Copper plate engraving:
Process Documentation

by

Richard Halliday

This talk was given by Richard Halliday to the Transferware Collectors Club during the 2016 meeting in Charlottesville, VA

Hello, welcome. Firstly, I would like to thank Leslie Bouterie and the TCC for inviting me here today. I have been a member of the TCC for well over ten years and this is my third trip to the USA. It is a great delight to be back and see so many friends once again.

There are three main loves in my life. Firstly, this stupid game. It is an English oddity that I won't bore you with today.

Cricket

Secondly, Pike Fishing. This is my personal best Pike caught on Christmas day a couple of years ago and I don't always look like a mass-murderer as seen here!

31lb 4oz

And finally, blue printed pottery. I have been dealing it in for about twenty years, but as a fifth-generation dealer, I grew up in the trade.

So, who were my influences and inspirations along the way?

Arthur Negus

Was it this guy? Maybe, maybe not, but I guess this is where it started for a lot of people. Antiques in the mainstream.

Was it this guy? Possibly not, although my mother has got a bit of an Ian McShane thing going on!

Lovejoy

How about this guy? Definitely not! I quite like his tie though!

David Dickinson

This is more like it! Indiana Jones – the eternal treasure hunter within all of us.

Ok, why are we here? Big question I know. Don't worry though, it's not a deep and philosophical question. But, why are we here? How have we all become friends across generations and seas? I'll tell you why, it's because of people like this.

Frank Boothby

Joe Hassall.

Joe Barker

And this fine young man…

And, our very own Paul Holdway. It is because of the work and skill of the engravers that made our transferware possible that we sit here today in excellent company and forge life-long friendships.

The pottery industry has all but gone and is a shadow of its former self. There were 450 engravers working in Staffordshire in the 1980s, 45 in the 1990s and now there is only one. This is a powerful indication of where the engraver-based industry currently lies.

It is highly likely that we will never see engraving within the pottery industry undertaken again and certainly not to the level and skill that we have been spoilt with.

For those not aware, I am currently in year three of my PhD at Manchester Metropolitan University conducting research into engraving within the pottery industry, specifically at Spode. I have now formerly interviewed all of the surviving engravers that worked at Spode and am safe in the knowledge that their stories will live on.

Part of the research has been to document the process of engraving a copper plate from start to finish. This has never been documented before. This was of prime importance to me to preserve a record of the skills, before it is too late. This is what I am going to share with you today.

Bill Heath

Approximately two years ago, I started working with an engraver called Bill Heath who worked at Spode through the 1980s, 1990s and up to the closure in 2008. I go and visit him at his house in Stoke about every ten days or so and record the work he does. He does very little work in between my visits so that I can be there to see the engraving take

place. When I am there, I take over two hundred images, record every word with a dictaphone and sometimes use a camcorder too.

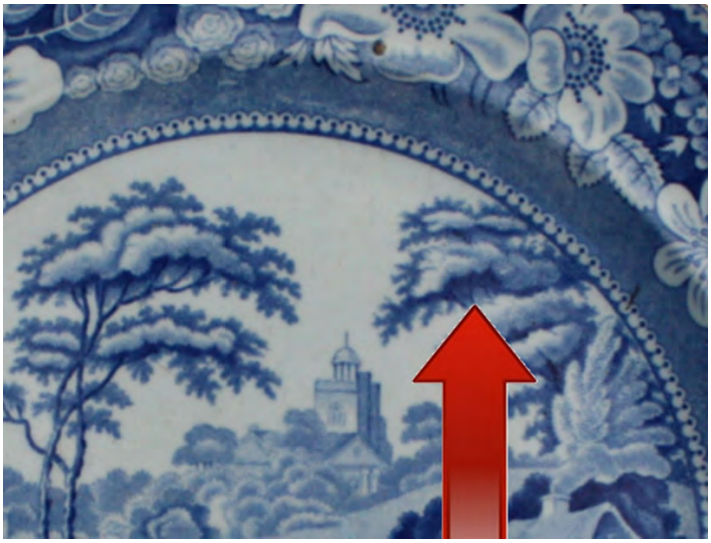
The process of engraving a 10” plate should take around, 6 to 8 weeks, but I am sure Bill is stretching the work he does with me out as he likes the pub lunch I buy him afterwards!

Yum Yum!

The base for the new engraving was to be the famous Wild Rose pattern.

Bill's mother bought this very good quality plate in an antique shop in the 1970s and he had always liked it. However, Bill being Bill and saying exactly what he thinks, said there were three elements that he didn't like and wanted to change. These were; the 'flying saucer' as Bill called it in the border.

Secondly, he thought this section of the tree was clumsy and didn't give enough sky. This would be 'pruned' in Bill's engraving.



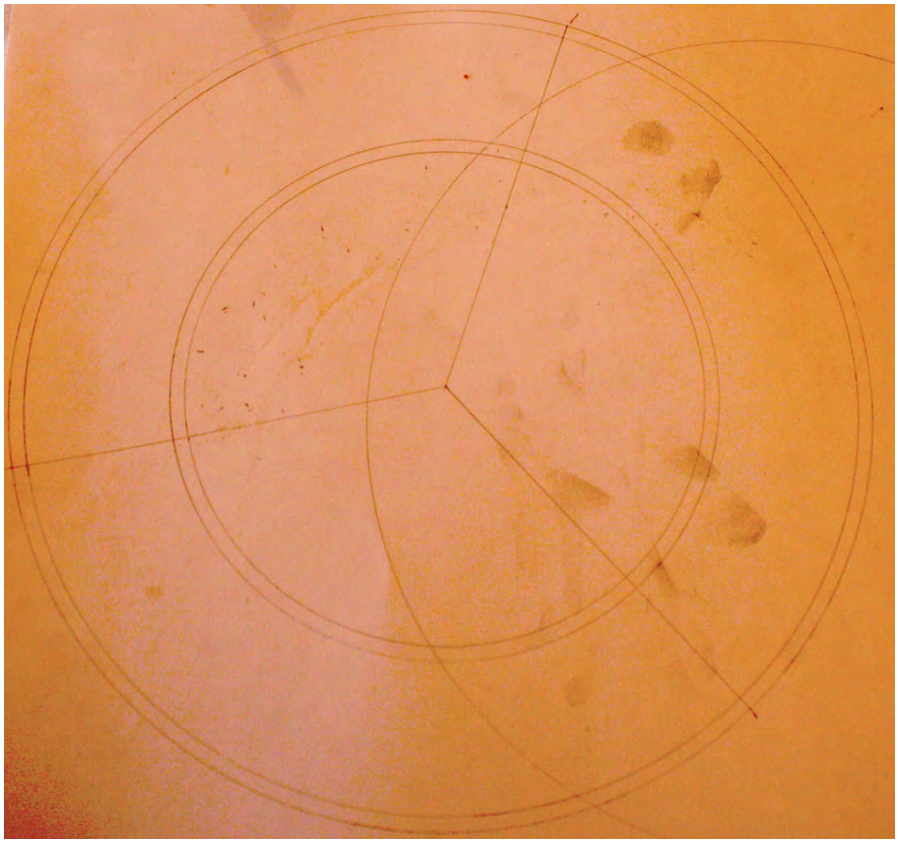
The final thing that really bothered Bill was the number of sheep in his ceramic example.

As we all know, there should only be odd numbers of things, so either three or five would be much better. Bill chose five.

In the original source print of 1811, there are two eel traps leaning up against the bridge. Being a fisherman myself, I asked Bill if these could go in the new engraving as they are absent in all of the production pieces as you can see here.

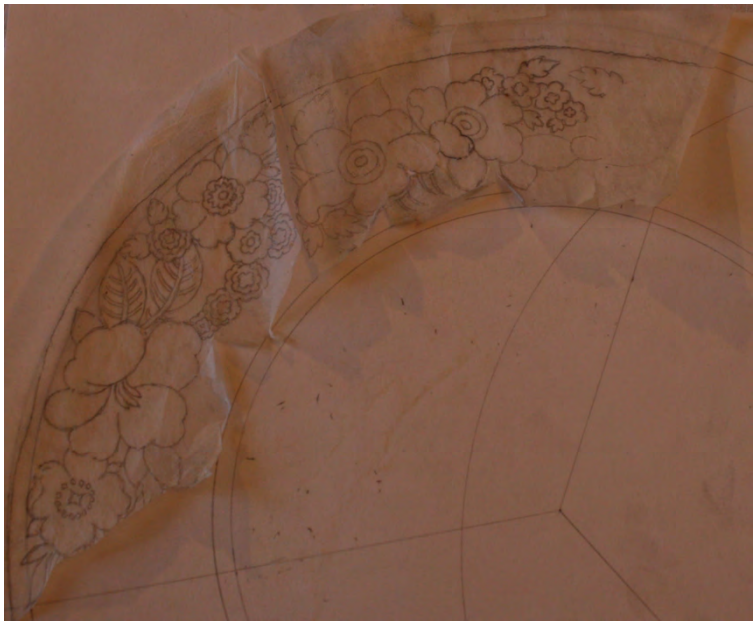
The first visit was a trip to Bob Finney the coppersmith where two pieces of copper were purchased. I also did an interview with Bob as his family supplied the whole engraving industry with copper from the 1850s onwards.

The very first step in creating a new engraving is making the correct size layout. This is determined by measuring the border, the central scene, the edge stringing (beading) to both elements and drawing a circle of appropriate size. This is then divided into three equal sections.

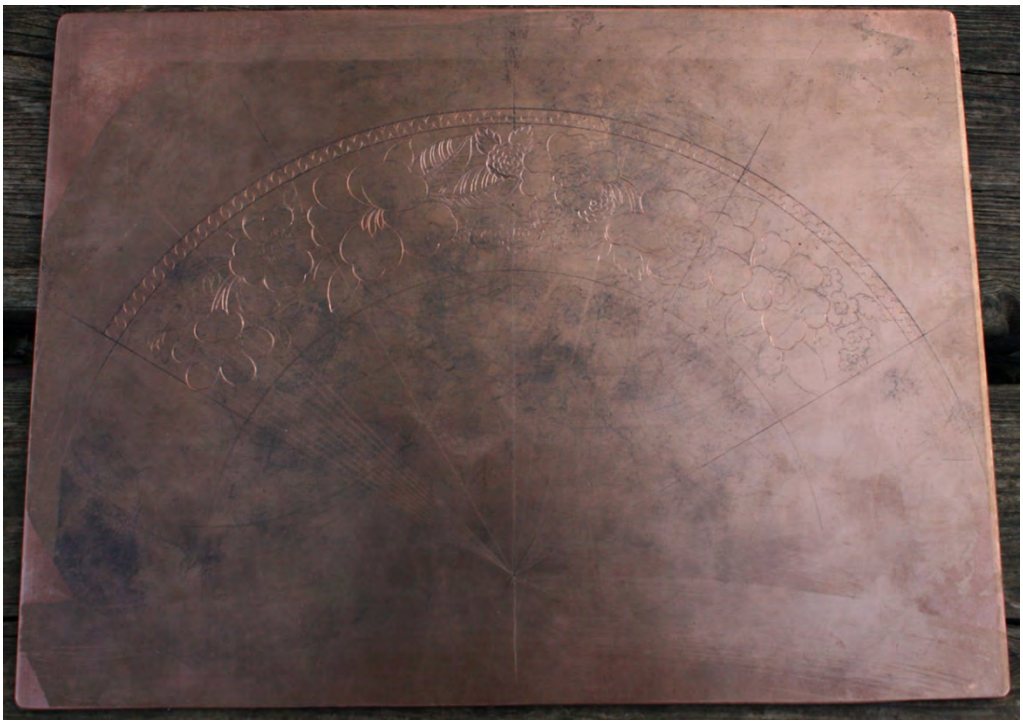


The first engraving step is to create a border lay-out copper plate. This is a small copper plate specifically for the border lay-out and construction. Setting it out in this manner ensures that the border is evenly balanced and has the correct amount of elements repeating. While this step is time consuming and does cost the use of an additional piece of copper, it does, in the long run, make for a much better looking and better balanced design. Once the section of border for reproduction is chosen, the outlines of the main elements are traced around using tracing paper.

These tracings are then checked on the size layout to make sure they fit and are long enough to fully cover the third of the border design.



The copper plate is sized with a thin wash of engravers' size. A graphite pen is used to coat the underside of the tracing and it is then carefully lined up and placed 'graphite' side down on the face of the copper plate.



Using a 9H pencil (one of the hardest pencils available), the design is traced onto the copper plate in the correct position. At the key intersections, a needle mark is pushed through into the surface of the copper plate.

The design transferred to the surface of the copper in pencil and partially outline-engraved using a needle graver. This process is known as 'needling' a pattern.

Here we can see both the pencil outlines transferred and the beginnings of the needle outlining. At this stage, subtle changes can be made to the shape of specific pattern elements as the engraver sees fit.

The radius is carefully divided up into equal sections from the centre-point of the 'plate' and the rope-like stringing is needle engraved.

Taking the time and trouble at this stage to ensure these fine design elements are correct and even will make for a better finished engraving. Errors and oversights made during the layout are translated and multiplied as the engraving progresses.

Bill then uses a graver with the aid of a hand-held magnifying glass to cut the design a little deeper. The graver is used to go over the needled engraving and to correct any errors made in the tracing and needling process.

This nearly concludes the work on the initial border lay-out engraving. Here is a close-up of the graver work.

Remember Bill's flying saucer, well here is the first change he has made to the pattern This element looks far more like a rose hip than a UFO!

The next step is to make sure that the sections, when repeated three times to the main engraving, meet up and interlink correctly. This is achieved by taking cellotape 'pulls' of each end and transferring them to the opposite end to see where they will meet when the circle is made a whole. I believe you know cellotape as Scotch tape over here. The object is to not have repeats, cuts and where the sections meet, to not have blank areas and have a degree of inter-linking instead.

Once planished flat, cleaned and dried, a small amount of colour is applied to the plate and worked in to the engraving using a cork and the excess is then scrapped off.

A piece of cellotape is cut and placed sticky side down onto the colour-filled engraving.

Tracing paper is then placed over the top and the Cellotaped-area then burnished with the end of the punching hammer's handle to make sure that the colour is successfully picked up by the sticky tape.

The tape is then very carefully removed and set aside making sure it does not touch anything else or curl up on itself. The process is repeated at the other end of the engraving. The plate is then cleaned again to make sure it is free from grease.

In turn, the pulls are carefully lined up on the opposite side of the sector from which they were taken and stuck down using the radius line and the engraved circumference lines as a guide. The purpose of this is to see where the sections will meet when repeated three times.

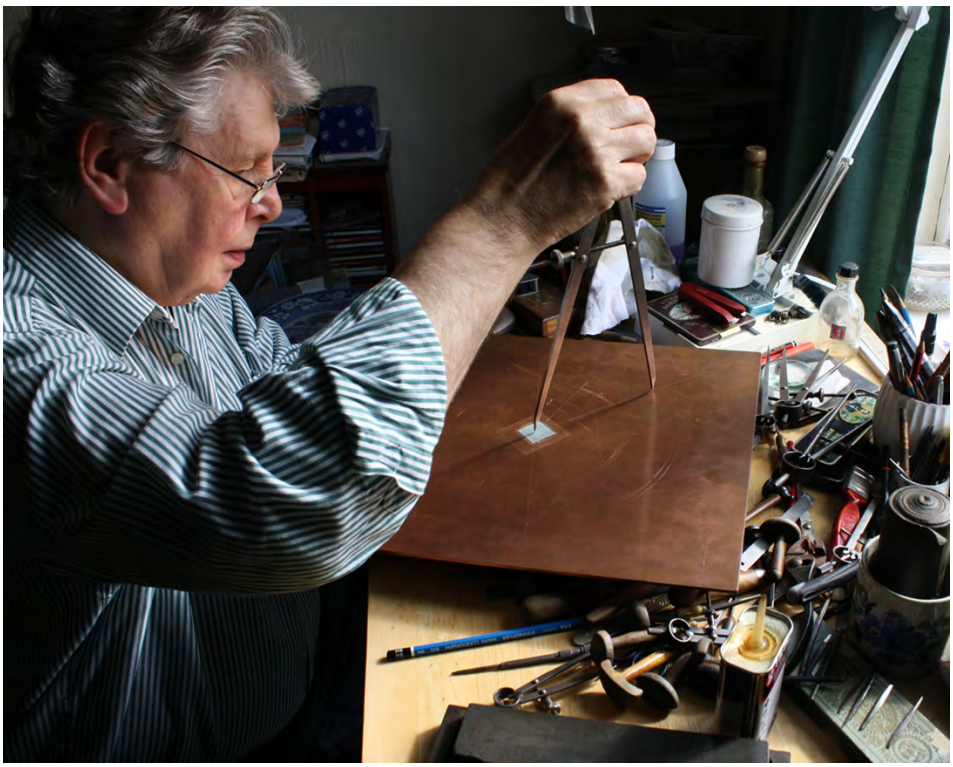
The gaps are then filled with flowers and or leaves as so desired. This work is undertaken with a very sharp graver and this now completes the work on the border copper.

The next step is to start work on the main copper. The centre is found by lightly inscribing diagonal lines from opposite corners that meet in the centre of the plate.

To ensure that this 'laying out' is accurate, the compass point must remain perfectly centred and stable. This requires a punched hole in the centre. As not to damage the centre of the copper plate, which would consequently need repair work in the form of 'knocking up' from the back and 'planishing' flat, a thin piece of metal sheet is taped to the centre to receive the punched hole that the compass point rides in.

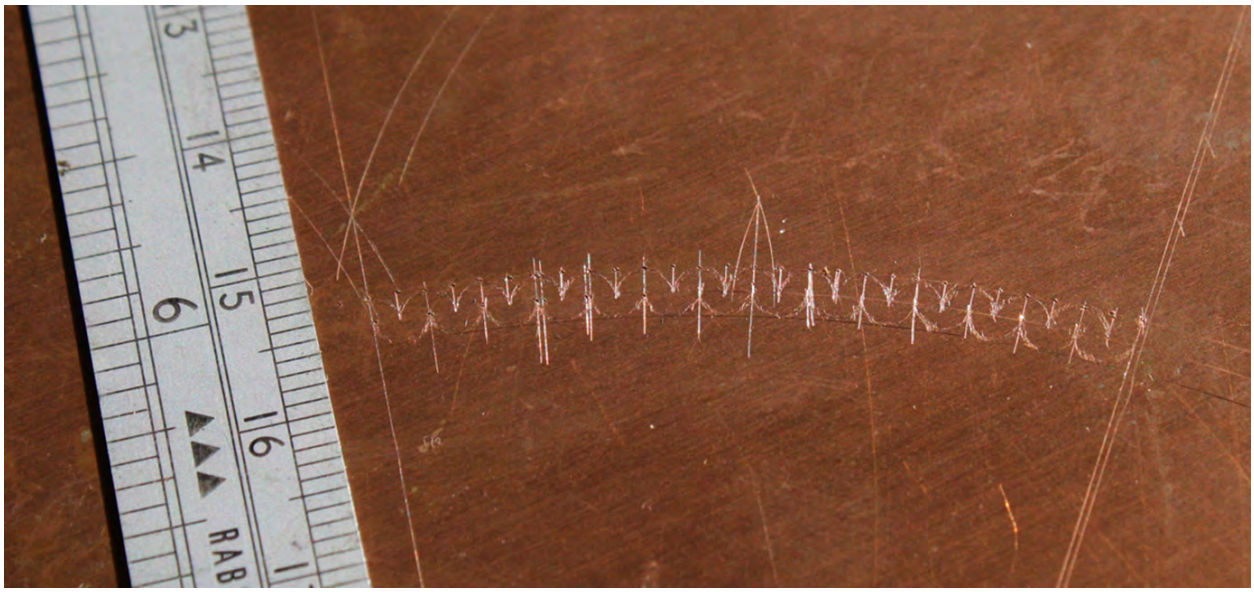
In this case, Bill cut up aluminium drinks can and tapes a small section of it to the centre of the plate. Other soft drinks are available!

Once cut down, the small piece of aluminium is fixed in place at the centre of the copper plate.



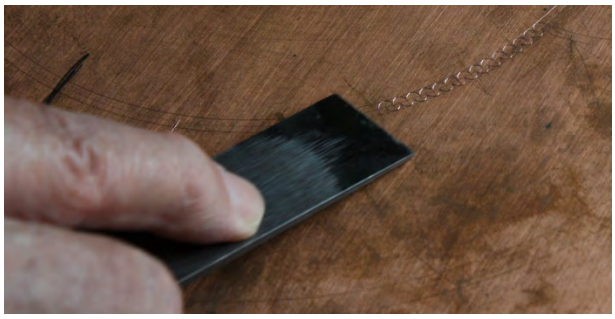
Bill checks the final measurements with the 'border-section' plate before beginning the layout on the large copper plate. As Bill says; "measure twice, cut once".

The next step is to divide the working area of the plate into six and then twelve equal sectors.



These are marked very lightly and finely with the aid of the rule and the needle. The inner bead is divided within one of the twelve sectors into fourteen equal sections and is then lightly needled to form the outline of the bead's distinctive shape.

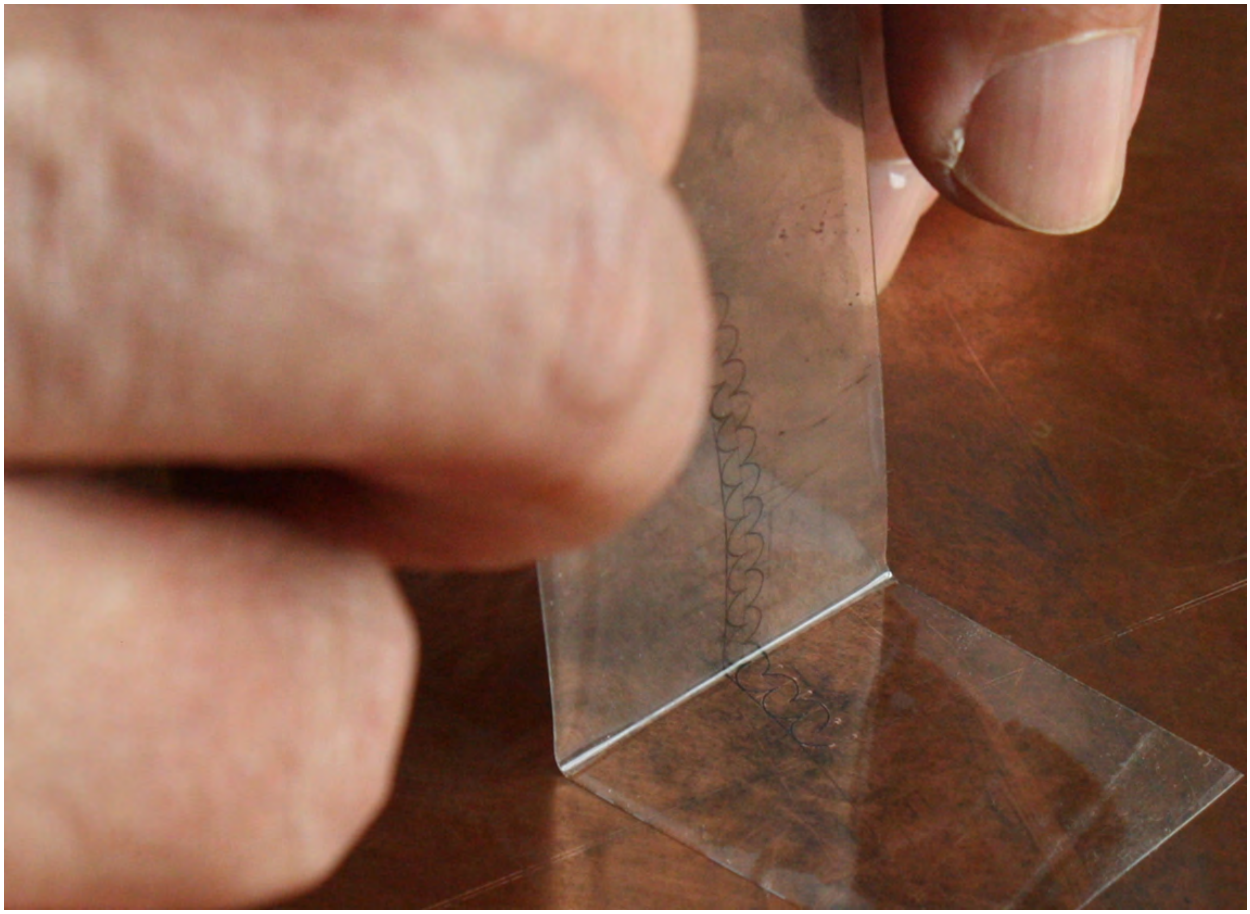
The innermost compass line of the inner bead is cut using the graver to fully define it to aid the continued layout and as preparation for the final depth of cut for the finished engraving.



The needled inner-bead is cut with the graver and the burr raised by this cutting action is removed with the scrapper.

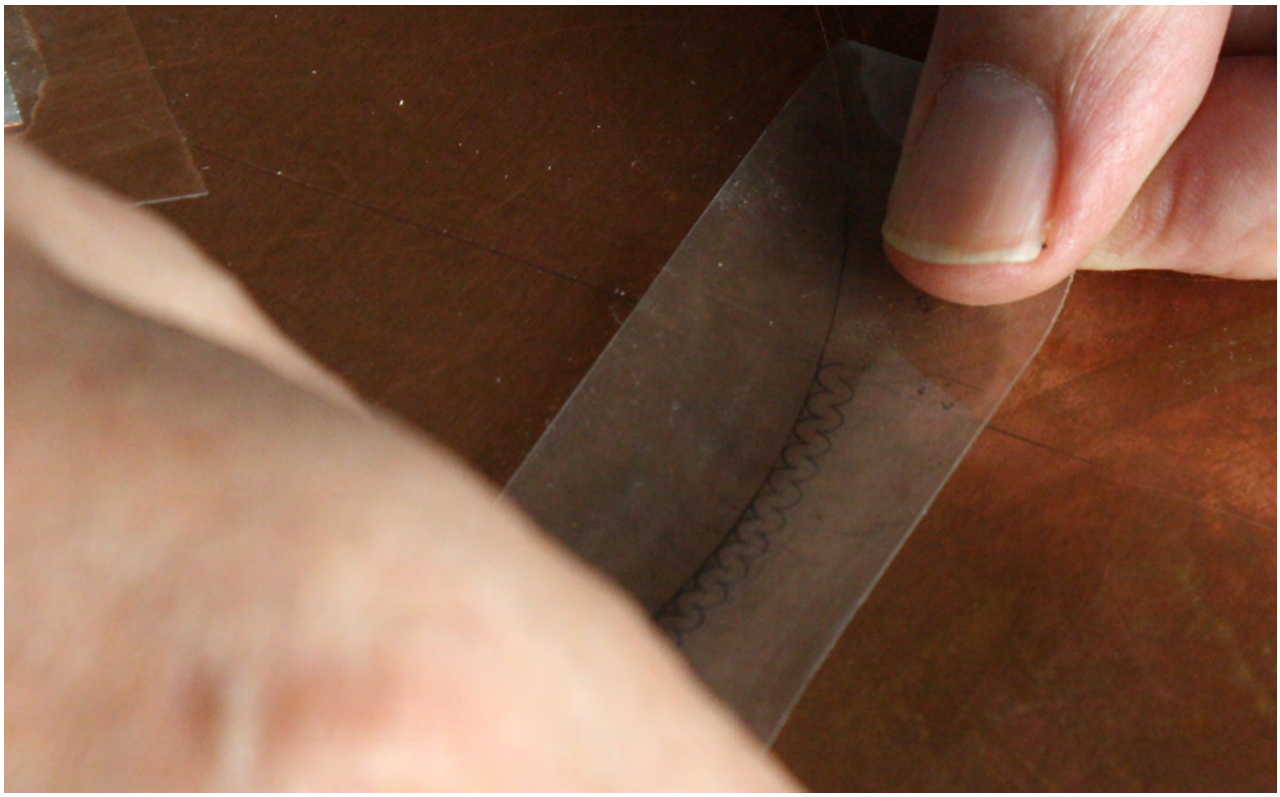
Dried colour is forced into this engraved bead with the scrapper in the first instance and then with a piece of cork. The excess is removed and returned to the 'colour pot' by the scrapper.

A piece of cellotape is cut to size from the roll and is placed over the colour filled engraved bead and firmly pushed down using the thumb.



The tape is then carefully pealed back and off to reveal that the colour has firmly stuck to the sticky side of the tape and a perfect copy of the engraved work is thus transferred to the tape.

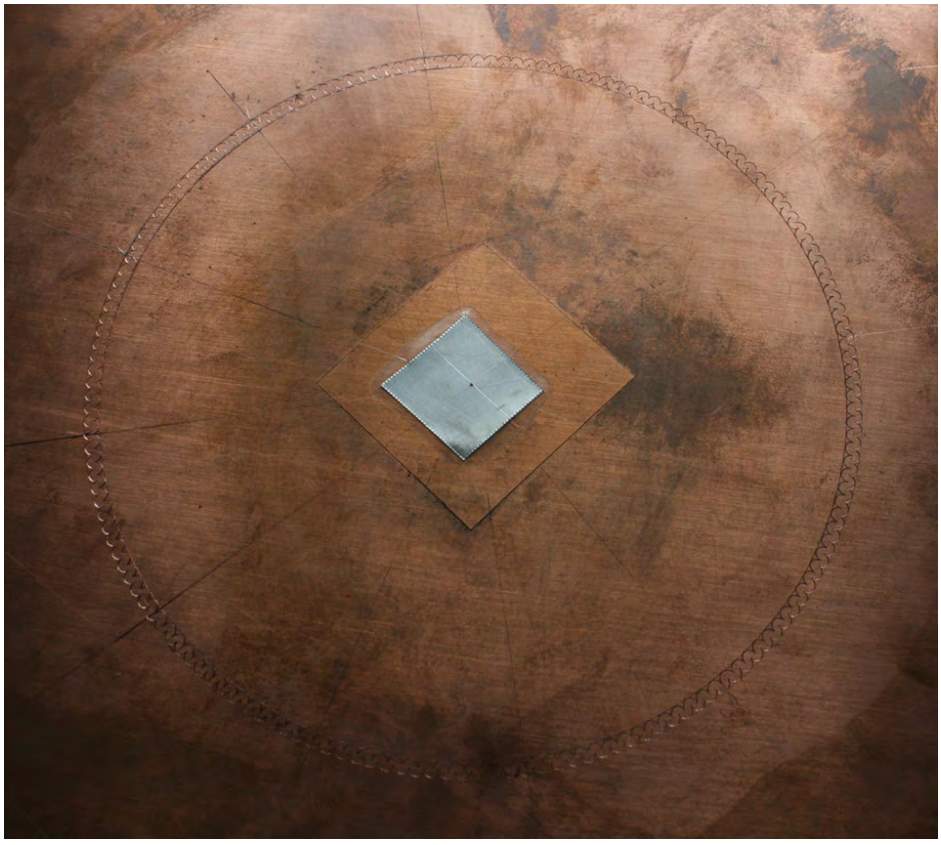
A section of the copper plate is lightly covered in size. The cellotape pull is very carefully placed down over the tacky size ensuring that it matches up with the compass-inscribed lines and the end of the engraved bead.



The pull is gradually pulled back and this leaves a feint colour impression of the bead on the plate.

The colour impression is cut using the graver.

Extra care is taken when undertaking this engraving as not to touch the colour. The colour is easily removed if the engraver's hand or arm touches it. This process is repeated a further ten times to fill the twelve sections of both the inner and out beads.

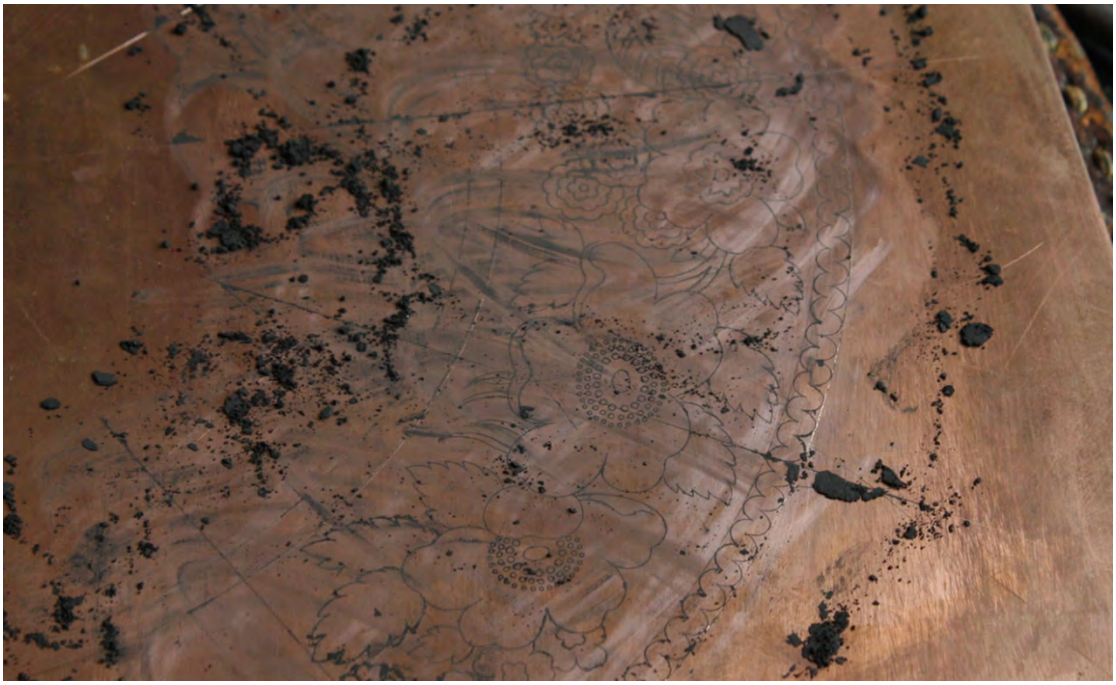


He we can see that the inner bead is now complete. The next step is to 'lay down' the border pattern from the border plate to the main plate.

Bill suggested using the cellotape method, but the border section is too wide and deep for a single piece of tape to fully cover it, so he has opted to use the traditional 'wax-paper' method instead.

This image shows that olive oil is distributed evenly across a piece of tissue paper using horizontal strokes. The tissue is turned by ninety degrees periodically to ensure an even and thorough coating. The reason for doing this is it makes the paper translucent which will aid the engraver when the paper is 'laid down' on the main copper plate.

The tissue paper is then turned over and placed oil-side-down. A mixture of bee's wax and tallow are used to cover the surface. This will be the medium that picks up the colour from the engraving on the border plate and takes the place of the sticky side of the cellotape in the case of using cellotape prints/pulls.



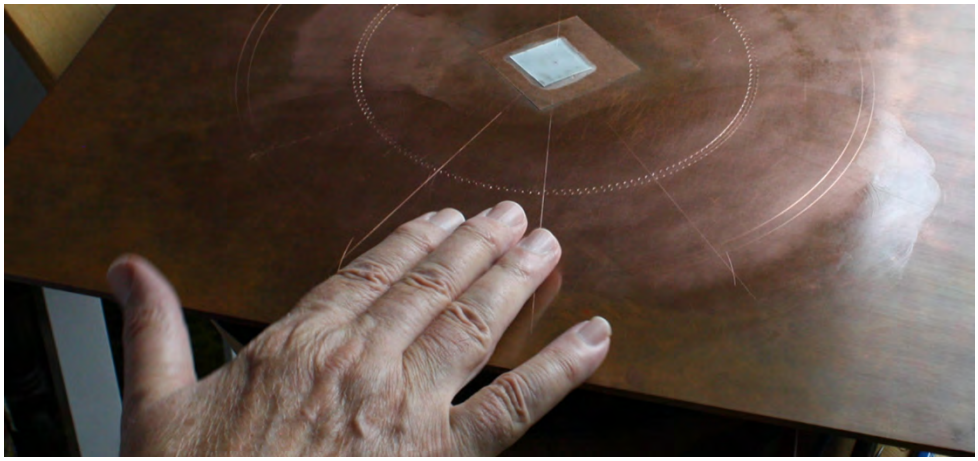
The entire engraved work of the border plate now has the coloured firmly rubbed in. Any excess colour is scrapped off with the use of the scrapper and returned to the colour pot for re-use.

The 'wax paper' is now laid down across the surface of the border plate ensuring that the engraved work is covered. A piece of thick film is laid across the wax paper and firstly rubbed lightly with the bee's wax and tallow. This begins the burnishing process,

but more importantly, coats the film with a friction-lessening agent that allows the burnishing tool to ride more easily and smoothly when it is used to burnish the wax paper to the engraved work.

The wax paper is now very carefully peeled back to reveal that the process has been successful. The colour-covered engraved work is transferred to the wax and tallow and Bill even exclaims how well it has turned out!

The main plate is thoroughly and vigorously cleaned using turpentine and a tooth brush. This removes any grease and general dirt that may impede the transfer of the wax print. The oil rubber, as shown here, is made of rolled felt and a small amount of mineral oil are used to boss the surface of the plate in a final cleaning and smoothing process to make it ready to receive the wax paper pull.



The sector that is to receive the wax paper pull is primed with size and Bill checks with his fingers to see how tacky it has become.

Bill can see the lay-out lines and edges of the sector through the paper. It is also at this stage that the importance of the accurate and meticulous measuring and checking are made apparent.

As before with the border plate, a piece of beeswax and tallow covered film is placed over the wax paper and it is firmly burnished with the burnisher.

The wax paper, now fully 'laid down' is carefully peeled back to show that the transferring of the colour has been successful. Bill even says how impressed he is with how it has worked.

Talcum powder is lightly sprinkled across the area of the newly-laid colour and is rubbed/brushed very lightly with the finger tips to ensure an even, but light covering. This sticks to the remains of the size and acts as a stabiliser to the work.

The process is repeated twice more.

The border and inner and outer stringing are now ‘outlined’ with a graver and the work can now begin on the centre of the design.

Now Bill moves onto tracing the centre of the plate. A piece of tissue paper is used as the tracing medium, but needs some preparation before the tracing can begin. Firstly, it is

cut to fit the rough size of the inner plate where the tracing will be taken. One side is lightly coated with oil to help the tracing paper gain a degree of transparency that will aid with the tracing process. The other side is applied with a light coat of size. A '3H' pencil is used to trace the key features of the design from the plate that is being used as the inspiration.

Here is the result of this process. The tracing is complete and is now ready to be used to get the design onto the main plate.

The next step is to make a tissue paper that is capable of transferring the tracing onto the main plate. This is a form of carbon paper.

A piece of tissue paper is used and one side is liberally coated with graphite from a graphite pencil.

The centre ‘horizon’ is marked on the main plate to ensure the tracing paper is laid down in the correct place and orientation. The centre of the main plate receives a thin coat of size.

The graphite paper is placed face-down and a hard, 9H pencil is used to go over the traced outlines which in turns transfers data through the tracing paper, through the graphite paper and leaves an outline in graphite on the dried size on the main copper plate. Care is taken not to the apply pressure on the graphite paper in any way other than with the pencil that follows the traced outline. This ensures that only the traced details are transferred to the main plate.

The tracing process has left a feint impression in graphite upon the dried size of the outline of the key pattern elements. This can be seen in the transfer of the trees and building outlines in this image here.

The needle graver is used to lightly outline the graphite lines onto the face of the copper plate. This is critical to ensure the pattern remains the same as the one that is being copied and is undertaken quickly before oxidisation and thus deterioration of the graphite work occurs. It is at this stage corrections or alterations can be made.

Little by little, the outlines are turned into recognisable shapes. In the case of the tree-outlines that are being cut, the graver makes an initial minute cut (or bite) and the copper plate itself is turned to cut the curve of the tree or bush.

The tools used at this key stage. From top to bottom, the hand-held magnifying glass, the graver and the needle.

The central scene is now fully-cut with the graver.

Here are a couple of the key elements of the pattern. The famous arched-bridge and the Thames boatmen.

One of the main changes to the design; the eel traps that were in the original source work from 1811 by Cooke, but not used by any potters in the production transferware.

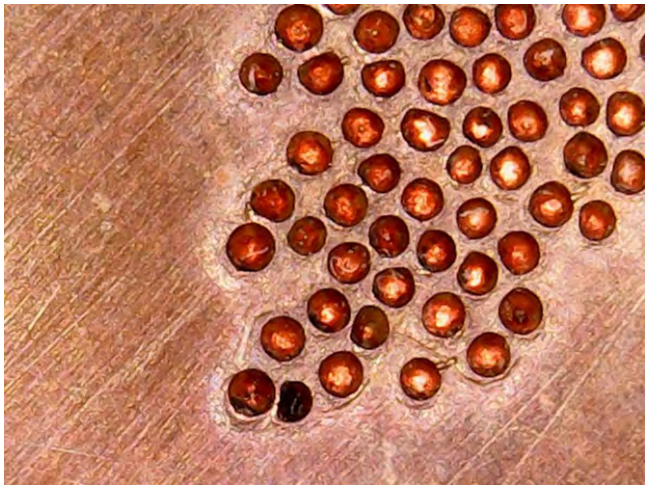
Bill comments that he has the luxury of adding or subtracting design elements as he sees fit as he does not work for Spode anymore where this type significant design change would not have been allowed.

Now all of the pattern elements (central design and border) are cut with a graver, the next step is to begin the punching. The punching is carried out using a single, steel punch, a punching hammer and a magnifying glass on a stand. This adds tonality and shade.

Bill uses a punch and punching hammer to enter dots onto the copper surface. As this is a two-handed job, Bill uses a magnifying glass on a stand to be able to see his work. The stand of the magnifying glass has a baize cloth fixed to the underside to prevent the plate from being scratched when the magnifying glass is moved around the surface of the copper plate.

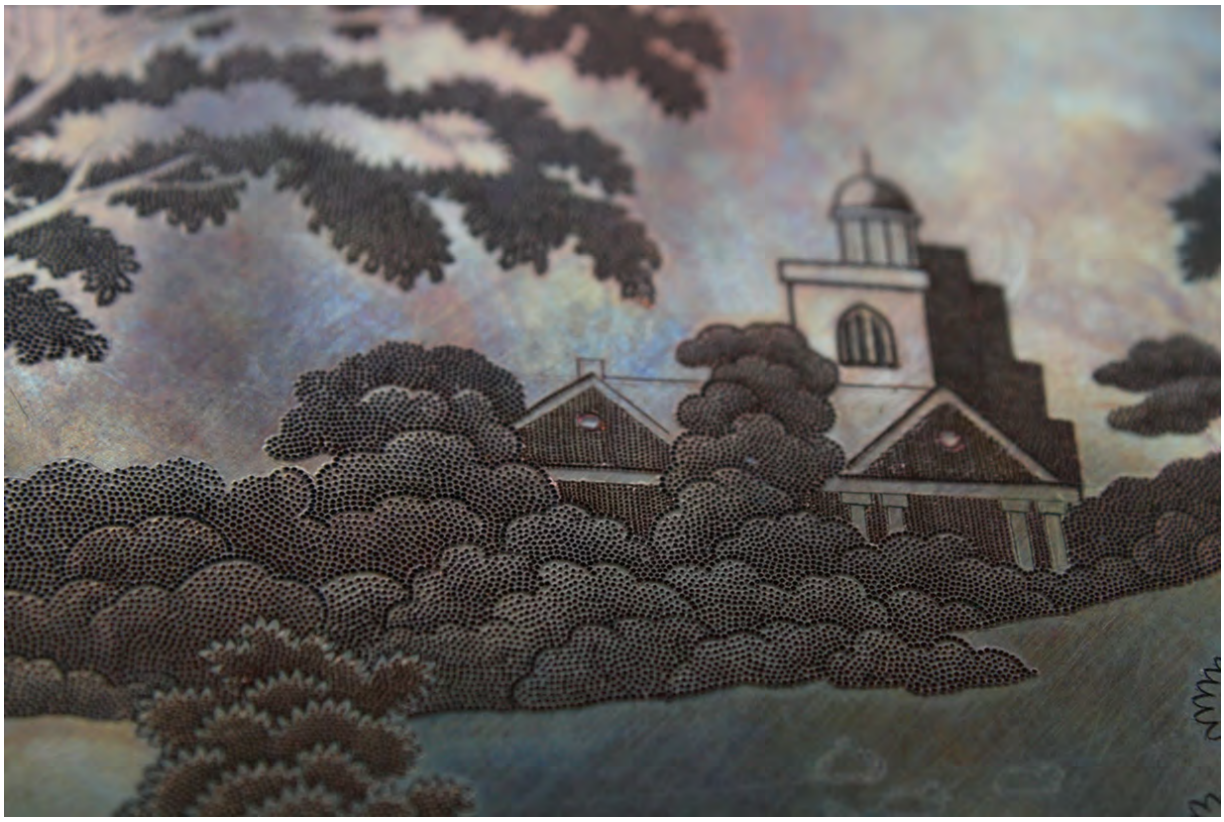

Here are a couple of examples from the first phase of punching. The trees to the left of the scene and the smoke coming from the cottage on the right.

Those of you who saw my talk last year will remember the 800 times magnification microscope I use, well he it is on Bill's work.

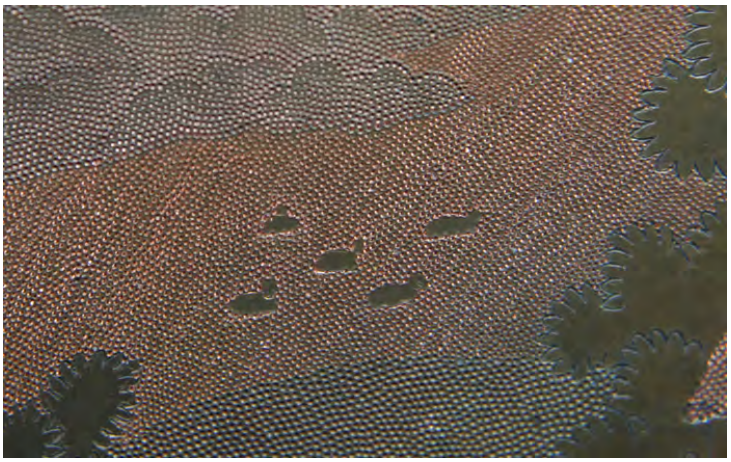
He's pretty good eh?

The first phase of punching to the centre is now complete. The trees, buildings, roofs and fields have been punched with three different punches in their respective areas.



Here is the middle-distance monument. This is surrounded by beautifully punched trees and bushes.

Here is Nuneham House. Again, these are beautifully punched with varying punch sizes and gauge to give a life-like look and feel to the foliage.



And here, the sheep have been altered in two ways from the original. Firstly, they number five now instead of four which is much better number. Secondly, they are not outlined with a harsh graver line.

Now the punching to then centre is complete, Bill moves onto punching the border.

The border is made up of three repeating sections.

Bill picks out the repeating elements and punches those all at the same time so that they are consistently punched and have no variations.

The next stage is to work on the large punched area between the inner bead and the flowers in the border. This is all punch-work of the same size, gauge and depth. It is critical that this is carried out with consistency too. The aim with this work is to have an expanse of the same tonal value that has the same weight of colour throughout. Any differences in hole depth, hole diameter and gauge, gauge is the gap between the holes, will be very visible and noticeable and could spoil the whole look of the design.

Bill starts this border punching where there is the smallest gap between the inner bead and a floral, border element. This is done so that when, having worked his way all the way around, it is easier to meet up and match the punching.

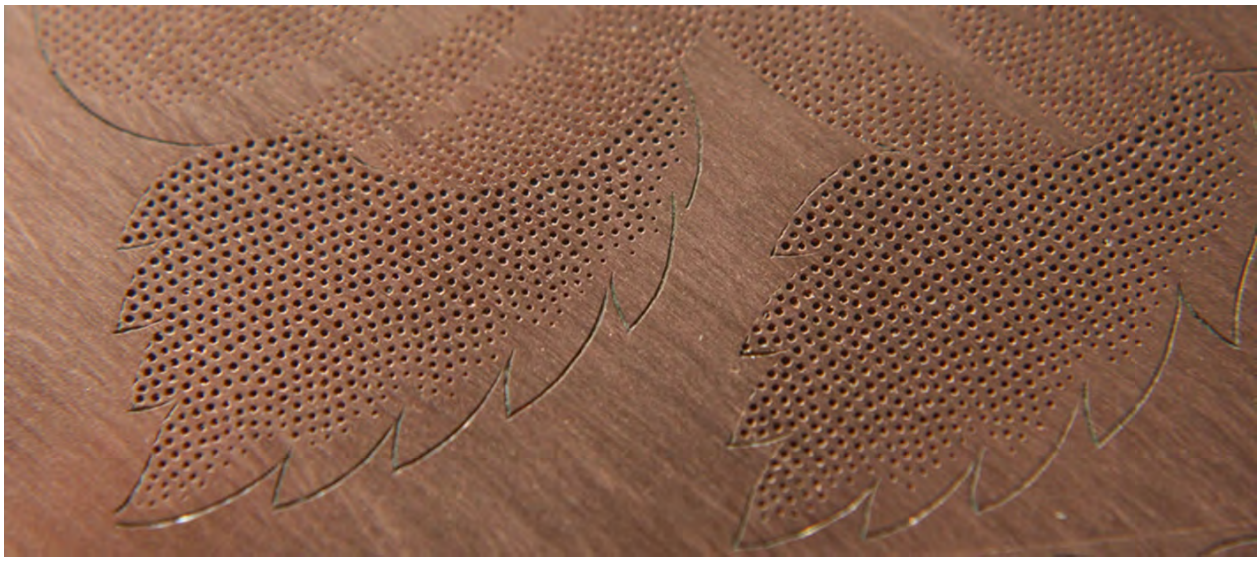
The first phase of punching is now complete within both the border and the centre. During the work on the punching, it is noticeable that the plate has begun to tarnish and is becoming more difficult to both photograph and appreciate what has been done.

The punched detail to all of the flowers in the border that will add shade, subtlety and contrast was very time-consuming. This work needs much planning and the use of several sizes on punches which all have to work together to create the overall effect that the engraver wants to achieve.

The Water of Ayr stone would be used for the planning step. This stone is mined from a place is the West of Scotland called Ayr, hence the name. This is a medium strength honing stone and removes a reasonable amount of material, but in a way that can be controlled by an experienced engraver. Bill comments that the engraver who created the engraving would undertake this task as an apprentice would not be trusted. Punching raises a burr and this must all be removed through planishing to make the engraving perfectly flat. A burr is a raised area that feels rather a cheese grater if you run your fingers across it.

The hone stone is pressed quite hard into the surface of the engraving in long, deliberate strokes. The direction of the strokes follow those that were imparted upon the copper plate when it was first planished at the coppersmith's.

After about forty fives minutes of planishing, during which the plate is washed several times, it is evident that quite a lot of material has been removed. However, there is still a long way to go. This can be seen in the areas that are clearly more yellow in appearance. These are the low points and the punched areas surrounding them are still too high and planishing must continue until the whole plate takes on the same appearance of fresh, rose-coloured copper. These yellow areas are known as 'shadows'.



After the planishing process, it is evident that some of the punched holes have become slightly 'filled in'. The planishing has the action of pushing material into the punched holes as well as removing it. As such, some of the punching will need to be 're-entered'.

Here is an image of the plate as a whole now the planishing is finished.

Here are a few close-ups of some of the key pattern elements as seen after the planishing.

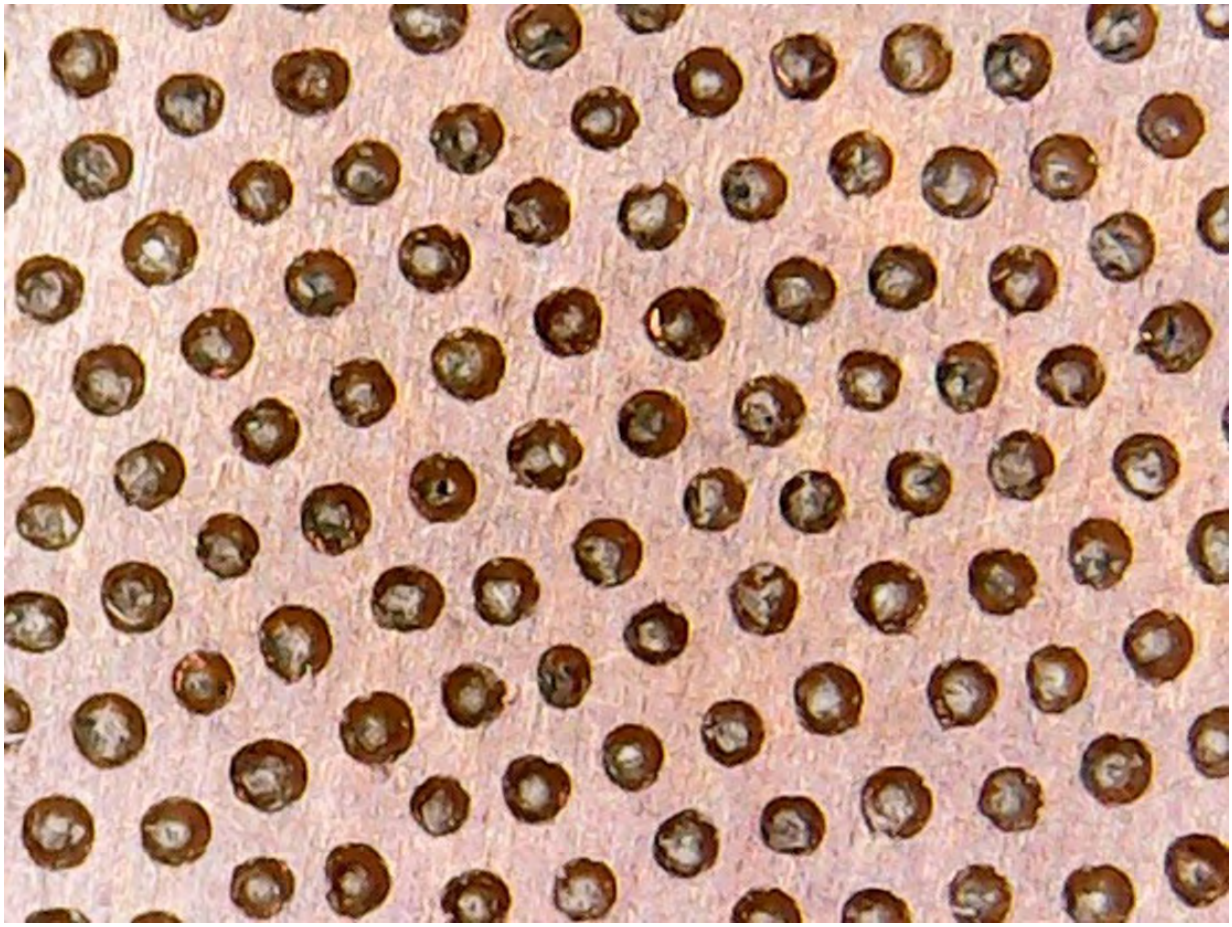
They are clockwise from the top left, Nuneham House, the Wild Rose border, the eel traps and finally, the Thames boatmen.

And here is the central scene looking very fresh and majestic.

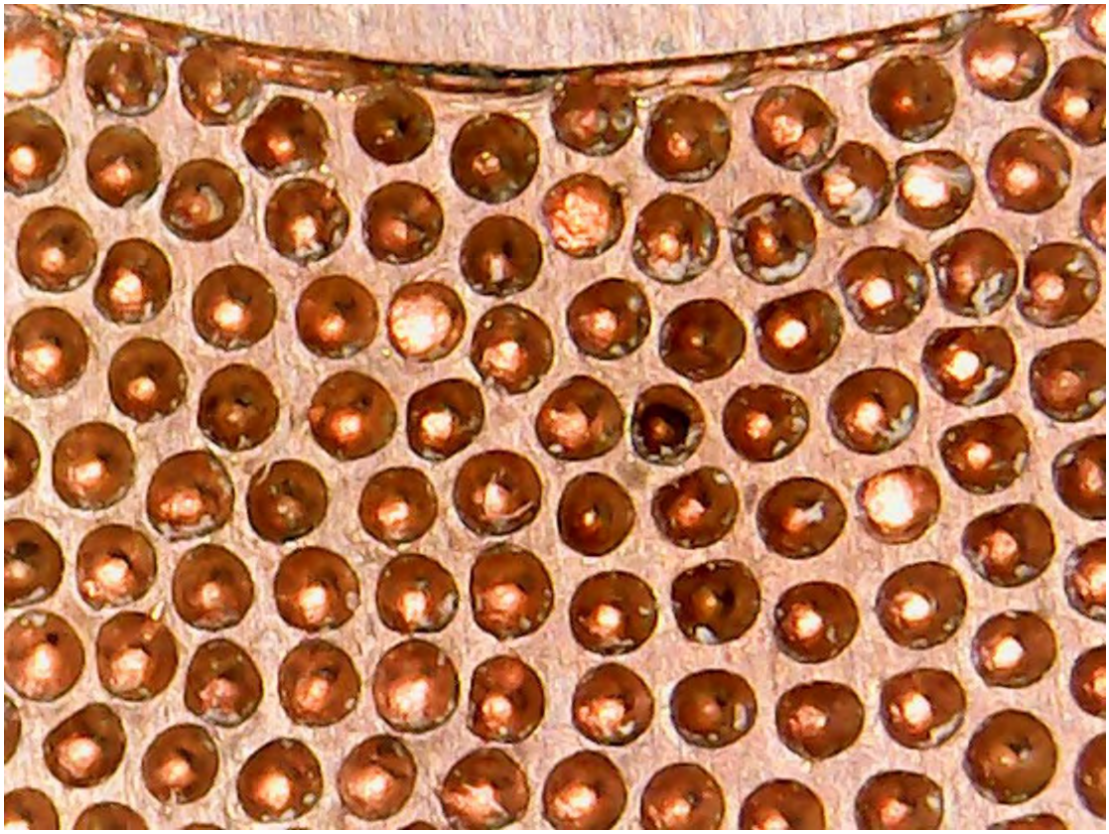
The beauty of the planishing process is it makes the engraved work far easier to appreciate and indeed to photograph.

The next phase is re-entering the punched dots, yes, every single one has to be painstakingly and accurately re-punched.

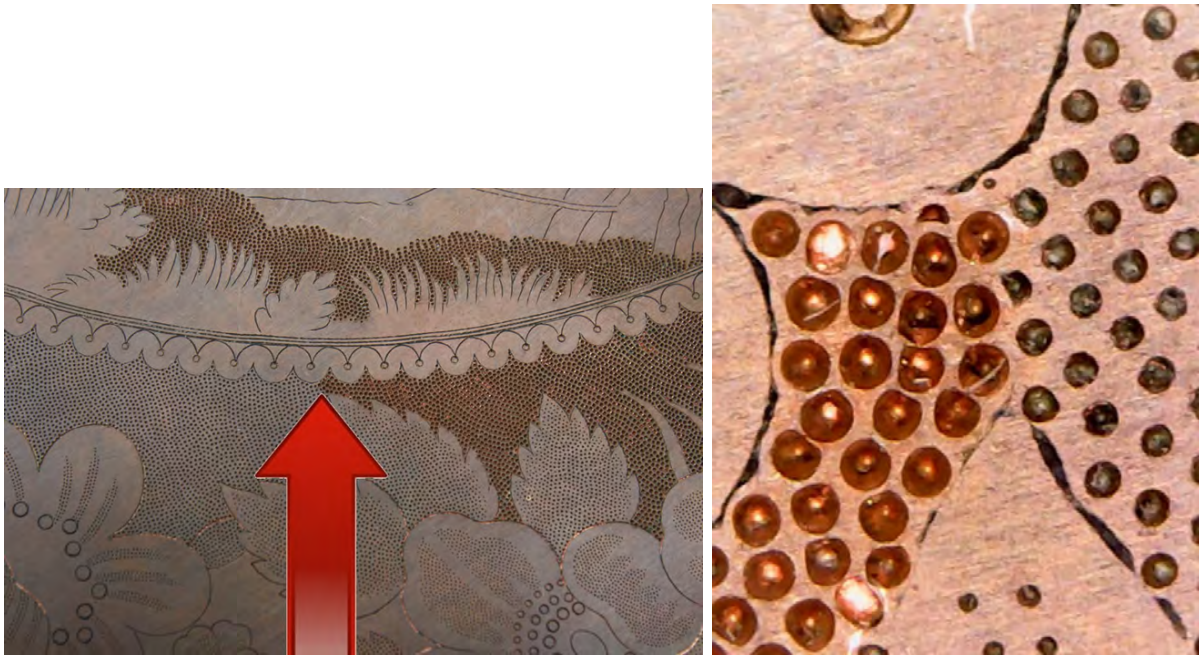
The re-entering of the punched dots is throughout the whole plate and this includes the central scene and the inner and outer border.



Here is an 800 times magnification from the USB microscope that illustrates the punch-work after the act of planishing.



And here is the same area again with a USB microscope of the punch-work after it has been re-entered following the first-phase planishing.



At the division between the planished punch-work and the re-entered punch-work, the microscopic view allows for an interesting direct comparison of the depth and diameter of the punched holes. The deeper and wider re-punched holes will hold more colour in the printing process and will print a darker shade of blue.

The re-punching stage is now complete. This image shows the copper plate at Bill's workstation with the simple hand tools that aided its creation. Bill can now think about adding the final line-work to the engraving.

Here is a closer look at the engraving as a whole. I'm sure you will agree that it looks magnificent.

Here is a colour inversion that allows a better look at the engraved work. This shows the engraving in great contrast to the rest of the plate.

I have a slight apology – the engraving isn't quite finished. Bill, the engraver, had a bad eye infection in the Spring which put our work about two months back. So, he has some line-work to the centre still to add.

This is mainly is in this area. The lines that suggests water and ripples have to be added along with some minor line-work to the boatmen.

This can be seen here. This work should be done and complete within a month or so. We are then going to print from the engraving and make a few ceramic plates to show the whole process from start to finish. I will keep you all posted with that.

As a slight aside, I bought this plate recently as a present for Bill. It is very poor quality in terms of both potting and engraving. I thought he would really like that!

The trees are punched using a multi-headed punch and look like 1980s computer graphics. Bill was very pleased with his gift and said it's so bad that he loves it!

Here is a comparison of the same area of Bill's work. I think you will agree, it is a little better?

As far as my research goes, I am investigating similar industries that used source-work, tracing images and the use of colour to make new images. One such industry is that of tattoos. You can't seem to turn the television on these days without seeing one tattoo show or another. Shows such as London Ink and Miami Ink are very popular. As such, I wanted to look at their use of source-work and adaptation as a comparison to transferware and I will be interviewing some tattoo artists. However, there is a big problem. I do have poor sales-resistance and my supervisors at university are convinced that I will end up looking like this.

Or even worse;

Like this. And yes, I'm sure you can tell this is my arm!

I hope you have enjoyed my presentation and have learnt a little about transferware and the engraving process. Transferware is not just something to collect. It is not just a commodity to buy and sell. It was painstakingly and lovingly created in lines and dots by highly-skilled artisans who are, in my opinion, the unsung heroes of the industry.

Thank you.