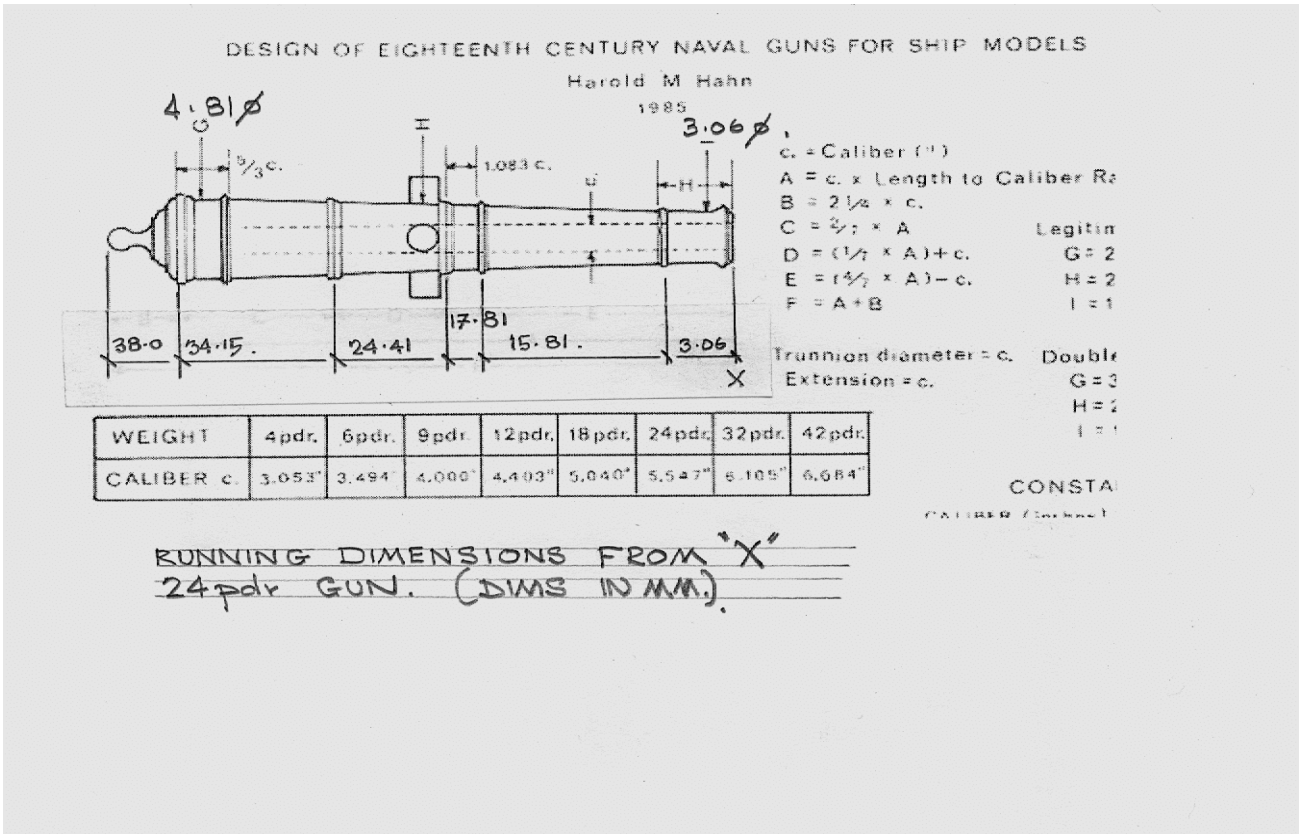
Lathework 2 TURNING A CANNON.

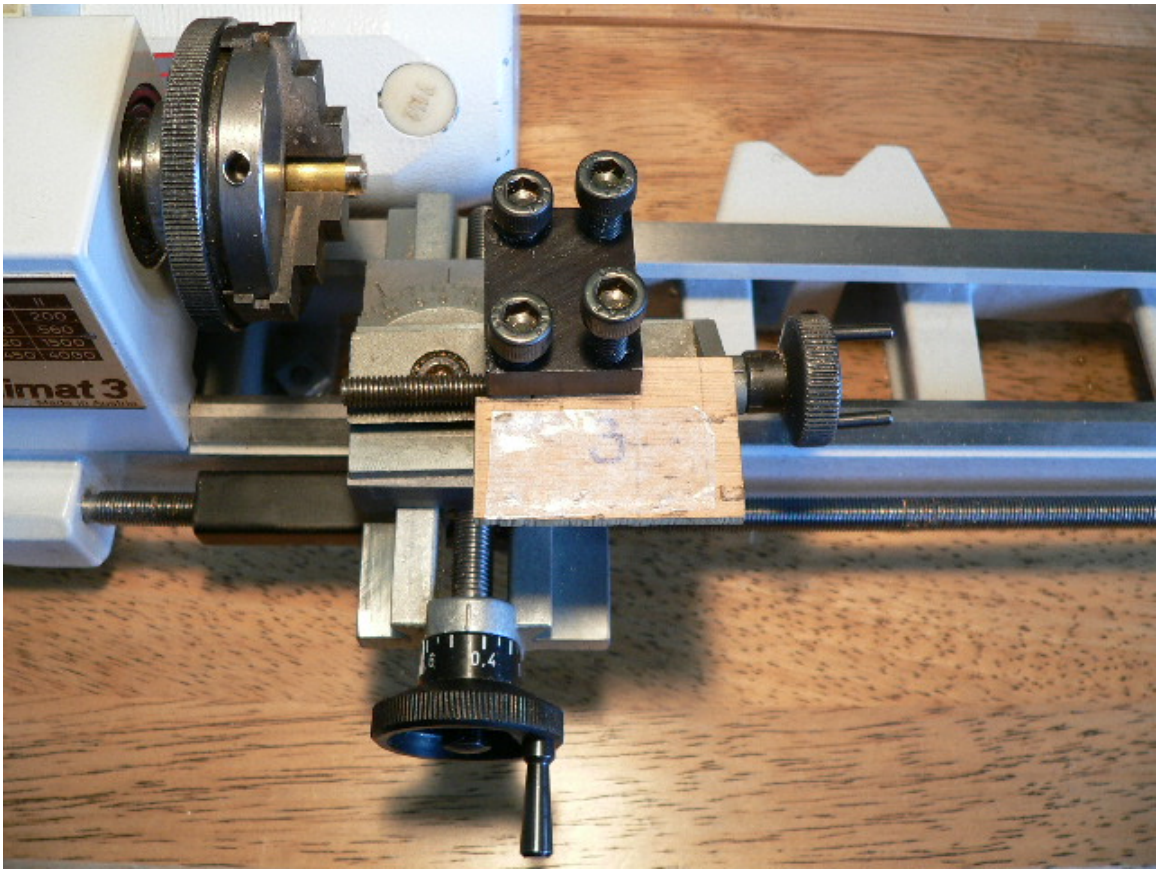
This text is intended to illustrate one method of turning cannon on a small “Hobby “ lathe. There will be other methods which modellers will read of, I lay no claim to my methods being superior or more correct, just that in experimenting these methods particularly have worked for me. I do consider that they have the advantage of producing cannon with a degree of dimensional repeatability. It is one thing to turn up a small cannon but to turn up many, all identical is more of a challenge to the amateur.

Whichever way you work the first task is to do a sketch with all the dimensions of the cannon you require: along the lines of the following.

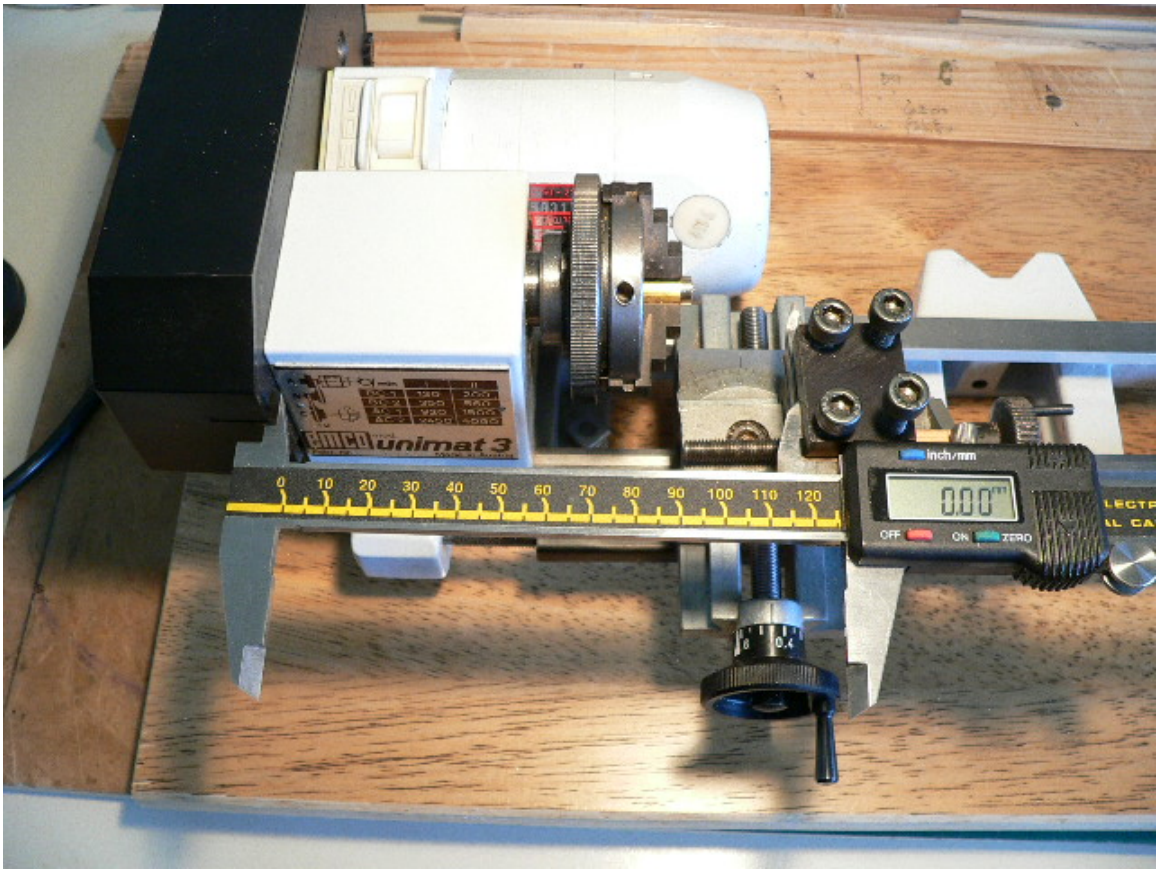


In the above the dimensions have been calculated from the comprehensive data in Harold Hahns book “Ships of the American Revolution and their Models”. For a 12 pound gun with a length / calibre ratio of 19.5. Scale 1/64. You will note the dimensions are all incremental from the muzzle end (point X). I tend to use metric as finding the smaller units much more convenient. (1 mm as opposed to 0.04”) But in all probability it is best to work in whatever system you are most familiar with.

My next operation is to set up my cheap set of digital callipers to give me a digital readout on the A-B axis of the lathe. This needs a little thought, I have done it here by making a small wood mount that is nipped under the hex head bolt on the lathe crossfeed . The calliper head is fixed to this with double sided sticky tape and the end of the other calliper jaw just rests against the motor plate on the left. Cost ? nothing. A lash up ? It is totally effective, I have checked its accuracy, one complete turn of the advance lead screw of the lathe and the calliper readout advances 1mm which is the pitch of the lead screw, 10 complete turns and the readout advances 10mm. You may not be able to do exactly the same arrangement on your lathe but I am sure something very similar is achievable. For some lathes you can buy a purpose made readout as an accessory for approx £40.00



Platform from 1/8” wood held in toolpost with double sided tape to take back of callipers



Callipers mounted to give digital readout.

To use, position the cutting tool at the end of the cannon (point “x” on the sketch) and press the zero reset button. Now you can move the tool along the work piece to the position you require indicated on the dial.

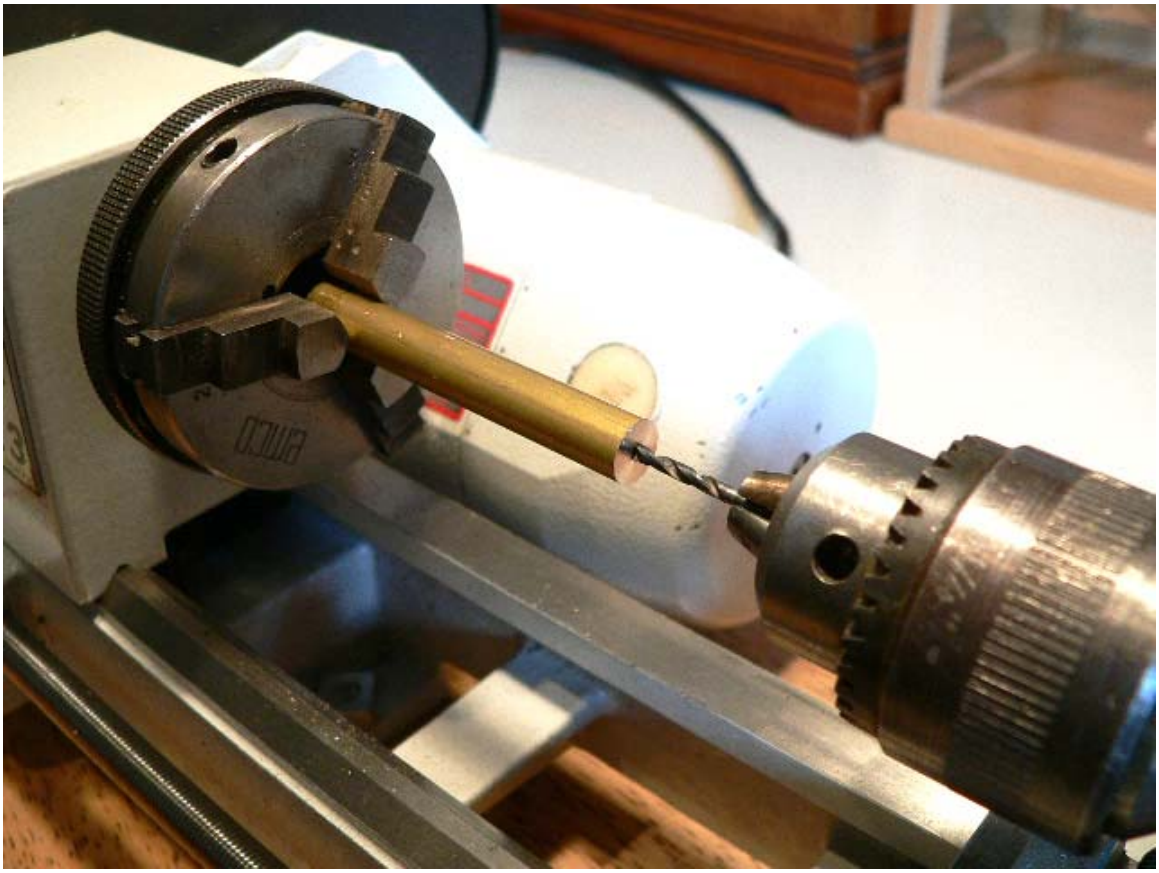
The above is not essential as hand measurements can be made but this way greatly assists repeatability of results.

You will however require a lathe with a taper turning cross slide accessory or one which has a swivelling headstock (Unimat BD/SL or Sherline)

Ok, preliminaries finished now let’s get down to work.

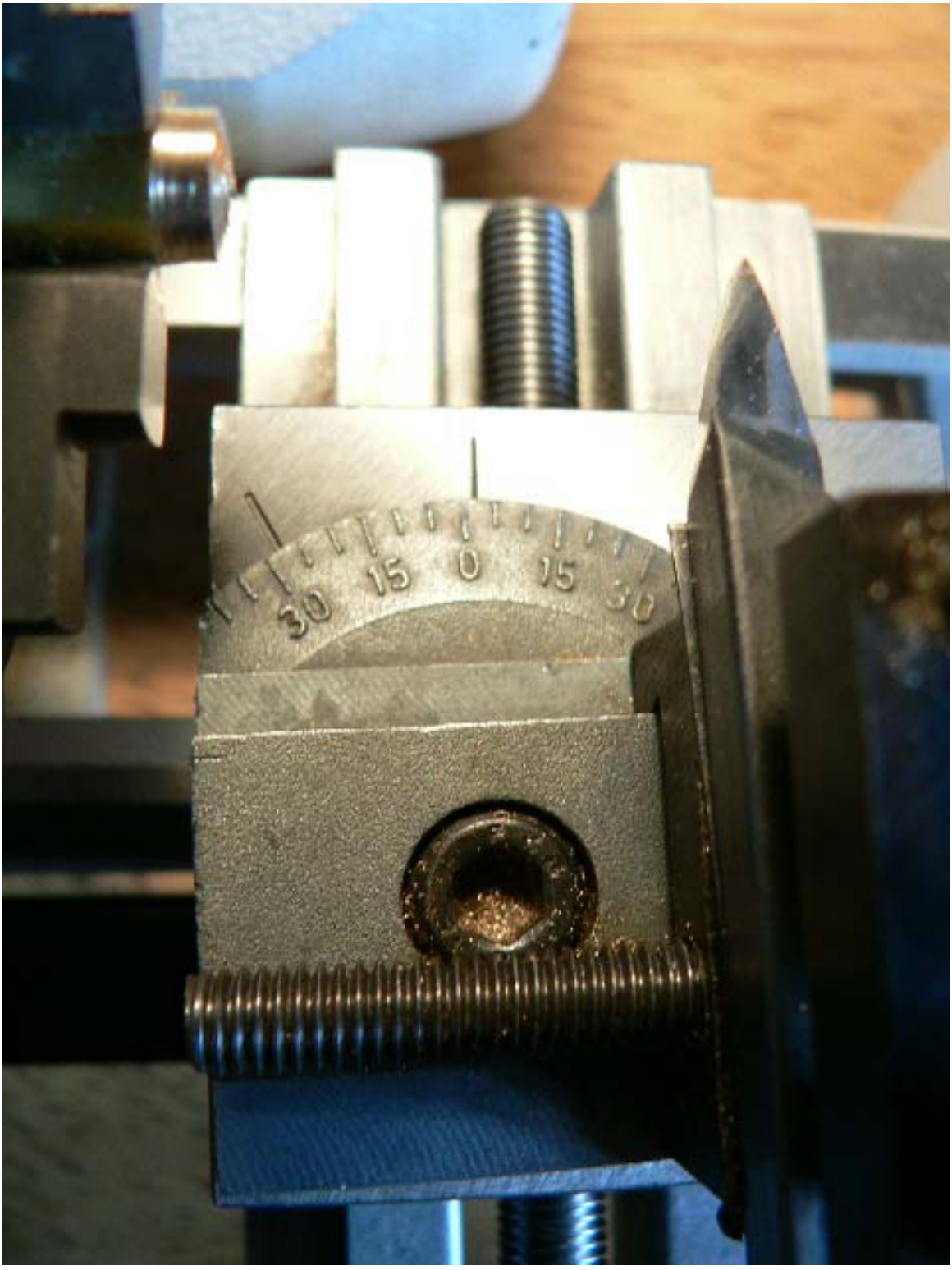
The material we are working in will not effect the operation, be it Brass Aluminium, Delrin Acetal plastic etc. We first need to cut a length of rod to suit; its diameter at least the max cannon dia (4.81mm). + 1mm for the rings and a tolerance to true up the bar – say 6mm dia and to a length to suit the cannon (38mm) + chuck entry 15mm + 10mm tool/chuck clearance. = 65mm.length

Mount the rod in the chuck and tighten. Run the lathe tool across the end of the rod to true it up and then with an appropriate size drill (12pdr = 4.4”/64 = 0.07” = 1.8mm dia) In the chuck of the tailstock and with the chuck rotating the workpiece, wind forward to drill the barrel about 5mm deep as shown in photo below.



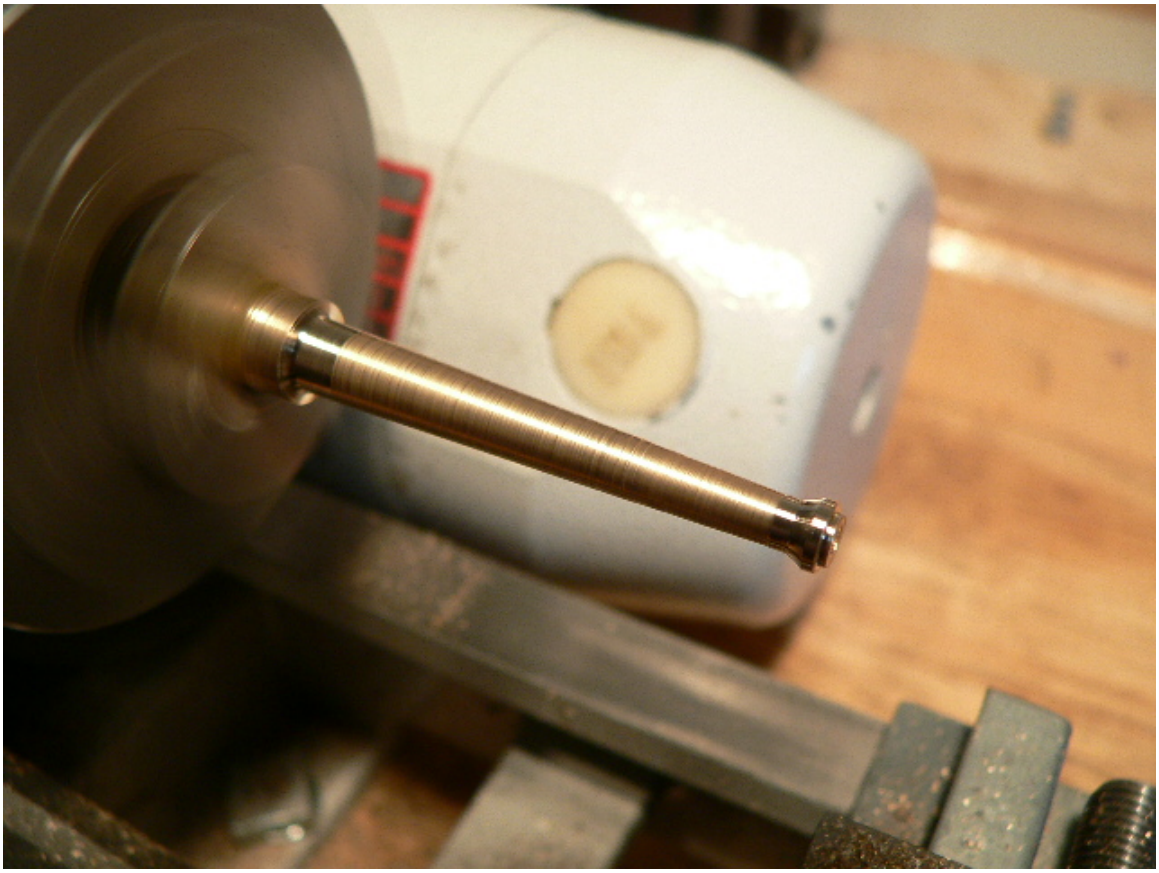
Remove the drill and with turning tool, turn down the end 5mm of the rod to be 2mm dia. larger than the finished barrel bell. Now is a good time to place the step at the barrel end as shown in the photograph below.

This completes the work that is done with the cross slide in the parallel position. The next step is to adjust the cross slide to a taper turning position to suit the taper of the gun barrel. This can be worked out by trigonometry to approx 1.25 deg. But in all honesty it is a very small angle as can be seen from the picture below. To get it right you will need to set it approximately and then with your callipers measure the dimension from the slide to the work piece at the two ends (wind the tool carriage between the two points and measure). The difference between the max and min diameters in our case is 2mm. So we are looking for a difference in our measure of 1mm (2mm halved) When you have adjusted the protractor setting and got it right I suggest you mark it so that you can return to the same setting each time. I use a small piece of adhesive white paper with a pen dot to align the “0” setting onto. An alternative is to turn up a batch of cannon blanks to the stage shown above and then set the slide once to do all the taper turning on them, if you do it this way I suggest you mark each blank with a pencil to show the location is was in the chuck (put a mark against the centre of No 1 jaw) so you can re-chuck it in the same location. You might otherwise get some eccentric turning wobble.



The above photo illustrates the small offset angle required to give the appropriate taper to the barrel

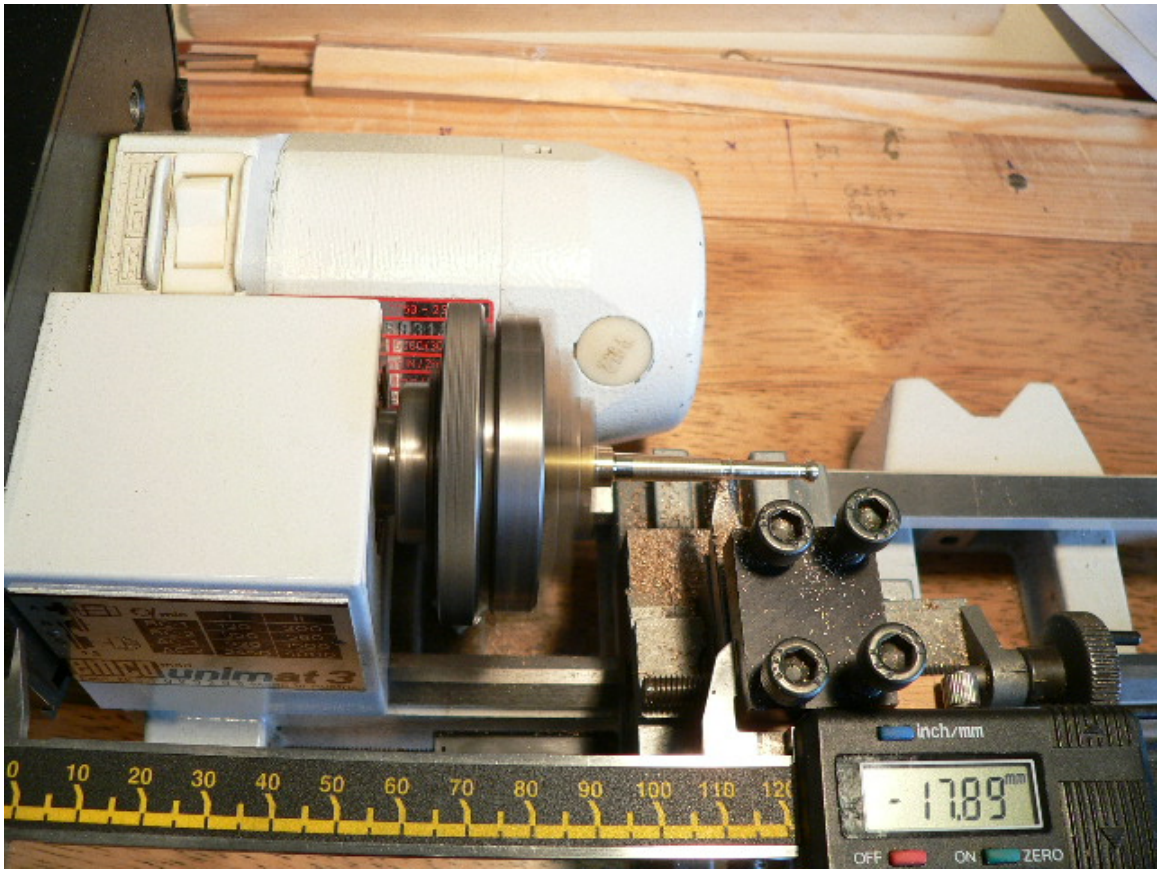
We can now progressively turn down the barrel in about 0.1mm cuts till we arrive at the situation below, where the piece is 0.8 mm larger in diameter to our required finished dimension. The cascabel has been roughed in freehand, by holding a round nosed tool against it as if cutting wood. At present it is oversized and will require finishing.



For the next operation we need to work by using the settings on the machine instead of by feel. For this it is necessary to know the thread pitch of the feed screws. On my lathes and I assume all European lathes and their eastern clones the pitch is I mm, that is for each complete turn of the handle the tool moves I mm. My hand wheel has a dial attached with a datum point and 20 divisions. So that each division passed is 0.05mm. This works well for the tool post advance where you are talking fractions. But for the cross feed carriage advance where the travel is 38mm it is not so convenient. So for this we now mount the Gonzo patented digital readout illustrated on page 3.and change to the pointed turning tool and proceed as follows.

A) Move the tool and align it with the very end of the barrel (point X) and press the readout reset to zero it. Move up the barrel to the narrowest part and wind the tool in until it just touches the work piece, with the lathe running turn the tool post advance wheel clockwise 8 divisions so the cutting tool has advanced 0.4mm .

B) Wind the cross slide left until it reaches the first ring position ,(reading 4.08), do this slowly as the pointed turning tool will only cut a small area in front of it. At this point wind the handle anti –clockwise one turn to withdraw the tool.
C) Wind the cross slide left 0.5mm and then wind the handle in again one full turn and continue to the next ring to repeat..(reading 15.81)
D) Continue till you reach the far end. Make the reinforcing bands a bit wider, 1mm.



Having reached the last band consider the space left between this and the end of the pommel and with a cutting off tool drive a cut halfway through the cannon to left of centre

Now I use a small riffler file to shape off the rounded end and to shape up the pommel. Also use the file to put the final shape on the cascabel

Note. Be careful using the files, run the lathe at slow speed and be very aware that you are in close proximity to the revolving jaws. These can knock your knuckles but also if you let the file wander over, the jaws can catch it and drive it back with force. I suggest turning up some wooden handles for the files to protect the palms of your hands.

When done you can finally cut off the cannon with a junior hacksaw and with the file and some emery paper round off the end of the pommel.

Hopefully you will end up with a cannon you are happy with, my attempt is not perfect by any means and someone with better eyesight and dexterity than me would make a much better job of it. However I am sure the method will give you a set of cannon all the same shape and size.