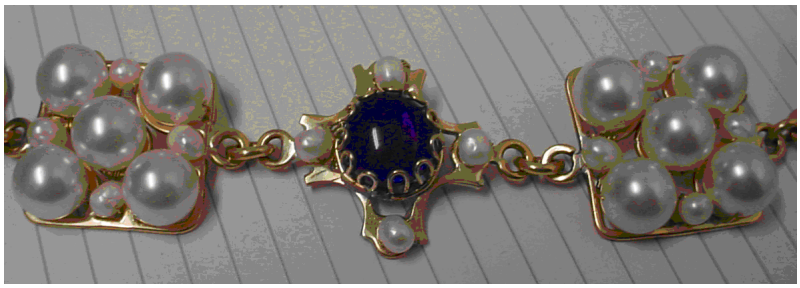
Jewelry Soldering Simplified

HL HRothgar Thorsson



This article provides an introduction to basic equipment and simplified techniques needed to work non-precious metals, using them to create beautiful pieces of jewelry for your SCA persona. In this presentation, I explain how to make the jeweled piece shown in the center of the photo above. This particular design is intended to have the look of jewelries that appeared in the time of Queen Elizabeth I of England in the late sixteenth century.

Pieces you create using these techniques can be worn by themselves like pendants or clasps, or can be chained together to make elaborate collars and belts. Many types of jeweled and pearled motifs can be constructed using these methods for a wide variety of personae and time periods.

Tools used in this project

Tools needed (*shown above*) are:
Wire Cutters
Anvil
Small ball-peen hammer
needle-nosed pliers
propane torch
metal file
1/2 inch drill bit

Other tools needed (*but not shown*) are:
vice-grips
5/16" drill bit
A bench grinder with a buffing wheel was used for polishing, though other ways of polishing the work are available.

Materials used:

Jeweler's Bronze Wire, 14 ga. round and square, 20 gauge round, and 26 gauge round.
"Easy-flo" Silver Solder
White brazing flux

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Blue glass cabochons
Other metals can be used, like Yellow Brass, Nickel Silver, or Red Brass.

Soldering

When metal is heated it expands, causing microscopic spaces to open up within the metal. The solder, or filler metal, has a lower melting point than the metal being soldered, and it flows into the spaces and is bonded there as the metal being soldered cools and contracts. (McCreight, 1982)

Here are important things to keep in mind when soldering:

1. The pieces of metal to be joined should fit as closely together as possible with as little of a gap between as possible. Since solder flows between close fitting pieces of metal through capillary action, soldering can be difficult if care is not taken to ensure a close fit between the pieces of metal you are trying to solder together. A tight fit will result in a cleaner and tighter solder joint. Silver solder sometimes "jump" across a narrow gap between the two pieces, but more often it will only run on one side of the joint.

2. Before the metal is able to be soldered, it must be clean. Avoid leaving things like pencil marks, finger prints, or stray pieces of tape on the metal. Any oxidation must be removed as well.

3. Soldering needs an chemical agent to help it flow, called *flux*. This prevents the air around the solder joint from reacting with the metal while the it is being heated. The metal is kept clean enough for the solder to flow and bond smoothly and effectively with the metal. For this project, I use a product called White Brazing Flux. It is available in the welding sections of most hardware stores.

4. All pieces that are being soldered should be brought up to the temperature for soldering at the same time. Do this by heating areas around the location of the soldering. Avoid directing the flame at the solder and not over the rest of the metal. If you do, only that location will get hot, and heat will be quickly drawn away from there outward to the rest of the metal, which is still cold. Soon, the temperature where you are directing the torch will spike, and can get hot enough to scorch and blacken the metal around that spot. By heating all the metal at the same time to just below the point where the solder will melt, it takes only a little more heating with the flame at the solder joint to bring that area up to soldering temperature. This will allow the solder to melt evenly and flow smoothly, resulting in a stronger and more attractive solder joint.

5. When applying the solder to the metal use just enough to fill the joint. It is much easier to use the right amount the first time than to remove any unwanted solder later.

6. The solder will tend to flow towards the heat. If one side of the joint is hotter than the other, the solder might jump to one side of the joint.

In modern silver soldering, five different solders are available, each with a slightly different melting point. A silversmith can start at one point in a project, perhaps the gem-setting for a ring, using the highest melting point of solder. He or she would then use a solder with a lower melting point to mount the already-soldered setting to the shank of the ring. Any further work or embellishment to the ring would be done with alloys of even lower melting points. The highest melting point alloy of silver solder is called "IT", and melts at 1490 degrees Fahrenheit, followed by "Hard" (1425 degrees), "Medium" (1390 degrees), "Easy" (1325), and "Easy-flo" (1270 degrees).

For simplicity, I use only one melting point of solder in this project. As a general rule, the lower the melting point of the solder you use in the project, the quicker the solder will flow, and the easier the cleanup will be later. While you can order silver solder through jewelry supply companies, an easier avenue exists. Most welding supply outfits carry an alloy similar to Easy-flo; often it is simply called "Silver Solder". It is chemically similar to Easy-flo and melts at about 1300 degrees. It polishes to a beautiful white silver shine, and is available at a reasonable price without having to resort to mail ordering.

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Step 1.

We start by making the pieces that we will be soldering together in Step 2. We will need six rings made of round wire and four "arcs" of square wire.

Step 2. Turn the 14 gauge square wire on the drill bit, using the bit as a mandrel. Take extra care to ensure that the wire is flat against the bit, and does not become twisted.

Step 3. Cut the spring of square wire into half inch pieces. File the ends of the pieces flat

Step 4. Make a spring of 14 gauge round wire using the 5/16" drill bit. Cut the spring into individual rings.

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Step 5. Lay the parts as they will appear in the finished jewelry. For this project, the work surface is a common piece of brick. Care should be taken in placing the parts. Brush the flux onto the metal at this point.

Step 6. The work should be heated gently at first. Always play the flame over the entire piece. When soldering copper alloys like brass and nickel silver, the entire piece must be at soldering temperature before the solder will begin to flow. The metal is heated just short of red hot, approximately 1400 degrees Fahrenheit, then the solder is quickly and carefully touched to wherever the metal pieces meet.

Step 7. Here is the piece immediately after soldering. Flux has formed a white buildup after it was heated to high temperatures. It also has formed a hard glassy surface. The now-solid metal piece is soaked in a water and vinegar solution for twenty minutes to break up the flux and to remove surface surface oxidation and discoloring. Remove the piece from the solution when the soaking is completed, and rinse it in clean tap water.

Step 8. Forging by hammering evenly on the anvil gives an attractive look to the piece. If there are any imperfections on the face of either the hammer or the anvil, lightly smooth them with a sheet of fine grit sandpaper. Otherwise, these imperfections will show up on the jewelry.

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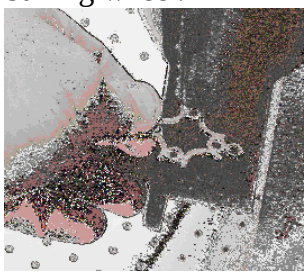
Step 9. Here, I'm shown polishing the piece using the bench grinder and buffing wheel infused with jeweler's rouge polishing compound. A polishing cloth works too, though not as quickly. If nothing else is available, steel wool will bring out a nice shine in the metal, though not the mirror-like finish that can be achieved with the buffing wheel.



The jewel setting in the next section is assembled and mounted on the piece finished in Step 9 using a set of soldering techniques known collectively as **The HRothgarlingian School of Jewelry**. This body of techniques covers an area of soldering called *soft solders*. These soldering techniques will be covered in greater detail in a future article. The following is a brief introduction to this form of soldering.

Mounting the Jewel Setting

Step 10. The jewel setting is formed using the 20 gauge wire as shown using the pliers, forming a "ruff" (upper left). A piece of 16 gauge wire is soft-soldered onto the base of the ruff to form the jewel setting (below). The prongs are rounded using the pliers, formed in to the setting around the cabochon, and soldered closed (upper right).

Step 11. Flux is applied to the underside of the setting and the top surface of the polished base piece of metal. The setting is then "sweat soldered" onto the base piece with a few passes of the torch. No additional solder needs to be applied, as the solder in the setting is in contact with the base piece and will bond to it when it reaches its melting point, which is around 430 degrees Fahrenheit. After cleaning the flux residue, the entire piece is polished again.

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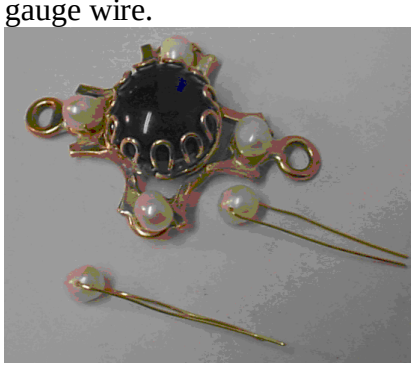
Step 12. In the final step of this project, 6 mm freshwater pearls are wired into the base of the piece using 26 gauge wire.



Conclusion

Using these techniques and others, I have personally created jeweled belts, collars of state, cloak clasps and brooches, and many more beautiful works of jewelry. With practice and imagination, the possibilities for making gorgeous and *GASP* *matching* jewelry are without limit!

Bibliography:

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McGrath, Jinks; *The Encyclopedia of Jewelry-Making Techniques*; Philadelphia, Running Press Book Publishers 1995; ISBN: 1-56138-526-3

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