Artemisian Cruet

14th Century, England

Materials Used

Soapstone
Lead-free Pewter
Stay-Clean Flux
Stay-Brite Solder
Copper wire

Tools Used

Wood carving tools
Jeweler's tools
Modeling clay
Wooden dowel
Propane/Oxygen "Smith Little Torch"
Electric Hot-Pot
Belt sander with grinding wheel
Vibrating polisher with walnut shell media

Introduction

In May 2012, I won the Artemisian Kingdom Arts & Sciences Competition. It is the duty of each champion to create an item of regalia for the Kingdom. Since I have heard much annoyance about the size, weight and fragility of the pitcher used for peerage ceremonies and I was intrigued to see if I could recreate a six-sided pewter cruet from a dig in Weoley Castle, England. (Figure 1)

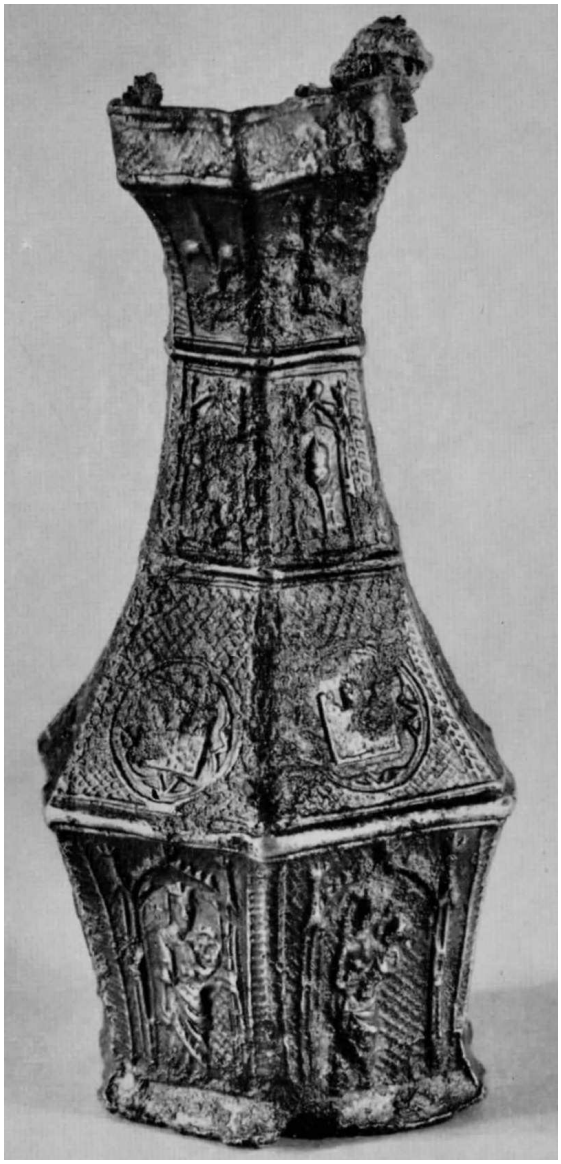

Figure 1 – Weoley Castle Cruet Image (Oswald, 73)

Summary

This cruet is based on one found at Weoley Castle, near Birmingham, Englad. It is dated to 1300-1350 and believed to be manufactured in the West Midlands of England. It is made of 99.9% tin, .04% lead and consists of 12 separate panels, soldered together. There is a rivit on the top for a lid. It is a communion cruet and was covered with heraldry and Biblical scenes similar to designs found in badges and stained glass windows of the time.

My cruet, roughly twice the size of the original cruet because I planned for it to be used to hold slightly more than a mouthful of sacrimental wine, is made from lead-free pewter of mainly tin. I based my designs off of pewter badges, stained glass windows and illuminations of the time/region. I used many soapstone moulds, carved with woodworking tools to create the panels, which I soldered together with a very fine propane/oxygen torch.

Cruet History and Characteristics

The cruet in Figure 1 was found in a dig of Weoley Castle (near Birmingham, England) by Adrian Oswald from a deposit dated around 1380. Experts have put its manufacture between 1300 and 1350 based on design style and specific images on the cruet. (Mould, 22) This cruet measures 4 5/8 in. in height by 2 in. in width at base (Oswald, 70) and had an attachment for a lid (Figure B.6)

Oswald originally thought that the cruet was manufactured in Spain, because he believed the cruet to have been poured in a two-part mould. More recent examination shows that the panels were poured individually and soldiered together. (Mould, 22) That, plus the style of carvings, suggests manufacture in the West Midlands of England. (Oswald, 71) A nearly identical cruet was also found at a dig in nearby Ludlow Castle (Figure B.7), though it was not in nearly such good shape.

Cruet Use

Oswald believed that this was a communion cruet. It is similar in size and shape to other known cruets from this time period and shows a number of Biblical scenes. While it is made of nearly pure tin, rather than more precious metals, Oswald noted that a Council at Winchester in 1076 permitted the use of pewter for chalices where gold and silver was too costly. (Oswald, 70)

Decoration Characteristics

This cruet has six sides, displaying various different emblems that could be heraldic in nature or Biblical. The bottom register has six different Biblical images: the Crucifixion, a bishop, possible St. James or perhaps St. Thomas A Becket, the Virgin and Child (Figure 2), St. Catherine, perhaps St. Margaret or St. Winifred and, finally, St. Peter. On the base is the Lamb of God with the inscription *Agnus Dei qui tollit peccat*. (Oswald, 71)

The designs found on the cruet were compared both to pilgrim badges and stained glass window designs of the era and region. More images of the cruet can be found in Appendix B

Figure 2 – Weoley Cruet Saint Image (Oswald, 74)

Materials

The composition of pewter in this time period varied quite a bit on area and application. Items are found with very high lead content, referred to as ‘lay metal’. ‘Fine metal’ referred to a tin/copper alloy that England was famed for and exported heavily. The Weoley Castle cruet is 99.9% tin and .04% lead. (Homer, 68)

Materials used for casting moulds included wood, baked clay, cuttlefish bone and stone (Figure A.3). While many types of stone were used, a close-grained stone like soapstone, or steatite, worked very well. (Spencer, 9) Soapstone quarry locations in Europe included Norway, Germany, Italy and Greece.

Manufacture

This cruet, originally believed to have been cast in a two-part mould, was examined more recently and found to be made of twelve panels soldered together. My sources don't say where the vertical split is in the panels, but it makes sense that the bottom registers would have been cast separately from the top 3 registers because there are so many variations. The panels would have been cast in flat stone molds, like in Figure A.3, and then easily bent into the desired shape.

The soldering process used soldering irons, as found in a pewterers inventory in 1427 (Homer, 71) a slightly lower temperature alloy for solder and borax, wine lees or natron as flux. For carving the stone moulds, as soapstone is such a soft stone, nearly anything will work. In the 12th-15th centuries, badge carving was done by a number of professions (eventually settling into a profession unto itself). As seal engravers and goldsmiths were among those pressed into this task (Spencer, 7) it stands to reason that jeweler's tools, in addition to basic knives and picks, would have been used.

My Materials and Tools

Pewter Alloy

Most pewter alloys in the Middle Ages used did contain some lead, though the 'Fine Metal' used by the London Pewterers Guild did not contain any significant lead. I do not care to use lead in my pewter for all the obvious brain liquefying reasons. The pewter that I am using closely matches that used for a bell in Canterbury; 98% tin, .50% copper and 1.5% antimony and it has a melting point of about 475ºF.

Soapstone Moulds

I use Brazilian soapstone for my moulds as it is very easy to carve, holds intricate detail and will last through hundreds of castings. I don't have access to any European soapstone but this soapstone has the same qualities. Appendix A has more information on casting in 2 and 3 piece moulds.

Carving Tools

I hand carved the mould using woodworking and stone carving tools as well as a selection of small jeweler's bits that I used with my hand drill. I added details of the piece with fine picks and a tiny knife and used modeling clay to help see what was being carved. The details are very small, so it helped to take off my glasses and use my near-sightedness for all it is worth.

Casting Tools

In medieval times, the casting would be done from a crucible heated up in a forge of some sort. For safety and cleanliness, I used an electric hot-pot for this process.

Soldering Tools

To assemble this box, I used a soldering technique. Soldering fills the seams between pieces with similar (usually lower melting temperature) material. I used a propane/oxygen torch with a very fine flame for both of these processes. In the middle ages, they used a soldering iron for this process, but I don't have an electronic iron that is hot enough (or a forge and apprentice to beat to keep a medieval one hot!) I used a commercial solder and flux for this process.

The Design, Moulds and Final Product

For more information about the mould preparation, registration, carving and pouring, see Appendix A.

Cruet Mould Designs

This project required 5 separate registered 2-piece moulds. When I conceived of this project, I determined that the bulk of each mould could be carved into one side of the 2-piece mould, leaving only the outer decoration on the other side. This will make the ability to change the decoration on this vessel very simple. For instance, there are 6 separate decorations for the bottom register.

The Weoley cruet was 4 5/8" tall. I wanted my cruet to be a bit more useful than such a small vessel, so it is roughly twice as tall. I tried to keep the rest of the proportions similar. You can see in Figure 1 that the Weoley cruet seems to have several curved lines in its silhouette. Curved lines are tricky to get right so I made all but the top two registers straight edged, as seen in Figure 3

I based my designs off of pewter badges, stained glass windows and illuminations of the time/region. Documentation for the specific designs that I choose for each of the registers can be seen in Appendix C.

For the top two registers, I wanted something very generically medieval and settled on floral designs. (Figures C.1, C.2) The 3rd register contains the arms of Artemisia in a frame similar to many pilgrim badges (C.3). The base of the cruet has a tree (C.4) and otter, for my heraldry, and a sheep… which I'm sure is for the Weoley cruet's "lamb of God" and has nothing to do with that one time at Uprising.

The bottom register has six different designs, all within the same (g-d forsaken) gothic frame (C.6). I wanted to show male and female representations of knight, laurel and pelican.

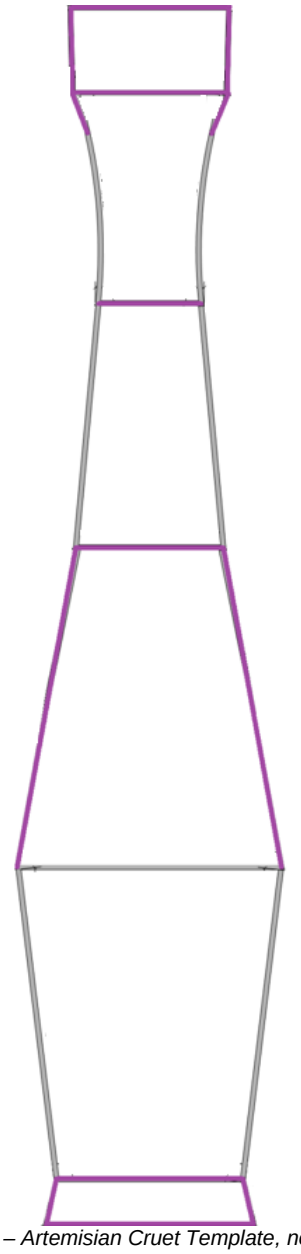

Figure 3 – Artemisian Cruet Template, not to size

Male Knight:	A knight on horseback (C.7), Duke Alan Youngforest.
Female Knight:	Difficult to show, but I tried to capture Sir Leah de Spencer (C.8).
Male Pelican:	After many fine cooks (C.11), such as Master Wendell the Badger.
Female Pelican:	We have quite a few giving ladies as officers, like Mistress Juliana (C.9, C.10, C.11)
Male Laurel:	Braden asked nicely if this might be a musician. ☺ (C.12)
Female Laurel:	Bronwyn the Embroiderer, who is to be the first peer washed with this cruet. (C.13)

Challenges

Other than chiropractic visits after my shoulder seized up from constant carving, I found an interesting challenge with trapped air. Before doing any carvings, I did a simple proof-of-concept piece with blank sides. After this was all carved, poured, sanded and soldered, I triumphantly poured water in it to marvel at its function… AND FOUND WATER LEAKING FROM THE MIDDLE OF "SOLID" PANELS!?!?! This was from air bubbles having no escape vector and creating patches of porous metal. I fixed this on my plain cruet by soldering over the leaky areas, but this wasn't a good long-term solution.

Figure 4 – Gertrude of Nivelles Slate Mould showing Air Vent Holes. 15th Century – Brussels (Koldeweij, 146)

Air venting is often a trick with complex or large moulds as the interior of the mould will not allow air to escape once the outer edge is poured. For added air venting, I drilled several very small holes from the interior of the through the bottom of the mould through to the outside and then stuffed it with straw to keep any stray pewter inside the mould. This type of process can be seen as pockmarks on many extant badges and can be seen from the holes in the interior of the mold in Figure 4. Using straw to keep the metal in isn't documented but they would have had to use something, they had straw, and it works wonderfully! Fortunately, all of the air vents went in on the inside surface of the panels, so the pockmarks aren't significantly visible in the end product.

Process

After creating the moulds, I poured using my electric hot pot. A liberal use of baby powder on the mould before each pour took care many air bubbles and patchy spots. I used files and my grinder to clean up the pieces as well as to make the angles on the side pieces as close to 30° as possible so that the cruet seams would line up. I then polished the pieces in a walnut shell media.

To assemble the cruet, I first used soldering to tack together the tops and bottoms of the top two registers and then soldered the insides (a very tight fit!) so that the striped corners would match up nicely. I ensured that the 3rd set of registers lined up well with the top and tacked/soldered the inside edges. To join these two hexagons, I lined them up and very lightly tacked the outside seams. I then worked inside to solder a very sturdy seam. (It is difficult to solder a sturdy seam on outside corners and I didn't want any more leaking!) I then took a very small flame and smoothed the raised edges on the outside of the seam together so that it looked like a continual seam. I repeated this process for the bottom most registers and then soldered on the bottom insert. I had trouble with the mold getting too hot from constant soldering and had to dunk the mold often to keep it from melting where I didn't want it to.

Final Summary

I hope that this cruet has many long years of use in our Kingdom. I put all of my love into it and honestly am having a hard time letting it go. It is exactly what I wanted it to be! It even holds water!

I feel like I did a good job combining elements from a number of different sources in this time/region, from badges to stained glass to illuminations.

The materials that I used and the end result very closely mirror what was used in the 14th century. The methods and tools that I used, though often powered (hot pot, grinder) were good equivalents for all of the processes in use in this period.

I had no idea when I started this just how large a project that it was going to be! For the record, this entire project, including my drive to have it done by Bronwyn's laurel ceremony, is entirely Braden's fault.

Thanks to Mistress Juliana for helping me with my research! You are a wonderful friend!!

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Appendix A – Casting in Soapstone

To create pieces with designs/elements on multiple sides, the blocks of soapstone must first be registered together, so that they fit together the same way each time. Figures A.1 and A.2 show examples of mould registration. A two part mould can be used for flat items with details on one or two sides. A three part mould is used for items that have details on several sides or would be tricky to pour based on open work.

The shape needed must be carved into the soapstone and then any designs are carved into the stone. The picture must be carved in reverse, both left to right as well as depth-wise.

Once the shape and design are carved, a sprue (or funnel) is added to channel the molten pewter into the mould and add weight to press the metal into the design.

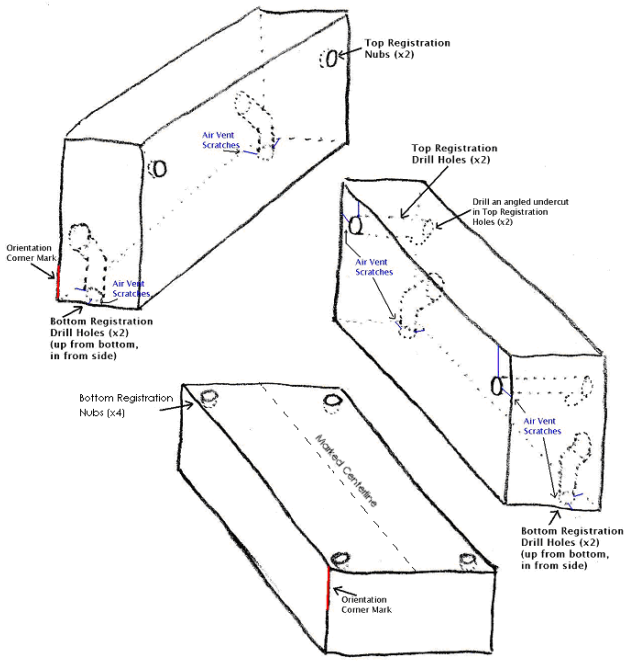

Figure A.1 - Diagram of Three-Part Mould Registration (Wolf, 3)

The pewter is melted and poured into the sprue. Once the metal is cooled, the piece is removed and the sprue clipped off and remelted.

The piece can be finished using files or a grinder as needed.

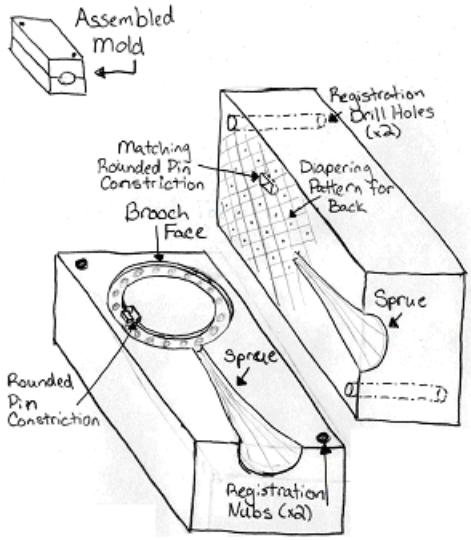

Figure A.2 - Diagram of Two-Part Mould Registration (Wolf, 3)

Figure A.3 – 15th century soapstone mould (Koldeweij, 147)

Appendix B – Communion Cruet

Figure B.1 – Weoley Cruet Image (Oswald, 73)

Figure B.2 – Weoley Cruet Image (De Boo, Communion Cruet)

Figure B.3 – Weoley Cruet Image (De Boo, Communion Cruet)

Figure B.4 – Weoley Cruet Image (De Boo, Images)

Figure B.5 – Weoley Cruet Bottom Image (De Boo, Images)

Figure B.6 - Weoley Cruet Top Image (De Boo, Images)

Figure B.7 – Ludlow Cruet Image (Oswald, 75)

Figure B.8 – Weoley Cruet Saint Image (Oswald, 74)

Appendix C – Design documentation

Figure C.1 – Mulberry tree with fruit
Lead-tim, 1366-1468
(Kunera, 03583)

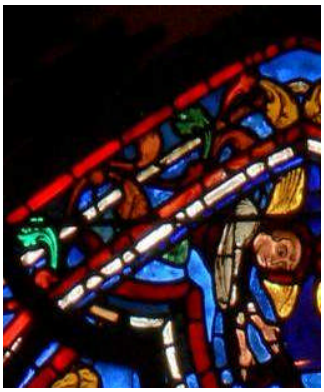

Figure C.2– Border on St. John window
Chartres Cathedral
Stained glass, Early 13th century
(therosewindow, Chartres w.48-4)

Figure C.3 – Mary standing with child in round frame surmounted by open-work towers
Lead-tin, 1450-1499
(Kunera, 00465)

Figure C.4 – Tree with pear shaped fruit
1400-1499
(Kunera, 02451)

Figure C.5 – Round Pin with flower within star
Lead-tin, 1350-1399
(Kunera, 07179)

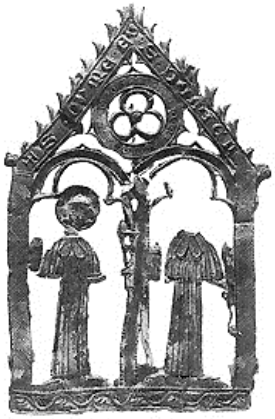

Figure C.6 – Cosmas and Damian as physicians. Lead-tin, 1400-1409
(Kunera, 01201)

Figure C.7 – St. George and the Dragon
Lead-tin, 1300-1350
(Kunera, 06277)

Figure C.8 – Knight in armor
Lead-tin, 1350-1399
(Kunera, 05661)

Figure C.9 – Crowned woman
Lead-tin, 1390-1410
(Kunera, 03374)

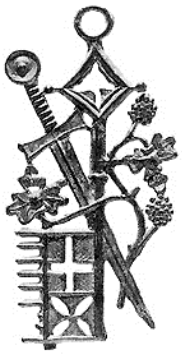

Figure C.10 – Key and Sword
Lead-tin, 1400-1499
(Kunera, 01344)

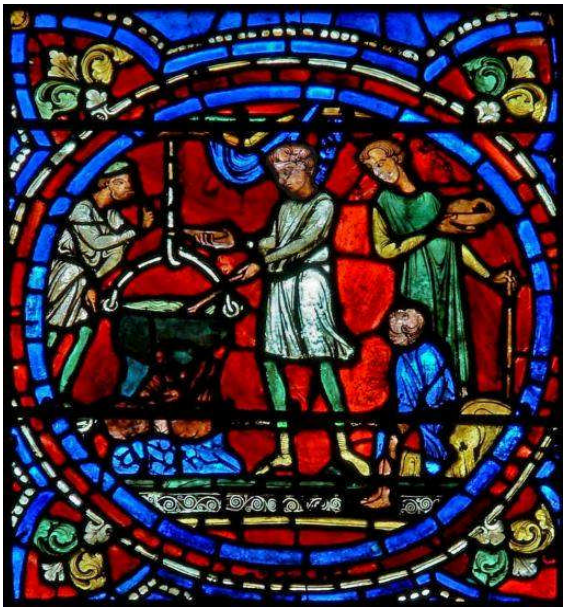

Figure C.11 – The Prodigal Son
Chartres Cathedral
Stained glass, Early 13th century
(therosewindow, Chartres w.35-58)

Figure C.12 – Pelican in her Piety
Lead-tin, 1325-1374
(Kunera, 06655)

Figure C.13 – Medieval Musician
(Bell)