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Enameling
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There is a fascinating world that mixes metal and glass. As so much of what we do with our crafts are dependent on the persona(s) we are most interested in, I have divided this handout to reflect those differences, both in time and region where possible. I have not found documentable evidence of enamel in every region, but it can be found in every time period, for as far as the history books go. Trade routes are our friend!

Enameling is simply the act of decorating metal with glass. Glass is ground with mortar and pestle to a fine grit. It is then applied to metal either in recesses or in enclosures made of wire. The decorated piece is then fired in a kiln to varying degrees of heat that melt the glass. It's a magical process that fuses the two together.

PRE-1000



A Rein Guide or "Terret" from the 1st century A.D. - Copper Alloy with Champlevé Enamel. Currently living at the Metropolitan Museum of Art.



A 3rd century vase found in La Guierce, France.

Only 4 ³/₄ inch high with 4 ¹/₂ inch diameter base.

Enameling all done in the champlevé technique.



An Anglo-Saxon disk brooch from the 600's. Thought to be made in Fabersham, southeastern England.

Cells in the Cloisonné fashion with garnets and glass.



Box of silver and gold with sliding lid decorated with cloisonné enamel.

Late 8th, early 9th century, Byzantine.

Only 4 x 2 7/8 inch



A personification of the Moon. From southern France, 860-890

Copper alloy, iron, and cloisonné enamel

More Roman Pieces:

http://www.nms.ac.uk/education/outreach_programmes/celts_and_romans_at_birnie/explore_the_roman_finds.aspx

1000-1250



A double-sided pendant of Mary and Jesus
Both champlevé and cloisonné enamel on gold
ca. 1080-1120
Byzantine



Temple Pendant with two birds flanking the tree of life
Kiev, ca 1000-1200
Both champlevé and cloisonné enamel on gold
2 1/2 x 2 1/8 inches

Medallions and plaques from Conques, France

Both champlevé and cloisonné work with layered gilt copper sheets

ca. 1100



1250-1492



Opaque red enamel roundel found on the interior of a double cup.

From Germany or Bohemia, ca. 1300 - 1350

Silver with champlevé enameling



Spanish Parade Helmet believed to be from the Nasrid period (1238-1492)

steel, gold leaf, silver, with cloisonné enamels

A plaque currently living in at the V&A museum. It's supposedly a winged ox - the symbol of St. Luke. c. 1300-1350





Examples of Champlévé currently living at the Victoria Albert Museum

117 Group of badges (from left to right)

Badge with the royal arms of England before 1340

Copper alloy with *champlévé* enamel, traces of gilding
England, c.1300–40

V&A: M.315–1921

Badge with the arms of the Visconti or Sforza families

Copper, gilt with *champlévé* enamel

Italy, around 1350–1400

V&A: M.73–1923

Badge with the arms of Warenne

Copper alloy with *champlévé* enamel

England, c.1300–50

V&A: M.13–1989



118 Badge with the arms of Bishop Angelo Acciaioli

Copper alloy, gilt, with *champlévé* enamel

Italy, perhaps Florence, c.1328–57

V&A: 8991–1863

1492-1600



Gold necklace with cloisonné
From Nasrid, Granada

ca late 15th-early 16th century



c. 1554
Champlevé enamel on copper

Plaque possibly commissioned as a memorial.

Currently living at the V&A



Made by an unknown artist from Germany.

Enameled gold set with rubies, emeralds, table-cut diamonds and pearls.

Currently living at the V&A.

c. 1575-1600



Macabre Toothpick... Enameled gold, set with a ruby

Living at the V&A Museum

c. 1620

Enameling Techniques

We have evidence of two types of enameling. Cloisonné and Champlevé

Cloisonné is done with wire to create small corrals for the enameling powder to sit in. However you form the wire will determine your piece's design.

Champlevé is done by placing enameling powder in recesses of the metal. This is usually done by carving out the metal according to a set pattern. It can also be accomplished by sandwiching two pieces of metal together, one with a cut out design and the other without.

Many pieces in period use a combination of both. A recess is created, but wires are used to create figure details and borders for different enamel colors.



General Notes

Enameling is one of those things that you must read about, and see, to understand. You must be willing to experiment and play to really learn how the glass is going to interact with the metal and behave when it is fired. The varied colors of enameling glass melt at different temperatures. You have to learn which colors melt faster than the others and then plan to fire your piece accordingly. Methods for cleaning your copper are varied and really will depend on your own strength and tolerance for work. There are a variety of books and resource materials out there. While *You Tube* is generally a wonderful tool for learning new things, at the time of this handout, there are very few “how to” videos for enameling.

The best resource for enameling supplies and materials that I have found so far is Thompson Enamel. They can be found online at <http://www.thompsonenamel.com/> .

In the next few pages I will share my own set-up.

My Set-up



(Pay no attention to that pampered chef bag in the corner.... Objects in the picture appear closer to the kiln than they actually are...)

This is a “Coleman Camp Table” that I set up close to my dining table when I enamel. Yes, I do this in the house, because I do not trust the garage power outlets.

The kiln is model “DT-1” from Thompson Enamel. It is sitting on three glass blocks purchased from home depot. (Just for extra heat clearance away from the table.

The two white boards in front are Marinite Boards, also available from Thompson Enamel. They absorb the heat of the trivets and are great for transporting the trivets between kiln and work table.

The gloves there on the right are mandatory for use when pulling pieces in and out of the kiln. I use the small spatula looking thing there so my fingers are very close to the intense heat.

Notice the two projects on top of the kiln. The top of the kiln is a great surface for ensuring your piece is dry before sticking it in the kiln.

**NOTE: I do this AFTER my children are upstairs and in bed.
I will never risk my kids getting too close to the kiln...**

And the work table:



This is a small space on my dining table.

I do not have a permanent spot for all this cause that generates clutter...

Here we have:

A simple piece of scratch paper for a placemat.

Jars of different colors.

A small measuring syringe for dispensing the glue like liquid (Klyr-Fire)

Small cups with just the right amount of enamel. These have been swished with filtered water to “clean” them, mostly the transparent colors. I use a straw that is cut at a significant angle for laying down the color.



The glass jar on the right has an acid solution called “Sparex,” used to clean off the firescale created from the exposed copper in the kiln. The mug warmer helps elevate the liquid’s temperature just enough to help the solution be more effective. Copper tongs are the only tool that can go in and out of this solution without problems. And you’ll need lots of paper towels...

Pictures of the Champlévé technique using modern etching solution



The copper is prepped with Asphaltum, ready to go into the acid etch bath.



The copper piece is in the acid etch. The etching solution works a bit better when slightly warm. A standard mug/candle warmer works perfectly for this task.



The pieces have just come out of the acid bath. The surface has been neutralized with a baking soda paste to stop the chemical reaction.



It's the enamel station. The straws clipped to a point make a great applicator for "wet packing" enamel.



The enamel needs to dry completely before going into the kiln. The topside of this kiln makes a great dryer. Here you can see a wet and a dry piece.

Different colors are applied and fired individually!



The enameling on these pieces is complete. They look a bit rough because the glass needs to be sanded down to meet the level of the metal around it.



There are special stones available in different “grits” just like sand paper. Stone the surface of the pieces just enough to make it smooth against the metal.

When you are done, the piece will be dull. Stick it back in the kiln for a “flash fire” – heating it just till it looks “liquidy” again. And it’s done!



An example of “dry sifting” The white was sifted on first and fired. Then the blue was sifted on using a stencil made from a styrene blank.

Some important lessons:

Don’t forget to drill a hole(s) in your metal before you lay down your enamel. Once the enamel is fired, you will not be able to drill that hole.

Learning how fast your colors fire takes time! You simply have to practice and watch.

Picture Resources

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- "Temple Pendant with Two Birds Flanking the Tree of Life [Kievan Rus'; Made in Kiev, found in 1842 in or near the Desiatynna (Dormition) Church, Kiev] (17.190.679)". In *Heilbrunn Timeline of Art History*. New York: The Metropolitan Museum of Art, 2000 ndash;.
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