at Quadstate Southern Ohio Forge and Anvil Blacksmith Conference. This is a really tough steel that has high impact strength. Really any shock resistant tool steel would work fine. Even mild steel in a pinch but expect deformation. 4140 would be a classic example of suitable steel.

I wanted a curve and a sort of flattened ball on the end. The stake gets clamped in the leg vise at different angles as needed. Stakes often fit into a socket or even into the Hardy hole of the anvil. I wanted more versatility of angle so the clamping in the vise.



This picture shows the stake clamped and and the raising hammer at the angle I was using it at. Remember the texture you leave on the surface of the stake is the texture you get on the inside of the object you are raising. Copper smiths and silver smiths often polish the working surfaces of their stakes and hammers to mirror smooth. I did not as I could accept a rough interior to the skull.



The other really useful stake is simply a piece of hardwood clamped in the vise. This piece is about 6 inches long and about 1 inch square. Flat on the end shown and a Vee notch cut in the other end.

I used it for flattening, curving and as a backing for some chasing to define the eye sockets.

The chasing was done with a combination of small hammers and smooth punches and chisels.



The above image shows outlining the eye socket on the wooden stake. The punch I am using is a smooth rounded tear drop shape. This allows blending the individual punch marks with multiple passes and works well with curves.

I found the bronze had to be annealed often. It would stiffen up and that is when you get cracks developing. Remember with non ferrous metals it is heat up to colour and quench to anneal. If you were working steel heat up to showing colour and slow cool.



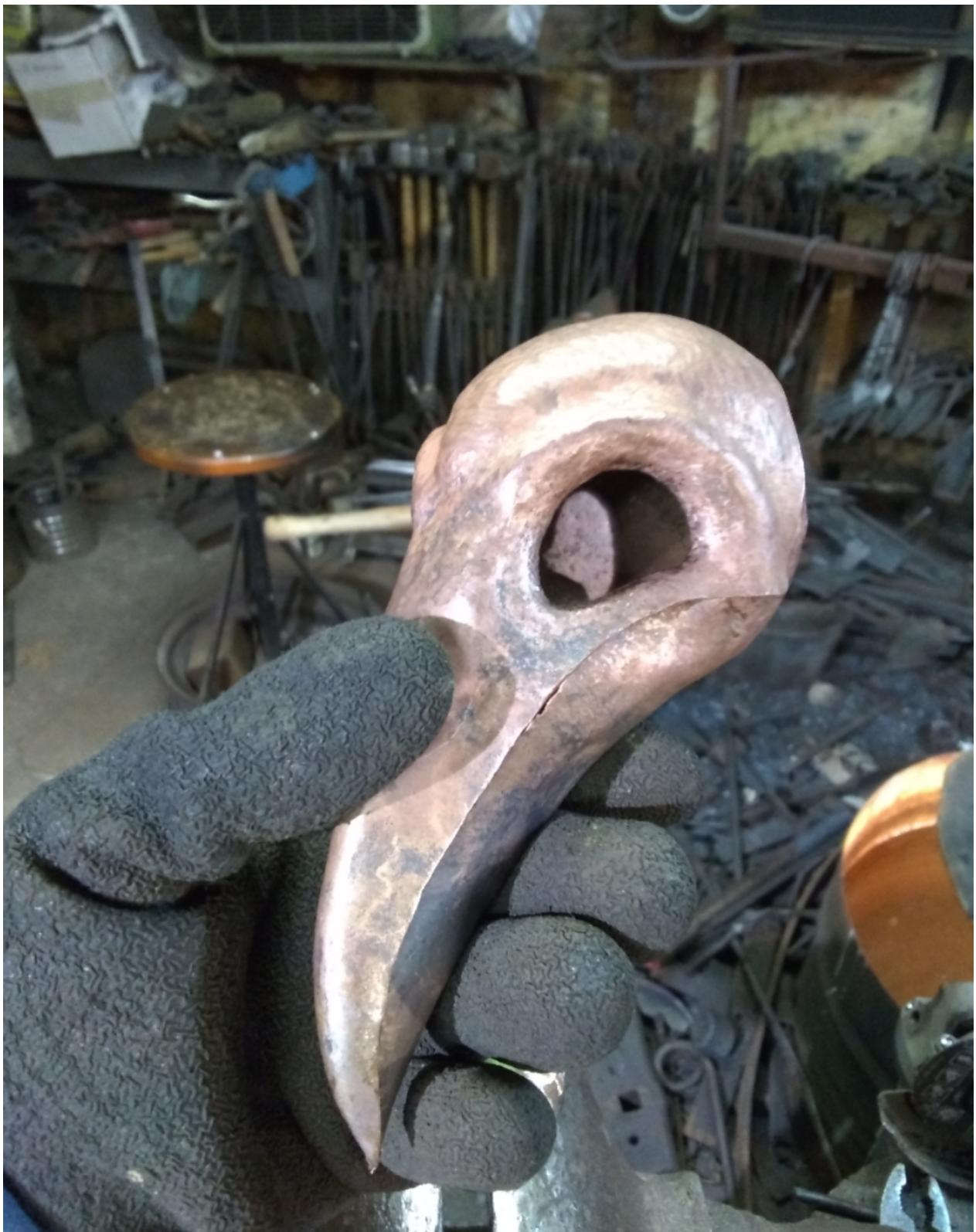
The inside of the skull roughed out by first hot dishing then cold raising. The beak was in early stage of forming using a Vee stake and a sharp cross peen hammer to create the trough.



With the top half of the skull formed I had to look at the lower jaw and base of the skull. I did not create a pattern before as I really had no idea what dimensions I would end up with on the top portion. The paper at the right was rough fit to the top piece leaving extra.



The above image shows the lower jaw/beak part way along in formation. Virtually the same hot dishing first then raising techniques to get the fit. Clear view of the stake I was using.



The fit is coming along. Small refinements with each pass. The eyes had been plasma cut out then reworked to create the sunken look. The nostrils are same technique but I left to the end so that the bronze had maximum support.



The series of hammers that I used. Also the primary dishing tool used with the small ball peen second from the right. Each hammer is a different size and got into a different shaped spot. Sometimes just a very few hammer blows to adjust shape were needed. The hammer on the left was the primary raising hammer.



The stakes and punches that I used. From left to right.

- Hatchet stake to form clean bends in a line
- Vee stake for deep trough formation of the beak
- The raising stake I ended up making for the majority of the work
- Straight radiused punch (think of a cold chisel rounded off smooth and not sharp)
- Tear drop punch
- Bent narrow stake for bending tighter radiiuses (think smooth rounded cold chisel hammered to 45 degree angle)
- Wooden stake (flat one end Vee notch other end)
- Specialty offset flat punch (used to get inside the nostril to flex the bronze into a curve)

When doing chasing the finer the detail the smaller punches. Most of the punches were made out of truck spring.

Copper and bronze are wonderful to work and give a high contrast to forged steel. Read up on chasing and dishing and raising and start with a simple project to see if this is a type of smithing that suits you. Although not quiet it is very light work.