

The image features a collection of jewelry made from torch-fired enamel. On the left, a necklace with a metal chain hangs several pendants. These include a large, multi-lobed pendant with a yellow-to-pink gradient, a smaller one with a red-to-yellow gradient, and a small bell-shaped pendant at the bottom. To the right, a ring with a similar multi-lobed design in red and yellow is shown. The background is a warm, textured surface in shades of red and orange.

torch-fired enamel jewelry

*a workshop in
painting with fire*

BARBARA LEWIS



Torch-Fired Enamel Jewelry

*a workshop in
painting with fire*

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NORTH LIGHT BOOKS
Cincinnati, Ohio

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METRIC CONVERSION CHART		
TO CONVERT	TO	MULTIPLY BY
inches	centimeters	2.54
centimeters	inches	0.4
feet	centimeters	30.5
centimeters	feet	0.03
yards	meters	0.9
meters	yards	1.1



DEDICATION: *I dedicate this book to Jim, Laura and David, who have been my loudest cheerleaders. My love to you always.*

ACKNOWLEDGMENTS: *I would like to thank my family, immediate, extended, and acquired, for your generous spirit of encouragement. Your positive impact cannot be overestimated.*

Special thanks goes to . . .

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Introduction

Do you love the look of enamel pieces in jewelry but you've been discouraged from making them because of the tedious and labor-intensive process? Maybe you're turned off by the investment in a kiln and the associated tripods and other supports. Or perhaps you are daunted by the fussiness of cleaning copper and washing and sifting enamels.

What if I told you that torch-fired enameling can solve all of these problems? That, for an investment of about \$100, you could get all the necessary equipment for a start-up enamel studio, including a torch, several enamel colors, beads and bits of copper? That you didn't have to wash or sift enamels or scrub metal? Better yet, that, as a beginner, you could enamel sixty beads in an afternoon?

Well, that is what I'm telling you! No kidding!

Even beyond the initial excitement over its affordability and spontaneous approach, torch-fired enamel offers much creative potential. You can manipulate pieces in the open flame to produce enamel flows or burnt edges. You can coax pink and golden flashes to the surface of a piece by manipulating the balance of oxygen and fuel. Want a smoky haze over there, right next to that hole you punched? Go for it! Torch-fired enameling gives you creative control.

From the minute you place a bead or pendant on your mandrel, you are making design decisions. You are intimately involved with your work. Your pieces never leave your sight to go into a kiln. Your approach is fluid, and your design decisions can be either spontaneous or planned.

What happens if you don't like the end result? Just re-fire it! Yes, you can do that, too! There are very few times in life when you get a do-over, but you've just found one of them!

Did I mention that it's also fun? It's the kind of fun that encourages play in the studio—the play of exploration! It was during a play session in the studio that I developed a heat rivet for delicate enamel. No hammering on glass required. Maybe you're interested in making bezels without solder, or making unique, etched beads from copper pipe. It's all here, between the front and back covers of this book!

My first goal is to get you comfortable with the open flame of a torch. We'll explore the types of enamels, their colors, and ways to modulate color. We'll discuss suitable metals that work with enamel. We will then combine this knowledge with some simple metalworking skills to create masterpieces. Using the projects in this book, you will develop a personal repertoire of design techniques that are not only successful, but will also appeal to your unique aesthetic.

The Japanese have an expression, *shibui*, which means “happy accident.” I have had many happy accidents in the studio, like the time I was at the potter's wheel and trimmed through the bottom of a ceramic platter only to create a mirror frame. I knew an old-time carpenter who expressed the concept of *shibui* in another way. He would say it was “when an accident works in your favor.”

For me, *shibui* is when something is perfectly imperfect. It is the triumph of personality over perfection. It is when the pressure is off and we allow ourselves to play without qualification or judgment. It is when things click, when they feel right, and when we have the most intimate connection to our work. Can you recapture the days when play was your work, the work of the innocent? This is my invitation to you.

Forty years ago, Joseph Spencer of Safety Harbor, Florida, grew tired of the tedious and time-consuming methods of kiln-firing enamel. Through trial and error, he created a unique firing process using a simple, affordable torch. Current conventional methods of torch-firing call for sifting the enamel on metal. The metal is stationary and you move the torch by hand. Flip this process upside down and you get Joe's method. The torch is stationary and you move the metal. A bonus is that there are much fewer airborne enamel particles.

Add this technique to my ceramics education and nearly twenty years of experience with firing gas kilns, and you get the Painting with Fire method, which encourages artistic interaction between the enamelist, the work and the flame. In a nutshell, this technique involves placing a metal bead on a stainless steel mandrel, heating the bead until it glows bright orange, and dipping the bead into enamel. Perform this process two or three times and you have created a little masterpiece!

All of the projects in this book are fired with an inexpensive torch. It is not necessary to have anything more. However, if you're a lampworker and have a torch that mixes oxygen with propane, methane or natural gas, you're all set. You can incorporate this technique into your glass beadmaking workflow with nary a hiccup.

METAL: The Object of My Attraction

The definition of enamel is glass on metal, but what kind of metal are we using? Copper, silver and gold are traditional metals for enameling, but you need not limit yourself to these metals. By trial and error, I found that the metal beads I had in my studio not only withstood the heat of the torch, but provided a

successful base onto which the enamel could fuse. I remembered that these beads were made from iron. With magnet in hand, I began to scan the depths of bead racks at craft stores, bead shops and flea markets for suitable beads.

Keep in mind that just because a bead is attracted to a magnet doesn't necessarily mean that it will enamel beautifully. Experiment with one before you buy five hundred. If a metal bead withstands the heat



What is Depletion Gilding?

Depletion gilding involves heating sterling silver to a dull cherry red so the copper oxides come to the surface and darken the sterling. Next, the sterling is placed in pickle, a mild acid, to remove the oxidation. This process is repeated about ten times, or until the sterling no longer darkens with copper oxides when heated. The copper has been depleted from the metal, and you are finally ready to enamel it. Gosh, that sounds like a lot of work!

without melting, enamel it. Wear the bead around and watch for chipping. Of course, if you want a sure thing, buy silver, copper or gold. Iron is a lot less expensive, though, and I like to be a little less traditional!

Brass is not a recommended metal, which is really a shame because there is such neat stuff in brass. It is the zinc in brass that is the troublemaker; enamel will not adhere to brass because of the zinc. The zinc content in a metal needs to be less than five percent in order for the enamel to adhere. Since brass is an alloy, we can't guarantee the metal composition.

While we're talking about caveats, also avoid copper beads that use high-zinc solder at the nearly invisible seams. You may want to ask your bead merchant about how the bead was constructed before buying it.

Sterling silver is a precious metal that shimmers beautifully under transparent enamel. Add a hammered texture to the sterling, and the light reflecting off the facets makes the piece even more brilliant. Enamelists working in the tradition of cloisonné will tell you that you must depletion-gild the sterling before it is enameled (see left). When you spend countless hours on a piece and you're working with pinks and purples, which can be persnickety, you want your colors to be as true as possible. So, by all means, do what you feel is necessary.

However, I have successfully enameled sterling silver with blue and green transparent enamels with wonderful results. No depletion gilding for me. I'm too impatient! *Aqua Ice* (see page 89) is an example of Nile Green transparent enamel over sterling silver.

In sheet or metal clay form, fine silver and enamel is a marriage made in heaven! Remember to use transparent enamel on silver . . . you don't want to cover its beauty with a blanket of opaque enamel.



ENAMEL: Decisions, Decisions, Decisions

We'll be working with Thompson 80 mesh, medium temperature/medium expansion enamels that look like colored sugar. Medium temperature/medium expansion enamels are designed to "fit" on copper, silver and gold and to fuse to those metals at temperatures between 1,400 and 1,500 F. Through experimentation, I have found that they fit like a glove on iron beads as well.

Shopping for enamels is like opening a crayon box. In addition to color, though, you'll be faced with decisions regarding transparent enamels or opaque enamels. A good starting point for your enamel inventory would be to purchase White or Nut (medium ivory), three colorful opaques, and one transparent.

Since the Painting with Fire method requires that the bead be immersed in the enamel, you will need 3 ounces of each enamel. However, smaller sample packets are good for adding highlights, which you can sprinkle on or roll the bead through. Take a look at *Cattywampus* (see page 51) to see what I mean. Heat-resistant containers, such as small tins, pottery bowls, and Pyrex custard cups are good choices for storing your enamels. You can also choose to recycle cat food, dog food or tuna fish tins and save your money for more enamel!

Transparent enamel goes on top of opaque because you can see through it. If you reverse the order, an opaque will cover the transparent completely and you'll never know it's there!

Modulating Color

Enamels do not mix like oil paints. In other words, if you mix blue and yellow enamel together, you won't get green. You'll get a blue and yellow speckled enamel, which will be beautiful, but it won't be green! However, you can use transparent enamels to help modulate color. For instance, if I put Lime Yellow transparent enamel over Mint Green opaque enamel (a blue-green), I get spearmint green.

Colors that are opposites on the color wheel are known as complementary colors. In painting, when mixed together, complementary colors create a

Coefficient of What?

"Coefficient of expansion" is a term that you'll hear frequently in the discussion of glass (ceramic glazes, lampworking glass, and enamel). The expansion of glass on heating and cooling must be appropriate to its application. For pottery, the application is pairing glazes with a claybody; for enamel, the application is pairing glass with metal.

dark brown or gray. Orient Red, a bright red opaque enamel, will become a deep, rich brick color when you fire a layer of Nile Green transparent on top of it. Transparent enamels over opaque enamels can produce beautiful color changes. In addition, transparent enamels will pool in the depressions of filigree beads or etched metals, accentuating the details.

Using the Flame to Your Advantage

Everything I know about flames and the atmosphere in a fiery environment, I learned when earning my fine arts degree in ceramics. After nearly twenty years of firing gas kilns, you learn a thing or two. However, don't let this part scare you; this is not a book about complicated interactions between atmosphere and oxides. Rather, it is a practical book of "do this and this will happen."

A neutral flame, which is the perfect balance of fuel and oxygen, is the most efficient flame and produces the greatest heat. However, you can create reduced, fuel-rich flames by closing the vent holes on your torch. The vent holes of the torch I use are located on the sides of the corrugated metal ring. To restrict oxygen, I simply turn the ring.

But why do we want to cut off the oxygen? Isn't oxygen good? Well, yes, but sometimes we want a little something special! Enamels with copper in their formulation will react to a reduced flame by flashing pale red and pink. Smoky hazes, particularly lovely on white enamel, are the result of incomplete combustion where carbon particles are deposited in the enamel.



Flame intensity can also be increased for controlled overfiring, causing copper oxides to bubble up through the surface and form green or red speckles, depending on the amount of oxygen in the flame. These are just two ways we can drastically affect the appearance of a piece by making a simple adjustment.

The enamels used in the projects are manufactured by Thompson Enamel. Not only does Thompson have a wide enamel selection, their enamels are widely available in the United States and abroad.

In fact, Thompson is the only enamel manufacturer in the Western Hemisphere. While there are other enamel manufacturers, they are very few.

If you have access to your mother's enamels from the 1970s or Aunt Hilda's enamels from the 1930s, feel free to use them. If you don't know the manufacturer of the enamel or its coefficient of expansion (see page 10), do not mix these enamels with those currently being manufactured.

The enamels used in each project are indicated in each project description. Assume the enamels used in the projects are opaque unless transparents are specifically called for.

In the Thompson line of enamels, there are five price grades of enamel, starting with Standard, which is the lowest priced enamel. A large percentage of the gorgeous enamels fall in this price category, including some of my favorites: Robin's Egg Blue, Nile Green (transparent), Lichen, White, and Pea Green. The price of a particular enamel is determined by its ingredients. For instance, many of the enamels in the color ranges of pink, purple, orange, red and yellow have gold in their formulation, which is reflected by their price.

The Enamelist's Workspace

The tools in the enamelist's workspace are essential to enameling everything from a bead to a pendant to a segment of copper pipe. When gathering tools for each project, assume that all of these tools are needed.

FUEL: CLEAN AND HOT! (1)

We will use a one-pound canister of MAPP gas as our fuel source. Any container labeled MAPP, MAP-Pro or Propylene can be used interchangeably for our purposes. However, there are a few you should stay away from. Butane is generally not hot enough. Propane and acetylene tend to lead to muddy colors. If you're a lampworker and have a torch that mixes oxygen with propane, natural gas or methane, you're ready to get started!

TORCH (2)

In my studio and at workshops, I use a nifty self-igniting torch. I used it to fire all the projects in this book.

WORK SURFACE (3)

You will need a nonflammable work surface. A large ceramic tile, a baking sheet or a cement board are all good choices. Use a clamp to secure the torch and your work surface to your table. If you are right-handed, set up the torch to the left side of your

workspace. Set up the torch on the right side if you're left-handed.

BEAD PULLING STATION (4)

The bead pulling station (BPS) is the workhorse of this operation. It keeps fingers away from hot beads. A bread pan filled with vermiculite or ceramic fiber acts as a nonflammable cushion for your hot beads. The bread pan sits in the interior space of the BPS. The BPS can be temporarily clamped or permanently affixed by screwing it to the table.



Attaching the Torch to the Work Surface



1 Screw the torch head into the gas canister. Slip a hose clamp over the canister. Wedge an angle bracket between the canister and the hose clamp.



2 Tighten the hose clamp with a flat-head screwdriver. The torch nozzle and the angle bracket should point in the same direction. Use a C-clamp or a quick-release clamp to secure the angle bracket to the work surface.

MANDRELS (NOT SHOWN)

A mandrel for enameling is a stainless steel rod that is available in assorted diameters. Because stainless steel does not conduct heat, the mandrel will stay cool in your hand. Stainless steel rods that are 36" (91.44cm) in length, known as TIG welding wire in the industry, can be purchased inexpensively from your local welding shop and make excellent mandrels. Just cut them with bolt cutters to manageable 9" (22.86cm) lengths. Over time, you will accumulate an assortment of mandrel sizes. Although the bead should move freely on the mandrel, try to find a mandrel that is as close to the size of the hole of the bead as possible. Mandrels may also be purchased at stores that sell lampworking supplies.

WATER JAR (5)

Quench your mandrel in water between beads to prevent burning your fingers.

CLAMPS (6)

Use C-clamps or quick-release clamps to attach the torch and BPS to the table.

Lighting the Torch

To ignite the torch, turn the knob on the back of the torch to the left. A soft whooshing sound means the gas is being released from the tank. Depressing the button on the back of the torch will create a spark and ignite the flame. If, upon pressing the button, the fuel does not ignite, try giving it a little more gas. However, have kitchen matches available. Simply hold the lit match beneath the tip of the torch and slowly raise it until the gas ignites. Be mindful that the force of the air and gas escaping from the torch nozzle can blow out the flame of the match. If this happens, simply turn the knob of the torch slightly to the right to reduce the flow.

A Note on Torch Safety

Do not leave the gas turned on without igniting it. MAPP gas is heavier than air, which means that it will not be circulated by air, but will hover near the torch. A spark could cause an explosion. Don't be alarmed—just don't leave the gas turned on unless you're firing enamel!

Tools of the Trade

Let's start our discussion of tools with the premise that we will buy the best we can afford and then take good care of them. I realize that you may just be venturing into metalworking and will need a bunch of tools quickly. I was that way, too. It was like when I bought my first house—you need so much all at once! However, if you find that you want to continue in this vein, think of your tools as an investment in your business or your hobby . . . or your sanity! Your motto should be, "The tools I use the most frequently are the ones in which I'll make the biggest investment."

DISC CUTTER

A disc cutter cuts perfectly circular discs from metal sheet in a variety of sizes. There are some tools where it pays to buy the best you can afford. This is one of them. Disc cutters come in all price ranges, from entry level (around \$30) to top-of-the-line models (about \$250). How often you'll use it will help determine how much you want to spend on it. Don't be shortsighted—plan for the future.

DEAD-BLOW HAMMER

This hammer delivers more power with minimal rebound or bounce-back. I often use the dead-blow hammer in conjunction with the disc cutter.

CHASING HAMMER

This hammer has a flat, slightly convex side and a ball-peen side. The flat, convex side is used for forging and hammering metal and wire. The convex shape prevents the edges of the hammer from marring the surface of your metal. The ball-peen side is great for texturing metal or riveting.

BENCH BLOCK

A bench block is a block of steel that provides a firm surface for hammering wire, metal and the forged beads we make for *Forging Ahead* (see page 84).

PIERCING HOLE PUNCH

This hole punch is great for creating larger holes in metal sheet. I use it in *Achilles' Shield* (see page 48) and *Going Tribal* (see page 105). Don't be frustrated when the punch becomes dull with use and the metal is



pushed out rather than punched out. This will leave raised edges around the holes—an added bonus!

WIRE CUTTERS

Wire cutters come in a variety of styles and are made to handle specific gauges. Super-flush wire cutters give you one flat end and one pinched end when you cut wire. They are handy for wire working because you can fit them into tight spaces to trim closely. The ones I have will cut up to 16-gauge wire. You may need other cutters for cutting thicker-gauge wire.

METAL SHEARS

Metal shears, also called tin snips, are for cutting metal sheet. Most of the projects are made from 24-gauge copper sheet, which is easily cut with tin snips. When I want to cut 18-gauge sheet for bracelet blanks, I take the metal to a machine shop where it can be easily and quickly cut into nice even strips with a bench shear.

METAL FILE

A metal file cuts on the push movement. Don't saw back and forth or you will dull the file. I use an assortment of needle files for close work and a set of files from the hardware store that have an interchange-



Drill Bits Demystified

When I started working with metal, I commonly purchased drill bits in a size such as no. 65 to accommodate 20-gauge wire and no. 60 to accommodate 18-gauge wire. The size of the drill bit becomes more crucial when you're creating a heat rivet because the wire needs to fit tightly in the hole. When creating a jump-ring hole, you want more wiggle room. The hole should not bind the movement of the jump ring. No. 65 and 60 drill bits can be purchased from a jewelry supply company. You can usually find larger sizes than this at the hardware store.

Currently, I find that drill bits are being referred to by their measurements in millimeters or inches. Below is a handy guide for the drill bit sizes used for the projects in this book. Remember, enamel can sometimes narrow the size of the hole.

WIRE GAUGE	DRILL BIT SIZE	MM	INCHES
20	65	0.889	0.035
18	60	1.016	0.040
16	55	1.321	0.052
15	52	1.613	0.0635
Silver handle of two-hole metal punch— $\frac{1}{16}$ " (1.6mm)			
14	51	1.702	0.067
11	41	2.438	0.096
Black handle of two-hole metal punch— $\frac{3}{32}$ " (2.3mm)			

able handle when I want to remove more metal or refine a shape, such as when I want to round corners.

TWO-HOLE METAL PUNCH

This hole punch is portable and makes a clean hole. The end with the silver handle creates a hole size that is $\frac{1}{16}$ " (1.6mm), and the end with the black handle creates a hole that is $\frac{3}{32}$ " (2.3mm). Nearly every project in this book uses this punch.

CHAIN-NOSE PLIERS

These pliers do not have serrated jaws and will not mar your metal. Use them for bending, pulling, shaping, opening and closing jump rings, plus countless other tasks.

ROUND-NOSE PLIERS

Reach for round-nose pliers when shaping wire. They have rounded jaws that are great for making loops.

FLEXIBLE SHAFT

The flexible shaft is a tool for drilling holes, polishing metal and grinding metal. It is particularly useful because it is lightweight in your hand and gives you great mobility. It is necessary for creating small holes for heat rivets.

DIAMOND BEAD REAMER

Diamond bead reamers, which look very much like needle files, are diamond-coated files in a variety of shapes and sizes. They are used to clean rough spots from enameled objects, especially the holes in beads or jump-ring openings.

ALUNDUM STONES

Alundum stones in 150- and 220-grit are used to grind rough spots from the edges of an enamel piece while it is held under water.

DUST MASK

The very nature of the Painting with Fire process, in which the enamel immediately begins to fuse to the hot metal, prevents most of the enamel from becoming airborne. However, it is your option as to whether you want to wear a dust mask for general enameling. Note that there are a few projects in this book in which liquid enamel is sanded from the high points of etched metal. In these instances, please do wear a dust mask.

Torch-Firing Beads

When torch-firing a bead with enamel, we want to seek out the “sweet spot” of the flame. The sweet spot is the hottest part of the flame and lies just at the tip of the blue cone of the flame. The coolest part of the flame is the area closest to the torch nozzle. If you

move your bead inward toward the torch nozzle, you will hear a loud rumbling sound, which means your bead is in the coolest part of the flame. Move your bead out to the hottest part of the flame to obtain successful results.



1 Slide a metal bead onto a mandrel.




2 Quickly rotate the bead in the flame for even heating. Watch for the bead to glow bright orange. Even heating is the secret to an even application of enamel.



3 When the bead glows, quickly dredge the bead through the enamel. For the first dip, tilt the enamel container to meet the bead. After you have a layer of enamel on the bead, the bead will be temporarily stuck to the mandrel, which makes it easier to rotate and dip the bead. Totally immerse the entire bead in the enamel. Tap the mandrel on the side of the enamel container to remove any excess enamel. Reheat the bead.

How Much Enamel?

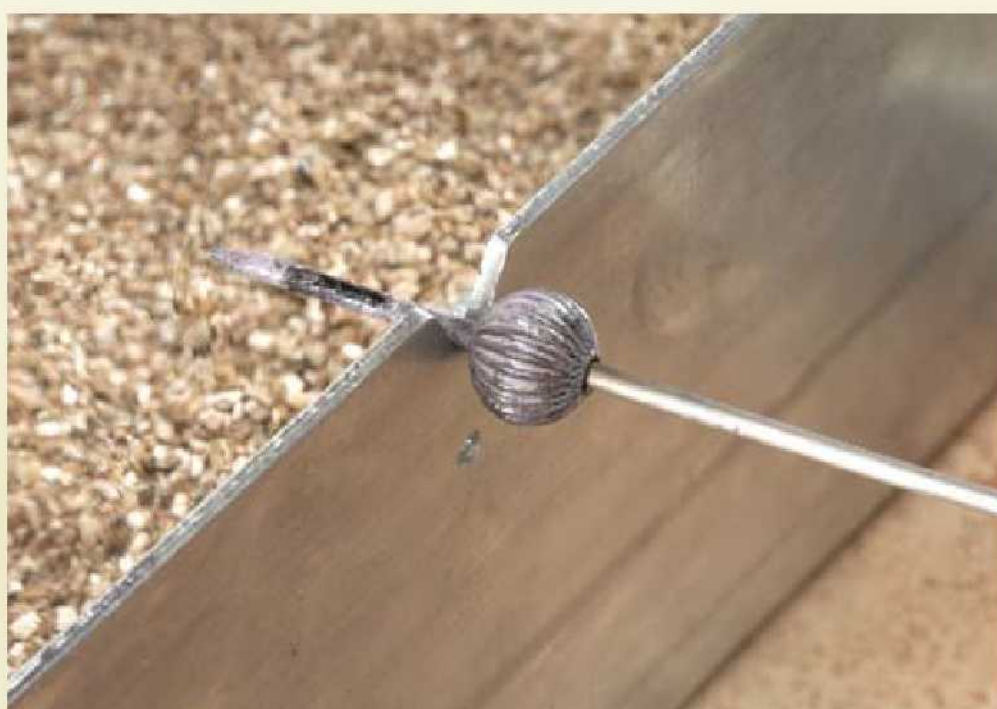
Three coats of enamel will adequately cover the metal and produce a rich color. When I use a transparent enamel, I fire two coats of opaque onto the metal and finish with one or two coats of transparent. Hot transparent enamel takes a few seconds longer to cool than opaque, so wait a bit longer before removing the bead from the mandrel.

 **TIP:** The part of the bead that enters the enamel first will have the heaviest application of enamel because it is the hottest part. As you rotate the bead in the enamel, the bead begins to cool. A cooler section of the bead will not pick up the enamel as readily as a hotter section. If you want a fairly even application, be quick!




4 Throughout the firing, try to keep the bead about $\frac{1}{4}$ " (6mm) from the end of the mandrel. This will prevent a buildup of enamel on the mandrel. Excess molten enamel on the mandrel will make the bead a little more difficult to remove.

To slide the bead back to the tip of the mandrel, place the mandrel in a notch of the BPS with the bead on the interior of the wall. Pull the mandrel toward you. The bead will slide down the mandrel toward the tip.



6 For beads with large holes, place the mandrel in the notch of the BPS with the bead on the outside of the wall—the side closest to you. Push your hand forward. Slide the bead 2"–3" (5.08cm–7.62cm) from the tip of the mandrel. This will break the enamel connections that have formed between the bead and the mandrel. Bring the bead back to the flame to sear off any glass threads that have formed at the end of the bead.

 **TIP:** For filigree beads with holes, simply remove the bead from the mandrel; no pushing or pulling movements are necessary.



5 Reheat the bead and dip it into the enamel. After three dips and firings, the bead is ready for removal.



7 Return the bead to the flame, spinning the mandrel to lightly heat it. Do not bring the bead to a glowing state. Bring the mandrel to the notch of the BPS again. Place the mandrel in a notch of the BPS with the bead on the interior of the wall. Pull the mandrel toward you. Pull the bead nearly off the mandrel. Allow the bead to cool a second or two. Continue to pull your hand toward you and the bead will fall onto the nonflammable cushion of vermiculite. There is no need to cover the bead with vermiculite. Allow at least ten minutes for the bead to cool before handling it.

Torch-Firing Pendants and Charms

The technique for firing pendants, charms and other flat pieces is similar to that of firing beads, with the exception that the flat piece of metal will dangle from the mandrel. Try to heat the shape evenly before dipping it into the enamel. However, this may not always be possible. In that case, heat the metal in sections. If heating in sections, give the piece a good overall heating before removal. For large pieces, two torches may be used. *Beady Bangle* (see page 30) demonstrates the use of two torches. If the enamel has cooled on a pendant and removing it from the mandrel is not possible, simply reheat the area around the hole of the pendant and try again.

If you have a large buildup of enamel at the tip of the mandrel, the excess may prevent you from removing the piece. There are two solutions. One is to allow the enamel to cool for several seconds, then use chain-nose pliers with teeth to crack the enamel off the mandrel. You can then continue the removal process, heating at the hole if necessary. A second solution would be to place the mandrel in the notch of the BPS with the piece on the outside of the wall. Push your hand forward until the piece reaches the midpoint of the mandrel. Grab the mandrel with pliers behind the piece, on the side with the excess enamel. Move the mandrel to a perpendicular position over the vermiculite and shake the piece off the mandrel.

A Few Words About Safety

When enameling, ventilation is very important. A ventilation hood over my workspace vents the gases outside, while keeping cold air out in the winter. Do research and check lampworking sites for ventilation ideas. There are plenty of resourceful people with ingenious ways to protect their lungs.

Torch-firing enamel does not produce the bright light of lampworking. If you want to wear welding glasses, make sure they are not so dark as to prevent you from seeing the flame. Polarized sunglasses are another solution.

When enameling, common sense is required. Being cautious, or even overly cautious, is never wrong. As you become more comfortable with an open flame, your movements around the flame will reflect your comfort level. Feel free to move your hands to the sides of the torch, under the torch, above the torch—just not in front of the torch!

Enameling Tips

- The key to an even application of enamel is to evenly heat the bead and quickly rotate it in the enamel.
- On an oxygen/propane torch, a reduced flame can be created by increasing the propane or reducing the oxygen.
- Before igniting the flame, make sure the vent holes are open.
- When creating a reducing flame while firing, make sure to use pliers to open and close the vent holes because the metal on the torch will be hot.
- Before removing the bead from the mandrel, make sure that it has cooled sufficiently so that the vermiculite will not stick to the hot enamel. If the bead is difficult to remove, reheat it slightly, focusing on the area where the bead comes in contact with the mandrel, and try again.
- Remember to dip the mandrel into water to cool it between beads.
- To prevent a buildup of enamel on the mandrel, heat the tip of the mandrel and dip it into a jar of water. Use a synthetic scrubbing pad to remove any loose enamel.
- For large beads, you may have to pull the bead several times at the BPS to remove it. Reheat the bead slightly in between pulls.
- Beginners often have a tendency to overheat the bead. Once the bead glows orange or red and the enamel looks glassy, stop heating it.
- When a bead is stuck on the mandrel, it can only be removed by heat.

Troubleshooting

PROBLEM	CAUSE(S)/SOLUTION(S)
The enamel chips off.	<ul style="list-style-type: none">• The metal was not heated sufficiently for the enamel to adhere (typically on the first coat).• The bead was dropped onto a cement floor.• The heating of a large object was uneven.• The metal is incompatible with the enamel.
The bead sticks to the mandrel.	<ul style="list-style-type: none">• Reheat the bead and try to remove it; try again if needed. Do not continue to pull on the mandrel or the mandrel will bend. <i>Heat is the answer!</i>
The enamel pulls from one end of the bead and has sharp edges.	<ul style="list-style-type: none">• Remember to push the bead away from the tip of the mandrel prior to removing it.• Sear the glass threads from the end of the bead.
The enamel applies unevenly.	<ul style="list-style-type: none">• Heat the bead evenly.• Dredge the bead through the enamel more quickly.
There are bubbles in the enamel.	<ul style="list-style-type: none">• The enamel has been overfired or underfired. You can tell which by evaluating the firing process. If the bead became smooth and shiny and you continued to fire it, it is overfired. Otherwise, assume that it is underfired.
The enamel is dry.	<ul style="list-style-type: none">• The enamel applications were too thin or the bead was not fired hot enough to pick up enough enamel.
The bead hole is filled with enamel.	<ul style="list-style-type: none">• The bead was not kept close enough to the tip of the mandrel during firing, and the enamel built up on the end of the mandrel. As the bead was pulled from the mandrel, the excess enamel filled the bead hole.

Torch-Firing Head Pins and Twisty Tendrils

Head pins and double-tipped head pins, which I call “twisty tendrils,” are persnickety little things. When I was first enameling them, I got so frustrated that pulling out my hair, wringing my hands and mutter-

ing under my breath all seemed like reasonable reactions. But I persisted until I perfected the technique, and now I can bring this information to you. Don’t skip any of these steps or it’s curtains!



1 Fill a small slow cooker with vermiculite. Turn it on high.



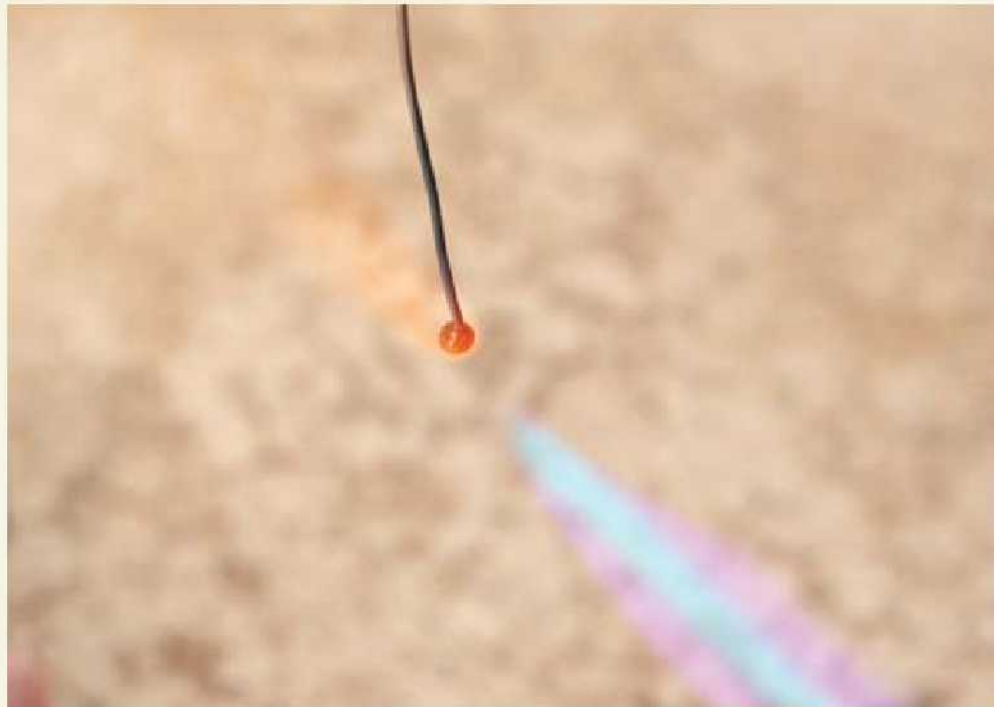
2 For a head pin, cut 2½”–3” (6.35cm–7.62cm) of 20- or 22-gauge wire.



3 Hold the wire with junk pliers or tweezers and dangle the end into the tip of the blue cone of the flame. Allow the metal to ball up; this is also referred to as “drawing a bead.”



4 Immediately dip the bead into medium fusing clear enamel, also called *flux*. (This flux is not to be confused with the flux used for hard and soft soldering.)



5 Bring the bead back into the flame again until it glows.



6 Dip the bead immediately into opaque colored enamel. Reheat the bead until it glows. Flame anneal the bead by moving the bead beyond the visible part of the flame, which is still very hot, for about 5 or 6 seconds. The glow on the bead will no longer be visible.



7 Place the head pin into the heated vermiculite to cool gradually.



For twisty tendrils, cut 5"–6" (12.7cm–15.24cm) of 22-gauge copper wire. Grab the wire at the midpoint and bend both ends down until you have created a U-shape. Follow Steps 3–7 to draw a bead and enamel each end of the wire.

TIPS:

- If you want a large head pin, make the metal bead large. Do not use the enamel to build up the size of the head pin. I do not recommend exceeding three layers of enamel on the head pin because it is more susceptible to cracking from thermal shock than a bead.
- Have a head pin and twisty tendril session where you make lots—you'll end up using them. After they are all in the vermiculite, turn off the slow cooker. Allow them to cool naturally before removing them. Do not force the cooling process.

Etching Copper Sheet

When you work with the etching solution ferric chloride, please use safe practices. Wear gloves and do not get the solution on your skin. Rinsing the solution from the metal after etching does not stop the etching action. Immerse the metal for 30 minutes in a 50/50 mixture of ammonia and water to neutralize the acid. Ferric chloride will stain the metal if left to dry. Check with your local government to ascertain disposal recommendations for neutralized ferric chloride. Do not dump it down the sink.

To prep metal for etching, scrub it with 0000 steel wool or 600-grit wet and dry sandpaper. Remove the dust. Apply a pattern with rubber stamps and white opaque Staz-On ink, or draw a design on the metal with a black permanent marker. Cover the back of your metal with masking or painters' tape to prevent the etchant from etching completely through the metal.



1 To prepare the etchant bath, drill a hole in one side of a lidded plastic container a few inches (5.08cm) from the top edge. The hole should be slightly larger than the rubber tubing of the air pump. The introduction of air into the etchant solution speeds the etching process and circulates fresh etchant over the metal, preventing the need to suspend the metal in the etchant solution.



2 Place the metal into the etchant. Check on it regularly, starting at about 10 minutes. When you're satisfied with the depth of the etch, remove the metal from the etchant, rinse it and place it in a 50/50 ammonia/water solution.

TIPS:

- Air pumps can be purchased in the aquarium section of pet stores.
- If the etching time starts to reach an hour or more, the etchant is probably spent. Before you dispose of it, add a couple of tablespoons of water to the solution to see if it activates again.

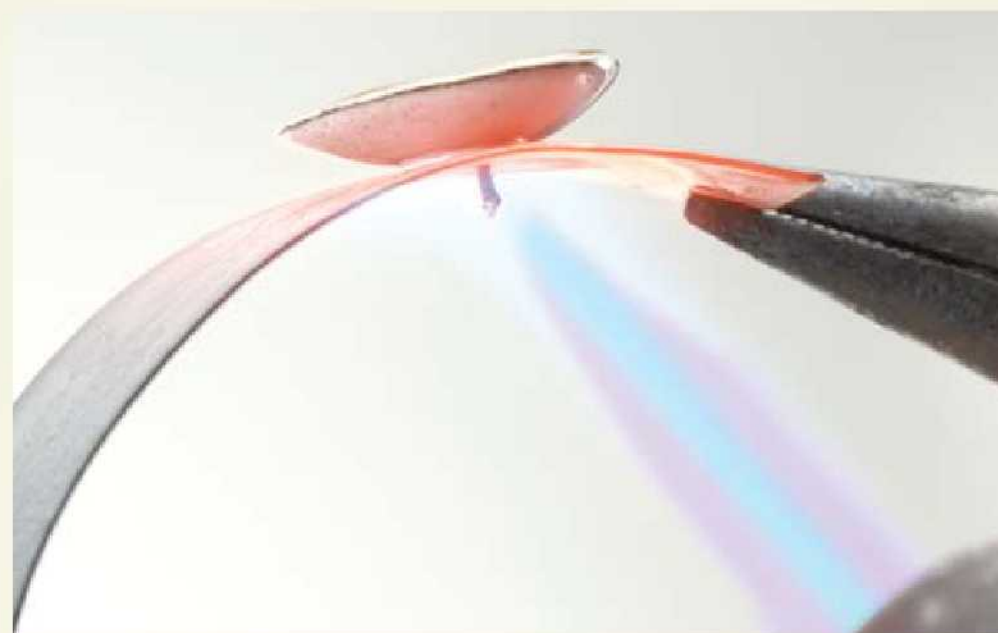
Heat Riveting

In the studio, I find myself naturally wanting to see things differently or to discover different ways of doing things. I thought about the inherent problems in riveting enameled objects. If we could draw a bead on the end of a wire for a rivet, why couldn't we do it for the other end as well? With this in mind, I took



- 1 Place the wire through two or more sheets of metal. Make sure that the wire fits tightly in the hole. Cut the end of the wire so that about $\frac{1}{8}$ " (3mm) extends beyond the metal.

advantage of the flame to handily create a "heat rivet." We use sterling wire because it has a lower melting point than copper; it makes our job easier! After the first bead is drawn, place it in pickle or scrub the metal to remove all oxidation.



- 2 If the pieces you're heat-riveting are enameled, gradually warm them by passing them in and out of the area beyond the visible part of the flame, which is still very hot. When the enamel shows signs of warming by turning darker, direct the tip of the flame at the tip of the wire and aggressively heat the wire to draw a bead. If the bead is too large for comfort, file it down.

Terms Worth Knowing

ANNEALING

Annealing is the solution to work-hardened metal. Metal that has been bent, hammered, folded or wiggled can become work-hardened and stiff, which makes it more difficult to shape. When this happens, simply heat your metal to a dull red state. Quench it in water or allow it to cool. Annealed metal is more malleable and more easily formed.

PATINAS

Liver of sulfur (LOS) is an excellent oxidizing agent for copper. It comes in nugget, liquid and gel form and darkens the metal, giving it an aged appearance. Create a solution by adding LOS to a small amount of warm water. Heat the water or the piece you are aging to accelerate the reaction. Dip or paint the piece

with LOS. When satisfied, neutralize the reaction by dipping the metal in a solution of $\frac{1}{2}$ cup (120mL) of water and 1 teaspoon (5mL) of baking soda. Rinse. Patina can be removed from the high points of details by abrading the metal with a fine sanding pad, 600-grit wet and dry sandpaper or 0000 steel wool. Seal the piece with a urethane sealant such as Permalac. I prefer to use Black Max and Silver Black on silver.

PICKLING

Pickle is a mild acid that removes fluxes and oxides from the metal after soldering or heating. Since we're not soldering anything in this book, we'll use pickle primarily to remove oxidation from the metal before we create a heat rivet. Placing a piece in a pickle solution for ten minutes should remove the oxidation that is created when the wire is heated. Rinse the piece in clear water and then neutralize it in a baking soda solution (see above).

Opening and Closing Jump Rings



1 Open a jump ring by grasping each side of the ring with a pair of chain-nose pliers.



2 To avoid distorting the shape of the ring, do not pull the jump ring open. Instead, twist each side of the jump ring in opposite directions.

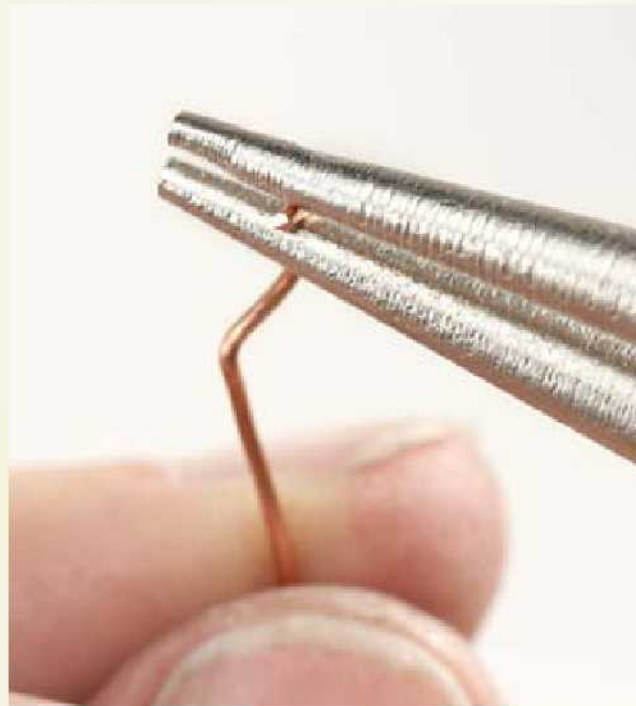


3 To close a jump ring, twist the wires back to their original positions until the ends meet. Wiggle the wires back and forth to get a tight fit and work-harden the metal.

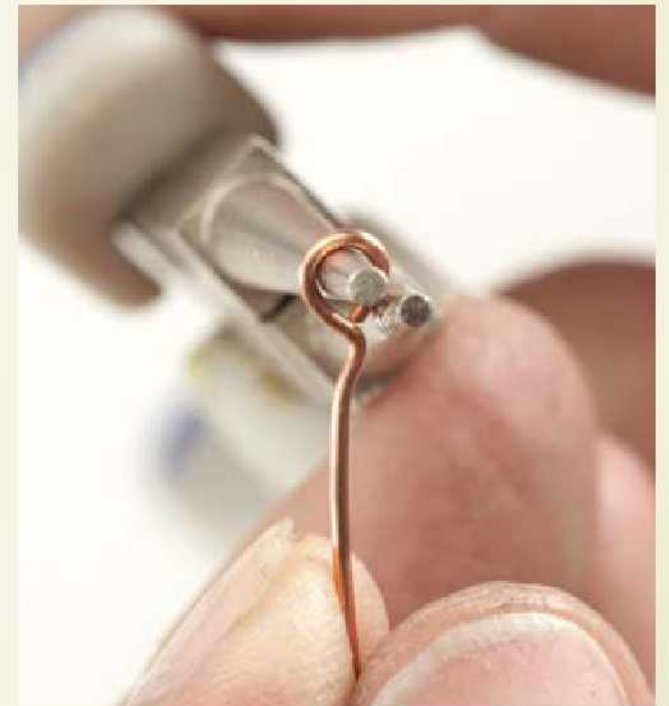
Making Simple Loops



1 Create a 90-degree bend in the wire approximately $\frac{1}{4}$ "– $\frac{3}{8}$ " (6mm–10mm) from the end of the wire.



2 Grasp the end of the wire with round-nose pliers. The bend in the wire should be facing toward you, and your palm should be facing upward.



3 Rotate your hand toward you until the tip of the wire touches the bend in the wire.

Making Wrapped Loops



1 Use flat-nose or chain-nose pliers to form a 90-degree bend about 2" (5.08cm) from the end of the wire. Place one of the jaws of the round-nose pliers in the crook of the 90-degree bend. Wrap the end of the wire around the jaw until it crosses the other wire.



2 Grasp the top of the loop with chain-nose pliers and wrap the wire tail around the base of the loop two full revolutions. Trim the excess wire.

Making S-Clasps



1 Cut approximately 2½" (6.35cm) of 16-gauge wire. Narrow the last ½" (1.27cm) of the wire with a needle file, rotating the wire as you work.



2 Grasp the tip of the wire with round-nose pliers so the end is just protruding from between the jaws.



3 Rotate your hand forward. Complete the rotation until the wire touches itself.



4 Repeat Steps 1–3 for the other end of the wire, making certain that the loops are facing in opposite directions.



5 Place a pencil behind the wire, approximately ⅝" (1.59cm) from the loop. Wrap the wire forward over the pencil as shown.



6 Repeat Step 5 for the other end, curving the wire in the opposite direction to form an S-shape.



7 Lash one end of the clasp closed with contrasting 22- to 24-gauge wire. Before lashing the clasp closed, you may want to connect the clasp to your project.



8 Hammer the curve at each end of the clasp with a chasing hammer to strengthen it.

Making Ear Wires



1 Cut 2" (5.08cm) of 20-gauge sterling wire. Hold the wire with junk pliers or tweezers and dangle the end in the tip of the blue cone of the flame. Create a ball at the end of the wire, which is a process called "drawing a bead."



2 Grasp the wire with round-nose pliers just below the bead.



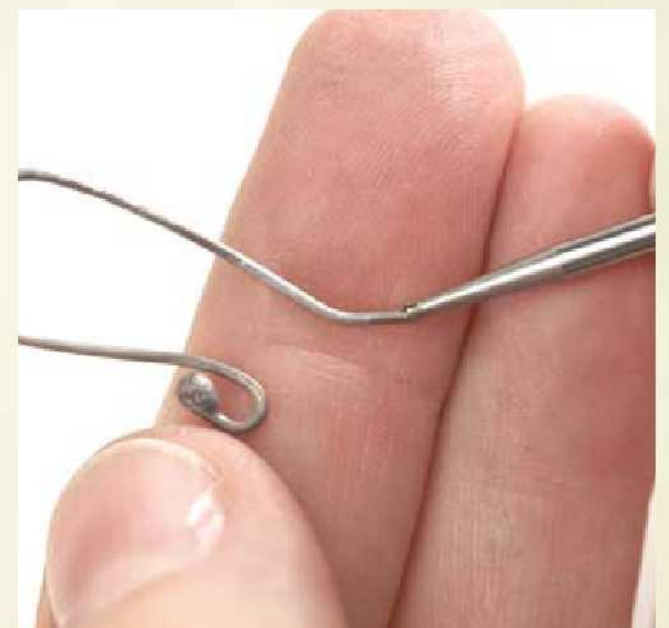
3 With your other hand, bring the wire around the jaws of the pliers to create a loop.



4 Place a pencil against the wire about $\frac{1}{2}$ " (1.27cm) from the loop and bend the wire around the pencil as shown.



5 Grasp the straight portion of the wire with the jaws of chain-nose pliers and create a slight bend.



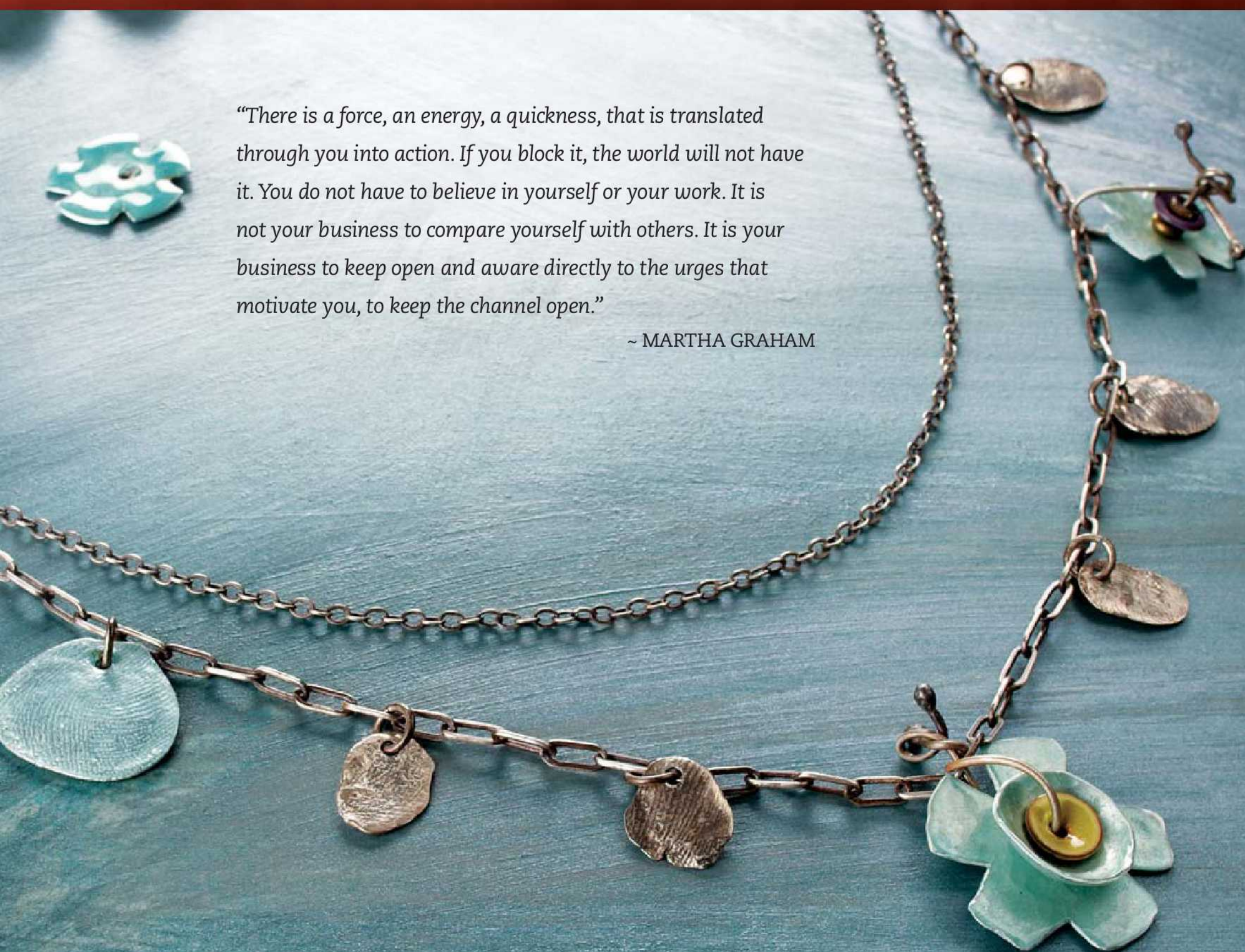
6 Snip the end of the wire about 4mm below the bend. Smooth the end of the wire with a 1.2mm burr cup or sandpaper.



7 Lay the curve of the ear wire on a bench block and flatten it with a chasing hammer to increase its strength.

"There is a force, an energy, a quickness, that is translated through you into action. If you block it, the world will not have it. You do not have to believe in yourself or your work. It is not your business to compare yourself with others. It is your business to keep open and aware directly to the urges that motivate you, to keep the channel open."

~ MARTHA GRAHAM





Torch-Fired Enamel Projects

The projects in this book reflect a history of where I've been and the things I've learned and loved. I fell in love with fabric as a little girl, when my grandmother taught me how to sew. I went from being an apparel design major in college to earning a fine arts degree in ceramics. Following two rotator cuff surgeries—the consequence of loading heavy kiln shelves for twenty years—I took up the intimate task of making jewelry, first using my ceramic beads, and then later using my torch-fired enamel beads.

The artist I am today reflects my interests in both firing and fiber. The beads, pendants and twisty tendrils in these pieces provide a rich variety of color, shape, size and texture. The fibers and ribbons serve as a soft transition between metal and enamel.

All of the techniques in this book are simple. Even metalworking involves only a hammer, metal snips, a hole punch and a bench block. The enameling techniques are all variations of the Painting with Fire method, whether you're enameling a bead or a pendant. You will use different colors of enamel and make adjustments in the oxygen/fuel mix of the torch to achieve a variety of looks.

Grab my hand, light your torch and let's get started!





MATERIALS

FINDINGS

- 18-gauge copper sheet
- 4' (1.22m) multicolor ribbon
- one copper-plated lobster clasp
- three 12mm corrugated iron beads
- two 10mm copper jump rings

ENAMELS

- Heron Blue, transparent (2650)
- Horizon Blue, opaque (1515)
- Hunter, opaque (1345)
- Lime Yellow, transparent (2230)
- Mint, opaque (1420)
- Orient Red, opaque (1870)
- Peacock Blue, opaque (1465)
- Pumpkin, opaque (1850)
- White, opaque (1055)

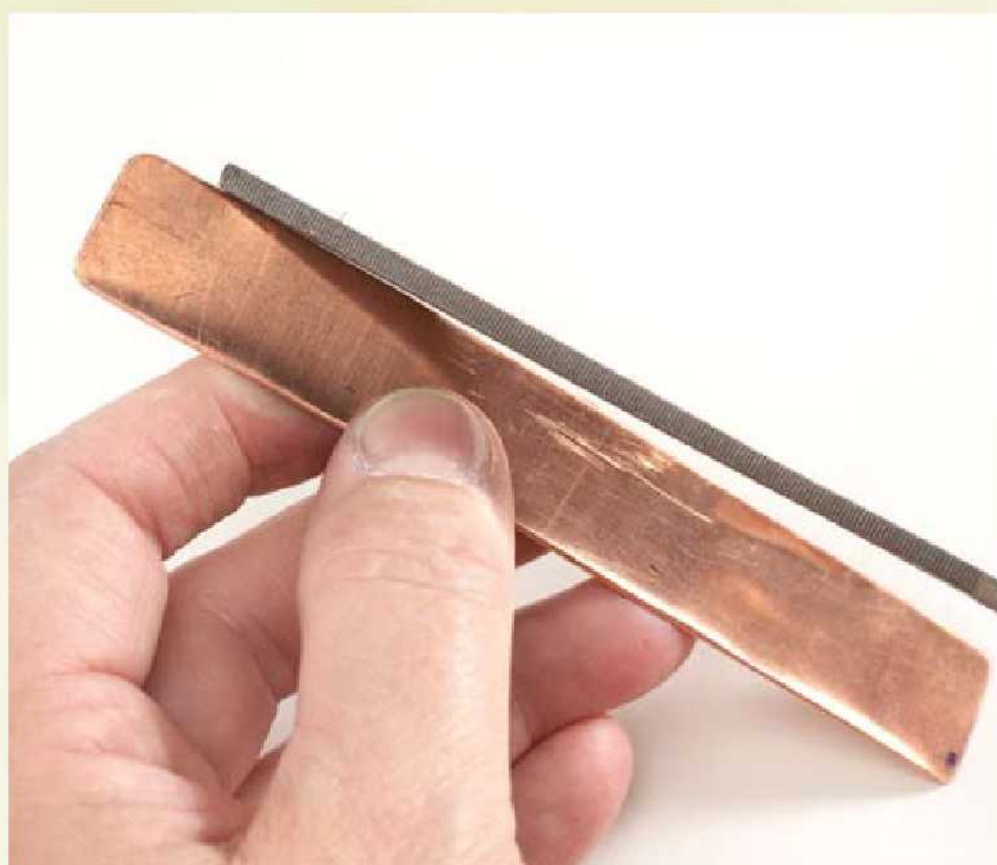
TOOLS

- 30-gauge wire to use as a needle
- felt-tip marker
- jar of water
- junk pliers
- metal file
- metal shears
- two-hole metal punch
- rawhide mallet
- rubber mallet
- scissors
- two pairs of chain-nose pliers
- vise

NOTE: A second torch, either freestanding or handheld, is needed for this project.

Beady Bangle

Can't choose between wearing a bracelet or a bangle? With the *Beady Bangle* you won't have to, because you'll be wearing both. You'll have the tight-fitting comfort of a bracelet with the uniqueness of a bangle. The colorful fiber strands add a lovely softness to the design. The ridge beads, a personal favorite, get very lively with a few coats of enamel. They take on a striped appearance when a final coat of transparent pools in the recesses between the ridges.



1 Cut a $\frac{5}{8}$ " \times 4 $\frac{1}{2}$ " (1.59cm \times 11.43cm) strip from 18-gauge copper sheet with metal shears. Round the corners and smooth the edges with a metal file.



2 Mark the placement of two holes with a felt-tip marker at each narrow end of the copper strip. With the black handle end of a two-hole metal punch, make two holes. Make sure the holes are close enough to the edges to accommodate 10mm jump rings.



3 Anneal the copper strip by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Quench it in water or allow it to cool gradually. Secure a rubber mallet in a vise and shape the strip over it to form the bangle. Tap the metal with a rawhide mallet to reinforce the shape.



4 Hold one end of the bangle with a pair of junk pliers. Keep one torch clamped to the table and hold the other torch in your nondominant hand. Heat the metal until it glows and then dip it into the enamel (see *Torch-Firing Pendants and Charms* on page 18). To control color placement, heat the bangle in sections. Enamel sections of the bangle in Peacock, Horizon Blue, Orient Red and Hunter. The enamel will only adhere to the hot section. Give a final equalizing firing to evenly heat the entire piece. Place the bangle in vermiculite and cover it to cool.

Enamel three corrugated iron beads: one in White with Heron Blue on top, one in Pumpkin and one in Mint with Lime Yellow on top (see *Torch-Firing Beads* on page 16).



5 Attach a 10mm jump ring to each hole in the bangle (see *Opening and Closing Jump Rings* on page 24). Cut two 24" (60.96cm) pieces of multicolor ribbon and fold them both in half. Insert the folded end through one of the jump rings. Make a lark's head knot around the jump ring.



6 Cut 6" (15.24cm) of 30-gauge wire. Lay the ribbon across the center of the wire. Bend the wire in half over the strands. Use the wire as a needle to thread the ribbon strands through the enamel corrugated beads. Make an overhand knot after each bead.



7 Using the wire needle, guide the ribbon strands through a lobster clasp. Tie an overhand knot to secure the strands. You can continue to tie more knots to make the attachment more decorative and a part of the design.



MATERIALS

FINDINGS

- 20-gauge sterling silver wire
- 24-gauge smooth copper sheet
- 24-gauge etched copper sheet
- eight 4mm brass heishi beads
- four 4mm jump rings
- two 3mm brass heishi beads

ENAMELS

- Bitter, opaque (1319)
- Orient Red, opaque (1870)

TOOLS

- 1.2mm cup bur
- bench block
- chasing hammer
- dapping block and punch
- dead blow hammer
- disc cutter (optional)
- felt-tip marker
- metal shears
- pencil
- plastic circle template with divisional lines
- straightedge
- two-hole metal punch
- two pairs of chain-nose pliers
- wire cutters

Disc Drive

These are wonderful, funky little earrings that feature colorful enamel discs and heishi beads. The smallest discs are 6mm . . . and we're going to enamel them. You'll see how easy it is! If you don't have a disc cutter, don't worry—you can handcut the discs. Jewelry should be about personality, not perfection. What's a little misshapen disc among friends?



1 Cut copper discs: two 16mm discs from 24-gauge etched copper sheet, and two 10mm and two 6mm discs from 24-gauge smooth copper sheet. If cutting by hand, use a plastic circle template with divisional hash marks. Indicate the center of each circle by drawing crosshairs on the discs using a felt-tip marker and a straightedge. You can also use a disc cutter.

TIP: If you cut the discs by hand, don't worry if they're not perfect. They will just look more natural and organic than machine-cut discs. You can hide any irregularities by hammering the edges of the disc with the ball-peen end of a chasing hammer.



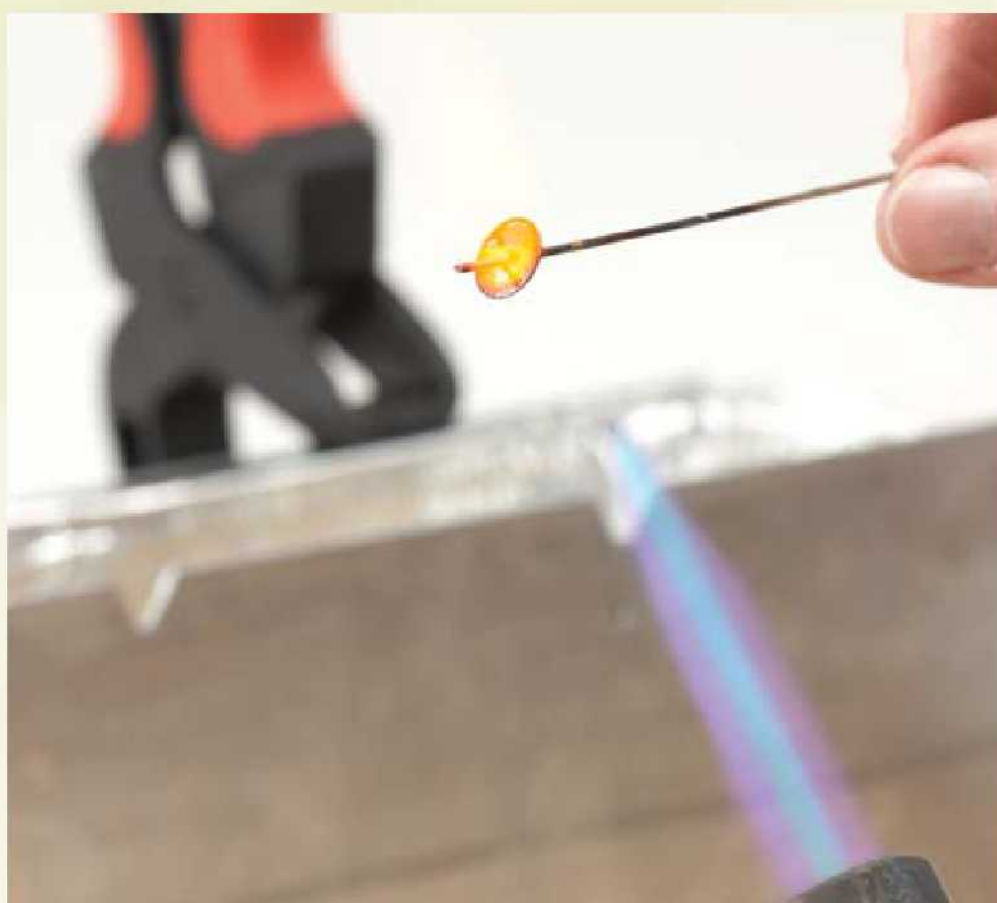
2 Distress the edges of the 16mm discs by hammering them with the ball-peen end of a chasing hammer.



3 Create a hole in each 16mm disc with the silver-handle end of a two-hole metal punch.



4 Dome each 16mm disc in a dapping block.



5 Enamel the 10mm discs in Bitter and the 6mm discs in Orient Red (see *Torch-Firing Beads* on page 16).



6 Dangle a 4" (10.16cm) piece of 20-gauge sterling wire in the flame and draw a bead on one end. String on a 3mm heishi bead, a 4mm heishi bead, the 6mm enamel disc, the 10mm enamel disc, a 4mm heishi bead, the 16mm etched copper disc and two 4mm heishi beads.



7 Use chain-nose pliers to grasp the wire from the back. Create a 90-degree bend in the wire flush against the last heishi bead. Grasp the wire about 4mm above the last heishi bead and rotate your wrist toward you, forcing the wire to touch or nearly touch the back of the copper disc. You may need to wiggle the wire a little to secure the discs.



8 Rest the lower edge of a pencil on the top edge of the copper disc. Bend the wire toward the front of the earring.



9 With chain-nose pliers, grasp the wire at a point that is slightly lower than the top edge of the 10mm enamel disc. Bend the wire to the right at a 90-degree angle.



10 Slide the wire behind the 10mm enamel disc, maintaining the integrity of the bend. Hold the copper disc in your nondominant hand and support the loop at the top of the earring. Wrap the wire once behind the enamel disc. Cut off the excess wire. Tuck in any exposed wire.



11 Make an ear wire using 20-gauge sterling wire (see *Making Ear Wires* on page 27). Attach the ear wire to the earring loop with a 4mm jump ring. Round the end of the cut wire with a cup bur. Repeat Steps 6–11 for the other earring.



MATERIALS

FINDINGS

- 14-gauge copper wire
- 24-gauge etched copper sheet
- 24-gauge smooth copper sheet
- three 3mm round iron beads
- three 6mm brass heishi beads

ENAMELS

- Clover Pink, opaque (1715)
- Egg Yellow, transparent (2215)
- Orient Red, opaque (1870)
- White, opaque (1055)

TOOLS

- bench block
- center punch
- chain-nose pliers
- chasing hammer
- dapping block and punch
- dead-blow hammer
- disc cutter
- NOTE: You can also use metal shears, a plastic circle template with divisional lines and a straightedge.
- flexible shaft
- no. 51 drill bit
- rawhide mallet
- rubber mallet or bracelet mandrel
- tweezers
- wire cutters

Sprout

My son, David, has the uncanny ability to come up with names for my jewelry pieces. I don't know why I should be surprised—he's a musician and lyricist. When I asked David what I should call this bracelet, he said, "Sprout." I thought, "Of course!" It's as if this quirky little flower sprouted from the bracelet. Thanks, Dave!



1 Use a disc cutter to cut a 1" (2.54cm) disc from 24-gauge etched copper sheet. Cut a $\frac{3}{4}$ " (1.9cm) disc and a $\frac{1}{2}$ " (1.27cm) disc from 24-gauge smooth copper sheet. Use a center punch to dimple the disc for the placement of the drill bit. Use a flexible shaft and a no. 51 drill bit to drill holes in the approximate center of the 1" (2.54cm) disc. Drill off-center holes in the two smaller discs.

TIP: Grasp the disc with pliers as you drill to prevent it from spinning and cutting your finger.



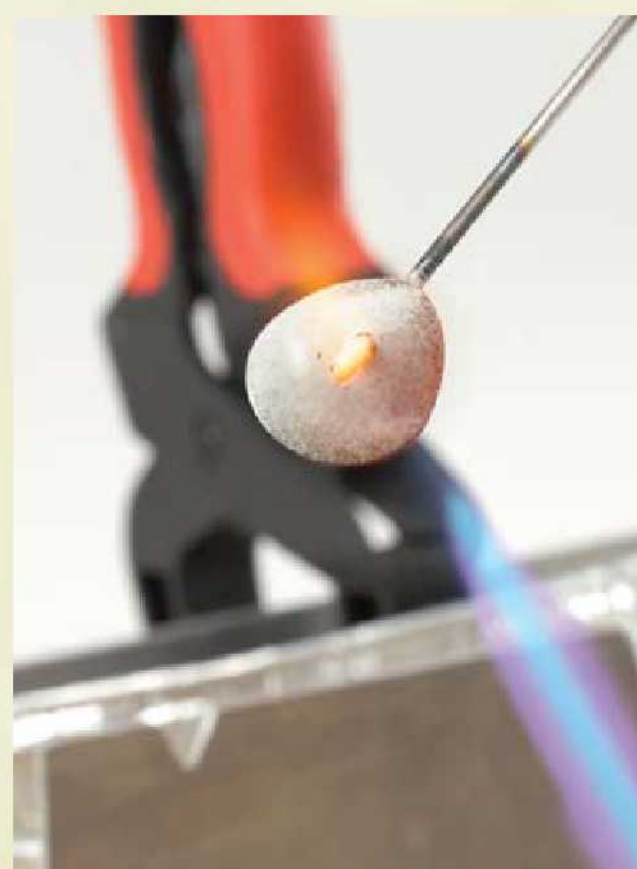
2 Anneal the 1" (2.54cm) disc by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow the disc to cool. Use the handle of a dapping punch, a dead-blow hammer and a dapping block with grooves to create a ruffled edge on the disc.



3 Dap the $\frac{3}{4}$ " (1.9cm) disc into a continuous curve with a chasing hammer. Move the disc to a smaller depression in the dapping block and hammer the edge over one side so it is slightly misshapen.



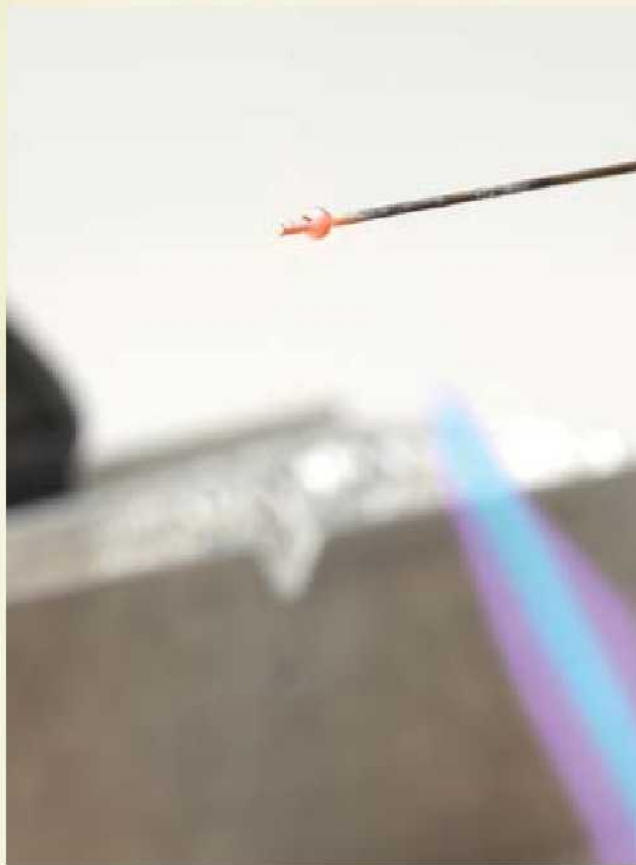
4 Hold the $\frac{1}{2}$ " (1.27cm) disc by the edge and hammer it with the ball-peen end of a chasing hammer. The edges will curl upward to create a gentle cupping.



5 Enamel the $\frac{3}{4}$ " (1.9cm) disc in two layers of White and two layers of Egg Yellow. Enamel the $\frac{1}{2}$ " (1.27cm) disc in Orient Red (see *Torch-Firing Beads* on page 16).



6 Cut a 26" (66.04cm) segment of 14-gauge copper wire. Loosely coil the wire. Draw a bead on one end of the wire. Anneal the wire by heating it to a dull cherry red. Quench it in water or allow it to cool gradually.



7 Enamel three 3mm beads in Clover Pink.



8 Thread the $\frac{1}{2}$ " (1.27cm) enamel disc, a 6mm heishi bead, the $\frac{3}{4}$ " (1.9cm) enamel disc, a 6mm heishi bead and the 1" (2.54cm) copper disc onto the 14-gauge wire. Heat the flower stack and place the 3mm beads in the flower center with tweezers. Sprinkle Clover Pink enamel on the center of the flower and heat it from above to fuse the beads to the enamel.



9 Create a 90-degree bend in the wire where it exits the back of the copper disc. Spiral the wire around a rubber mallet or bracelet mandrel. Reinforce the shape of the bracelet by hammering the wire with a rawhide mallet.



10 Bring the wire back to the 90-degree bend. Wrap the remaining wire around the bracelet wires to bind them together. Trim the wire and tuck in the tail with chain-nose pliers.



MATERIALS

FINDINGS

- 18-gauge sterling wire
- 24-gauge etched copper sheet
- 24-gauge smooth copper sheet
- one 3.5mm heishi bead
- two 4mm heishi beads

ENAMELS

- Clover Pink, opaque (1715)
- Mint, opaque (1420)

NOTE: To make the red and blue ring, use Orient Red, opaque (1870) and Bitter, opaque (1319) instead of Clover Pink and Mint.

TOOLS

- baking soda
- bench block
- center punch
- chasing hammer
- dapping block and punch
- dead-blow hammer
- disc cutter
- NOTE: You can also use metal shears with a plastic circle template and a straightedge.
- felt-tip marker
- flexible shaft
- junk pliers
- metal file
- metal shears
- no. 60 drill bit
- pencil
- pickling solution
- ring mandrel
- round needle file
- slow cooker or other pickling pot
- water
- wire cutters

Stacked Ring

Once you've learned how to harness heat, you've got it made! That's probably what the cavemen said as they sat around their first campfire. This project is another example of using heat to your advantage.

We will heat-rivet a stack of enameled discs to a strip of copper that has been formed into a ring. Go out on a limb and try some unlikely color combinations. It's only a small space—go for it!

Because enamel can chip and rings take abuse, I don't enamel the largest disc. The edges of the stacked enamel discs will be somewhat protected by this design.



1 Cut a $\frac{1}{2}$ " \times 3" (1.27cm \times 7.62cm) strip from 18-gauge copper sheet for a size 8 ring. For a smaller or larger ring, adjust the length accordingly. Texture the strip with the ball-peen end of a chasing hammer; this will increase its length slightly. Smooth the edges with a metal file if necessary. Anneal the strip by holding it with junk pliers and dangling it in the flame until it glows a dull cherry red (see *Annealing* on page 23). Quench it in water or allow it to cool gradually.



2 Wrap the copper strip around a ring mandrel to form the appropriate ring size, overlapping the ends. Form the ring by tapping the entire surface with a chasing hammer. Remove the ring from the mandrel, flip it over, place it on the mandrel and continue forming the ring.



3 Use a center punch to dimple the metal and mark the location of the hole and the rivet.



4 Place the ring around a pencil. Prop the pencil in the ring mandrel stand. Drill a hole using a flexible shaft and a no. 60 drill bit. Smooth the inside of the ring with a round needle file.



5 Use a disc cutter to cut a 16mm disc from 24-gauge etched copper sheet and a 10mm and 6mm disc from 24-gauge smooth copper sheet. You can also handcut the discs with metal shears. Mark the center of each disc with a felt-tip marker and dimple the mark with a center punch. Drill holes in the discs with the no. 60 drill bit. Dome the discs in a dapping block.



6 Enamel the 10mm disc in Clover Pink and the 6mm disc in Mint (see *Torch-Firing Beads* on page 16).



7 Dangle a 1½" (3.81cm) piece of 18-gauge sterling wire in the flame and draw a bead on one end. Pickle the wire and rinse it in a baking soda solution (see *Pickling* on page 23). String a 3.5mm heishi bead, a 4mm heishi bead, the 6mm enamel disc, a 4mm heishi bead, the 10mm enamel disc and the etched copper disc onto the wire. Thread the head pin into the holes in the ring shank.



8 Cut the excess wire to within ⅛" (3mm) of the ring shank and heat-rivet the discs to the ring shank (see *Heat Riveting* on page 23). Cool the ring in vermiculite.



Cute as a Button

Even though this bracelet has few elements, it makes a statement. I'm drawn to the contrast between the etched copper and the enameled discs. The chunky chain is perfect for the scale of the bracelet. *Cute as a Button* could easily be a gift for your guy, too, but don't tell him the name! By changing the shape of the "buttons" from circular to square, and the color to hunter green, deep blue, black or gray, it becomes decidedly more masculine. Again, for this project we're harnessing heat for the rivet.

MATERIALS

FINDINGS

- 14-gauge copper wire
- 16-gauge copper wire
- 18-gauge etched copper sheet
- 20-gauge sterling silver wire
- 24-gauge smooth copper sheet

ENAMELS

- Bitter, opaque (1319)
- Foxglove, opaque (1745)

TOOLS

- baking soda
- center punch
- dapping block and punch
- dead-blow hammer
- disc cutter
- felt-tip marker
- fine sanding pad
- flexible shaft
- junk pliers
- liver of sulfur or blackening solution
- metal file
- metal shears
- no. 65 twist drill bit
- pencil
- pickling solution
- rawhide mallet
- rubber mallet or bracelet mandrel
- slow cooker or other pickling pot
- two-hole metal punch
- two pairs of chain-nose pliers
- water
- wire cutters



1 Coil 14-gauge copper wire around a pencil fifteen times. Slide the coil off and cut thirteen 11mm jump rings.



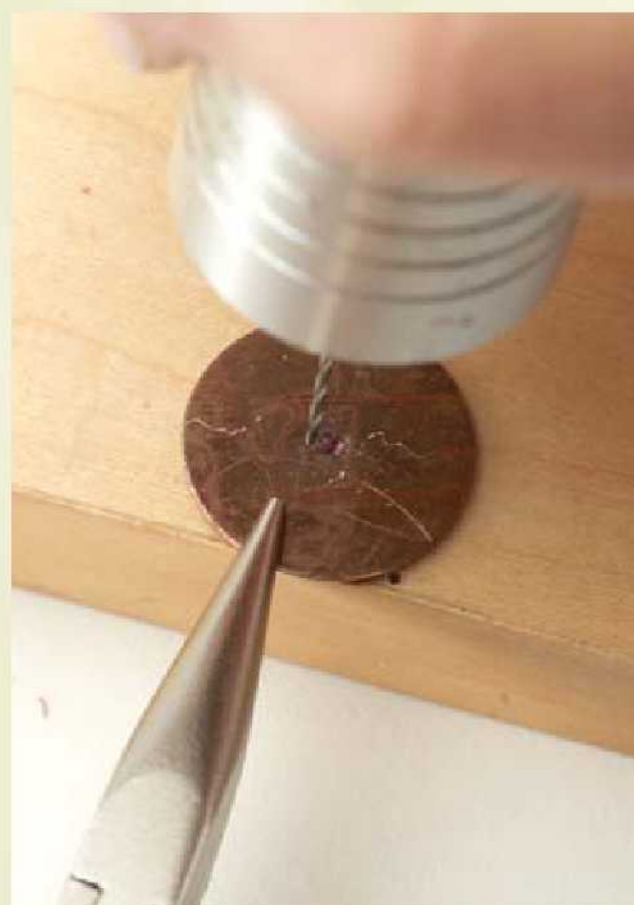
2 With metal shears, cut a 1" x 2½" (2.54cm x 6.35cm) rectangle from 18-gauge etched copper sheet. This measurement can be adjusted to suit your wrist size. Smooth the edges and round the corners of the strip with a metal file.



3 Use a disc cutter to punch out 6mm, 16mm and 19mm discs from 24-gauge smooth copper sheet. Mark the center hole with a felt-tip marker.



4 Use a center punch to create a dimple on the mark for the hole.

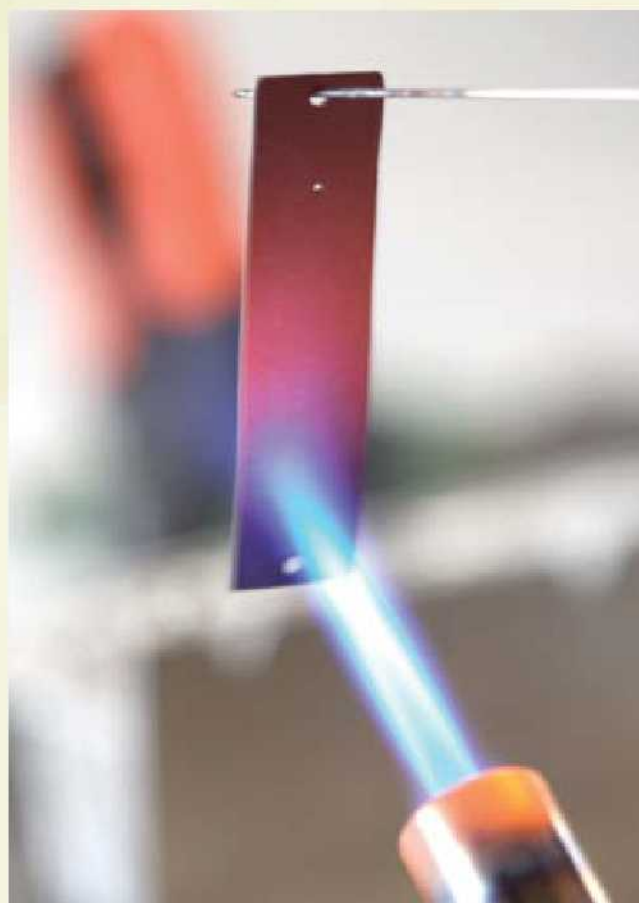


5 Use a no. 65 drill bit to drill a hole in the center of each disc. It is important that this hole closely fits the size of 20-gauge sterling wire.

TIP: Hold the disc with pliers while drilling it to prevent it from spinning and cutting your fingers.



6 You will need three holes in the bracelet: one at each narrow end to accommodate the jump ring chain and one for the placement of the discs. Use the black handle end of a two-hole metal punch for the two end holes. Drill the hole for the “buttons” with a no. 65 drill bit. Use the image on page 43 as a guide for placement.



7 Anneal the strip by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23).



8 Bend the bracelet over the rubber mallet or bracelet mandrel and forge it with a rawhide mallet to reinforce the shape.



9 Shape the three discs in the dapping block.



10 Enamel the 19mm disc in Bitter and the 16mm disc in Foxglove (see *Torch-Firing Beads* on page 16).



11 Draw a bead on one end of a 1¼" (3.18cm) piece of 20-gauge sterling silver wire. Pickle the wire and rinse it in a baking soda solution (see *Pickling* on page 23).

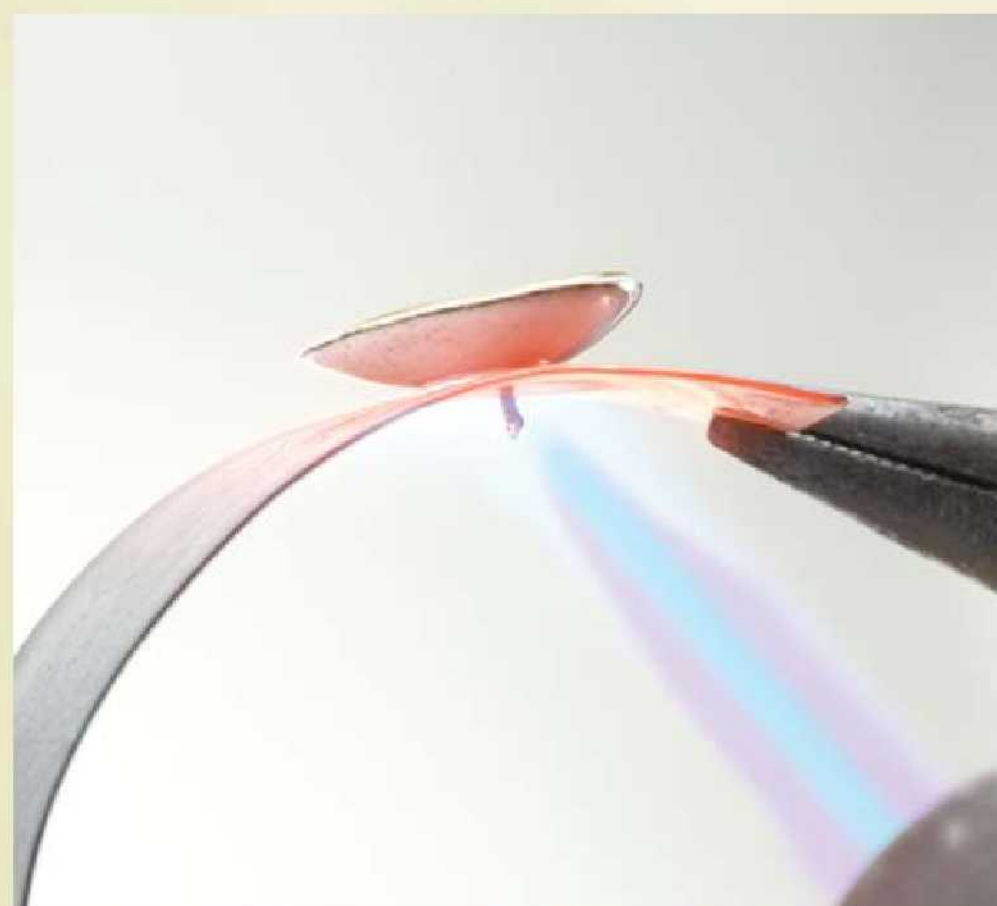
TIP: Punch holes in the bottom of a plastic disposable fruit cup and use it as a colander for placing your head pin in the different solutions. Rinse the colander after each use to avoid transferring baking soda to the pickle, which would neutralize the acid.



12 String the 6mm copper disc, the 16mm enamel disc and the 19mm enamel disc onto the head pin. Thread the head pin through the drilled hole in the bracelet.



13 Cut the excess wire to within ⅛" (3mm) of the bracelet.



14 Hold the bracelet with junk pliers with the discs balancing on top. Heat-rivet the discs to the bracelet (see *Heat Riveting* on page 23). Cool the bracelet in vermiculite.

TIP: Gradually heat the enamel before heat riveting to prevent thermal shock. Thermal shock may result in enamel popping off the metal.



15 Use 16-gauge copper wire to create an S-clasp (see *Making S-Clasps* on page 26). Hammer the clasp on the curves to strengthen the clasp.



16 Create a patina on the jump rings, S-clasp and bracelet (see *Patinas* on page 23). Don't overdo it. Liver of sulfur is a mild acid, and if you lose track of time while the piece is sitting in it, the color of the enamel discs could be affected. Rinse the pieces in a baking soda solution, then in water. Pat them dry.



17 With a fine sanding pad, sand some of the oxidation off the jump rings, clasp and wrist piece.



18 Connect ten jump rings and attach them to one end of the bracelet (see *Opening and Closing Jump Rings* on page 24). Connect three jump rings and connect them to the other end.



MATERIALS

FINDINGS

- 9½" (24.13cm) sterling silver chain
- 18-gauge sterling wire
- 22-gauge bronze wire
- 24-gauge copper sheet
- one 10mm jump ring
- one 22mm toggle bar
- one micro nut and bolt

ENAMEL

- White, opaque (1055)

TOOLS

- chain-nose pliers
- clear nail polish or glue
- metal file
- metal shears
- piercing hole punch
- round-nose pliers
- two-hole metal punch
- wire cutters

Achilles' Shield

Want to experiment with the versatility of the flame? This is a great project for achieving special effects from a reduced flame and controlled overfiring. With some overheating, the copper oxides bubble up through the white enamel to create a rich, colorful texture. We will also reduce the amount of oxygen coming to the flame by closing the vent holes. You'll immediately see that the flame becomes more yellow and less blue, and some smoke could appear. Yeah, that's the ticket!



1 With metal shears, cut an organic shield shape approximately $1\frac{1}{2}'' \times 2\frac{1}{2}''$ (3.81cm \times 6.35cm) from 24-gauge copper sheet. Smooth the edges with a metal file.



2 Use a piercing hole punch to punch decorative holes in the shield. Include functional holes at each end of the shape for attaching other components.



3 Enamel the shield in three layers of White (see *Torch-Firing Pendants and Charms* on page 18). Turn the torch to the maximum intensity. Focus the flame on the edges of the piece and on other select areas. We want the copper oxides to bubble to the surface.



4 Close the vent holes with chain-nose pliers to create a reduced, fuel-rich flame.



5 Use controlled overfiring to create color and texture. Some of the copper oxides that have bubbled to the surface will turn rust or pink, which is the effect of the reduced flame. Other areas will be green, which are the results of an oxygenated flame.



6 Cut a copper shape about $1\frac{1}{2}$ " (3.81cm) long and measuring $\frac{1}{2}$ " (1.27cm) at its widest point; one end should be slightly wider than the other. Use the silver handle end of a two-hole metal punch to make a hole at the wider end to accommodate a micro nut and bolt. Take care not to make the hole too large; it should be just big enough for the bolt. Fasten the strip to the shield using one of the functional holes. Add a dot of clear nail polish or glue to prevent the nut from unscrewing.



7 Use round-nose pliers to curl the narrower end of the copper shape to create a loop.



8 Draw a bead on both ends of a 2" (5.08cm) piece of 18-gauge sterling wire. Measure the width of the toggle, which in this case is 22mm. The diameter of the link should be roughly half of this. In my case, I wrapped the wire around a 10mm mandrel to obtain the proper size. Slide the wire into the loop in the copper shape and cross the beaded ends of the wire. Secure the link by tightly wrapping the ends together with 22-gauge bronze wire.



9 Attach a 10mm jump ring to the opposite side of the shield (see *Opening and Closing Jump Rings* on page 24). Thread a $9\frac{1}{2}$ " (24.13cm) length of sterling chain through the jump ring and double it over. Open the last links in each chain end and attach the toggle bar to both of them. Close the links.



Cattywampus

These quirky earrings get their attitude from the large bead holes that cause them to sit “cattywampus” on their head pins. To begin, choose three colors of enamel. You’ll need to decide which colors you want for the top and the bottom of the bead and which one will be the circumference color. Ribbon, enameled head pins and twisty tendrils add even more whimsy.

MATERIALS

FINDINGS

- 16" (40.64cm) multicolor rayon ribbon
- 18-gauge copper wire
- 20-gauge copper wire
- 24-gauge etched copper sheet
- four 3mm jump rings
- four 3mm copper heishi beads
- two 10mm iron beads

ENAMELS

- Pumpkin, opaque (1850)
- Clover Pink, opaque (1715)
- Cobalt, opaque (1685)
- Bitter, opaque (1319)
- Robin's Egg Blue, opaque (1410)

TOOLS

- ceramic tile
- dapping block and punch
- dead-blow hammer
- disc cutter
- round-nose pliers
- scissors
- spoon or small scoop
- two-hole metal punch
- two pairs of chain-nose pliers
- wire cutters



1 Sprinkle a pea-sized amount of Cobalt enamel on a ceramic tile. Spread it in a diffuse line with a spoon or small scoop.



2 Enamel a 10mm iron bead with two layers of Clover Pink (see *Torch-Firing Beads* on page 16).



3 For the third layer, hold the mandrel vertically and dip the bead halfway into Pumpkin enamel. Reheat the bead.



4 Roll the circumference of the bead in the Cobalt enamel that has been spread on the tile. Reheat the bead. Let it cool in vermiculite.



5 Punch four 10mm discs from 24-gauge etched copper sheet to use as bead caps.




6 Use the silver handle end of a two-hole metal punch to make a hole in the center of each bead cap.

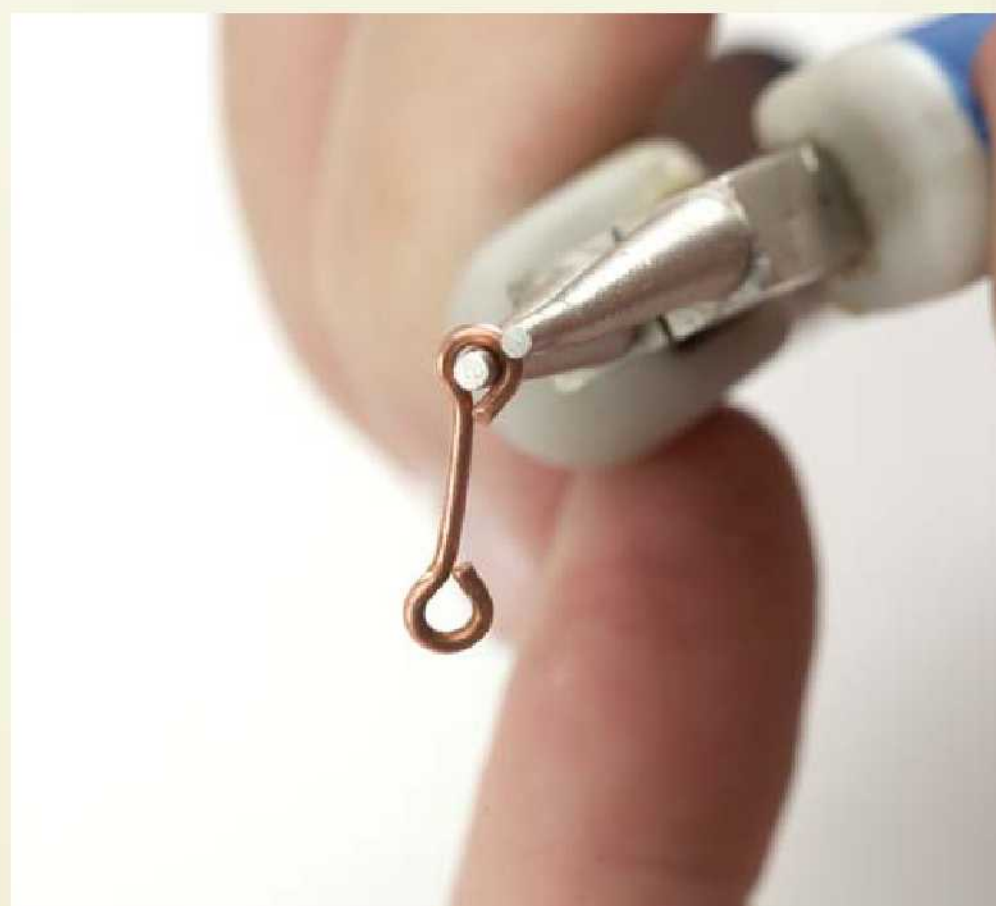


7 Place each bead cap etched-side down in a dapping block. Dome the bead caps.



8 Enamel two head pins in Bitter and two twisty tendrils in Robin's Egg Blue (see *Torch-Firing Head Pins and Twisty Tendrils* on pages 20 and 21). Allow them to cool. String a 3mm heishi bead, a bead cap, the 10mm enamel bead, a bead cap and a 3mm heishi bead onto the head pin. Make a wrapped loop flush to the last heishi bead. Repeat for the second earring.

 **TIP:** Applying too much torque to your wire wrapping can cause the enamel to chip from a head pin. Adding a heishi bead next to the head pin helps to prevent the enamel from cracking.



9 Make two earring connectors by cutting two 1" (2.54cm) sections of 18-gauge copper wire. Make a simple loop at each end of both wires (see *Making Simple Loops* on page 25). The loops should face the same way.



10 Start wrapping a 5"–8" (12.7cm–20.32cm) strand of ribbon around each connector, finishing with criss-cross wrapping. Knot and trim some of the excess.



11 Attach a 3mm jump ring to each earring (see *Opening and Closing Jump Rings* on page 24). Attach a connector to each jump ring.



12 Make two ear wires using 20-gauge copper wire (see *Making Ear Wires* on page 27). Use 3mm jump rings to attach an ear wire to each earring.



13 Wrap a twisty tendril loosely above the bead to fill in the space. Do not constrict the connection; the earring should be able to dangle freely. Repeat for the other earring.



All Wound Up

The versatile nature of enamel continues to unfold for me in the studio. A lot of “What if?” questions challenge me to think outside the box. So, when I was presented with molten, viscous glass, I thought, “What if I stuck something in it?” *All Wound Up* features a jump ring, millefiori and cat whiskers fused into the enamel to create a fun abstract design.

A great place to get cords and other fibers for your jewelry is the yarn shop. I’ve always wanted to learn how to knit sweaters. Now I can satisfy part of that yearning by adding gorgeous yarns to my jewelry.

MATERIALS

FINDINGS

- 16-gauge sterling silver wire
- 18-gauge copper sheet
- 19-gauge annealed steel wire
- 22-gauge bronze wire
- green synthetic suede lacing
- multicolored nylon cord
- one 7mm sterling silver jump ring
- one 10mm × 15mm solid sterling silver oval link
- one 11mm sterling silver jump ring

ENAMELS

- Aquamarine, opaque (1422)
- cat whiskers
- Medium Fusing Clear (2030)
- millefiori wafers
- Pea Green, opaque (1335)

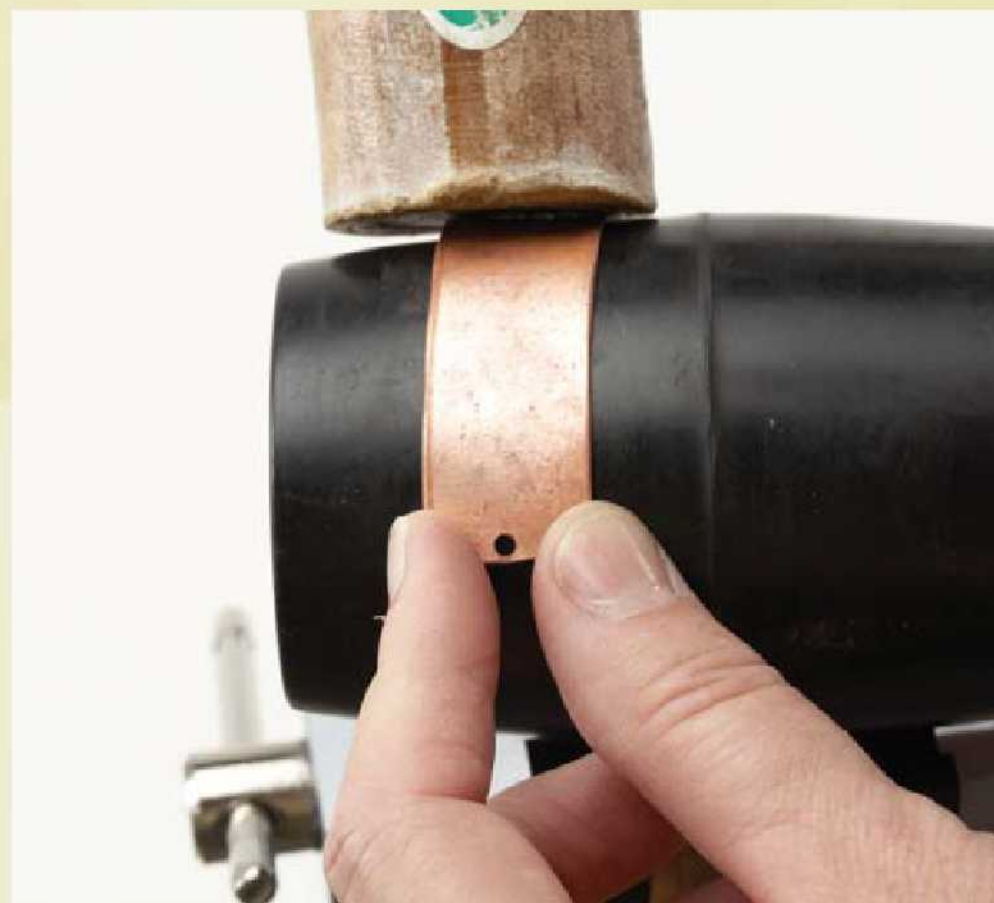
TOOLS

- metal file
- metal shears
- pencil
- rawhide mallet
- rubber mallet or bracelet mandrel
- tweezers
- two-hole metal punch
- two pairs of chain-nose pliers
- vise
- wire cutters

NOTE: A second torch, either freestanding or handheld, is needed for this project.



1 Use metal shears to cut a $\frac{3}{4}'' \times 3\frac{1}{4}''$ (1.91cm \times 8.26cm) strip from 18-gauge copper sheet. File the edges with a metal file to remove burs and round the corners. Pierce a hole in each narrow end of the rectangle with the black handle end of a two-hole metal punch.



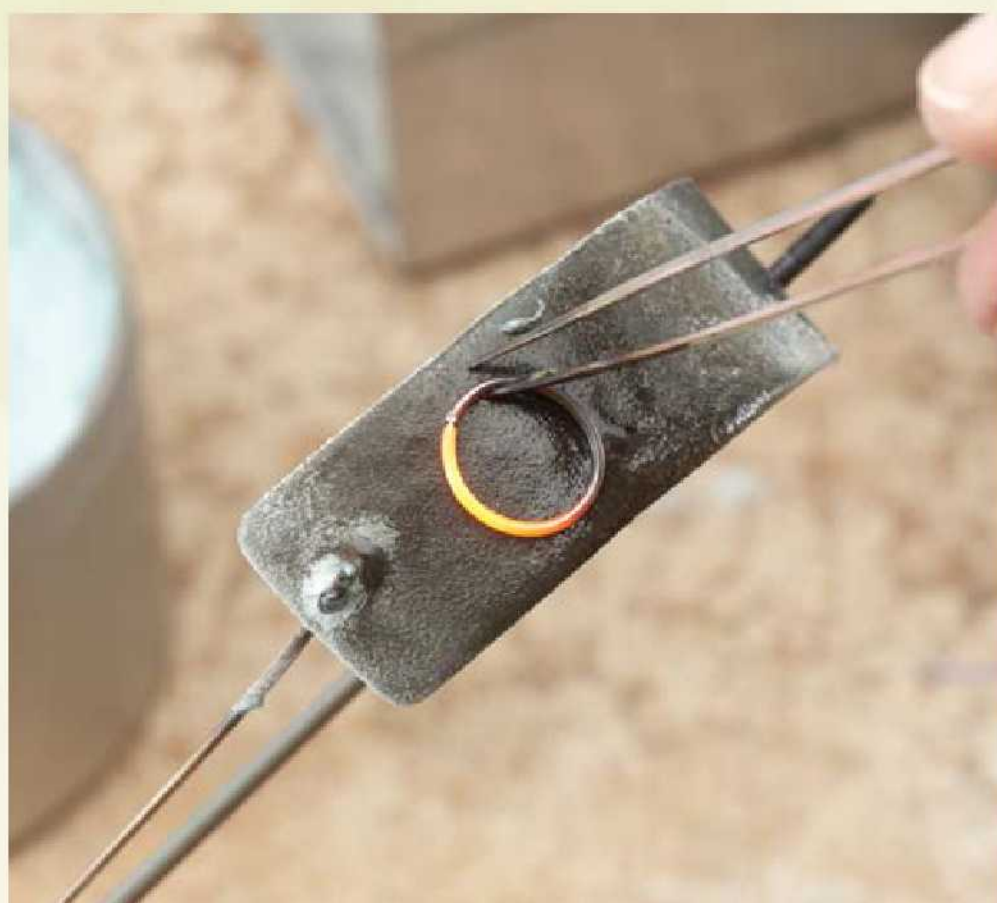
2 Anneal the strip by dangling it from a mandrel in the flame until it turns a dull cherry red (see *Annealing* on page 23). Quench it in water or allow it to cool gradually. Secure a rubber mallet in a vise and shape the wrist piece around it. You can also use a bracelet mandrel. Tap the metal with a rawhide mallet to reinforce the shape.



3 Wrap 19-gauge annealed steel wire around a pencil several times. Cut a jump ring from the coil to embed in the enamel.



4 Use a stationary torch to heat the lower half and a hand-held torch to heat the upper half of the wrist piece. Dip two-thirds of the piece into Aquamarine enamel. Reheat and dip the remainder into Pea Green enamel (see *Torch-Firing Pendants and Charms* on page 18).



5 Bring the metal back into the flame and heat it. Tilt your wrist so the bracelet is in a more horizontal position. Hold the jump ring from Step 3 with tweezers and gently heat it until it starts to glow. Dip the jump ring into medium fusing clear enamel. Lay the jump ring on top of the wrist piece and heat it from underneath. Press the jump ring into the enamel when it softens.



6 With the flame on the underside of the bracelet, heat the area where millefiori wafers will be applied. Continue to heat from underneath to fuse millefiori wafers to the wrist piece enamel.



7 Continue heating the bracelet from the underside. Remove the metal from the flame and place a cat whisker on the enamel. Apply more cat whiskers as desired. Heat until the cat whiskers totally fuse into the enamel. Apply one or two final coats of medium fusing clear enamel to make sure that the jump ring is held securely in place and won't snag clothing or get knocked off. Place the wrist piece in vermiculite and cover it to cool.



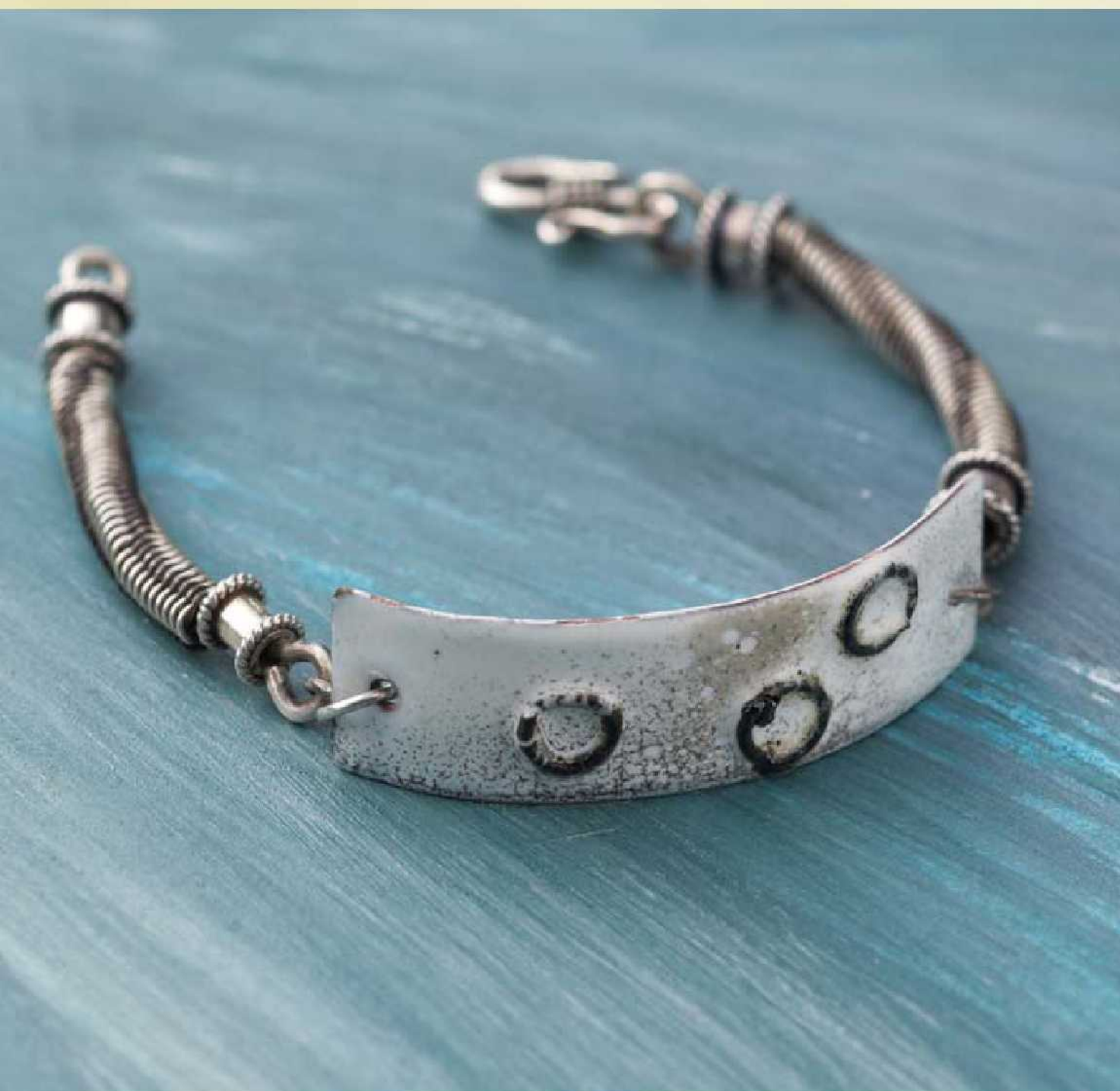
8 Attach a 7mm jump ring to one end of the bracelet and an 11mm jump ring to the other end (see *Opening and Closing Jump Rings* on page 24). Attach a second 11mm jump ring to the 7mm jump ring. Cut 20" (50.8cm) each of green suede lacing and multicolored nylon cord and double them over. Attach these to the side of the bracelet with the 7mm and 11mm jump rings using a lark's head knot.



9 Thread the suede lacing and nylon cords through a 10mm × 15mm sterling silver oval link and tie two over-hand knots approximately 2" (5.08cm) from the lark's head knot. Trim the excess.



10 Make an S-clasp from 2½" (8.89cm) of 16-gauge sterling wire (see *Making S-Clasps* on page 26). Attach one end of the clasp to the sterling silver oval link and sew it closed with 22-gauge bronze wire. Cut the wire and tuck in the ends.



Variation: Day into Night

This bracelet mimics the shape and abstract imagery of *All Wound Up*, but in a neutral palette. To make it, cut a 1" × 2½" (2.54cm × 6.35cm) piece of 20-gauge metal and enamel the metal in White (1055). During the firing process, place three annealed steel jump rings onto the piece. Reduce the amount of oxygen coming to the flame to get smoky hazes.

To create the bracelet ends, coil 22-gauge oxidized sterling wire using a ⅜" (0.24cm) mandrel and an electric drill. Coil the wire until it creates a 1½" (3.81cm) coil. Repeat for a second piece. Connect the ends to the bangle with jump rings.

Thread 16-gauge sterling wire through the coil at each end of the bracelet. Thread a sterling bead onto each end and make a loop. Add an S-clasp closure.



MATERIALS

FINDINGS

- ½" (1.27cm) diameter thin-walled copper pipe
- 19" (48cm) copper chain
- 24-gauge etched copper sheet
- two 9mm copper jump rings

ENAMEL

- White, opaque (1055)

TOOLS

- bench block
- center punch
- dead-blow hammer
- diamond bead reamer (optional)
- disc cutter with centering plugs
- felt-tip marker
- flexible shaft
- junk pliers
- long needle-nose pliers
- metal file
- no. 55 twist drill bit
- pipe cutter
- protective eyewear
- two-hole metal punch
- two pairs of chain-nose pliers

A Hole in One

This is the perfect unisex necklace. Your color choice will make it feminine or masculine. It requires no clasp and is a one-size-fits-all piece. It doesn't get much easier than that! You can choose to simply fire each piece with solid enamel, or you can get a little fancier like I did and etch the metal first.



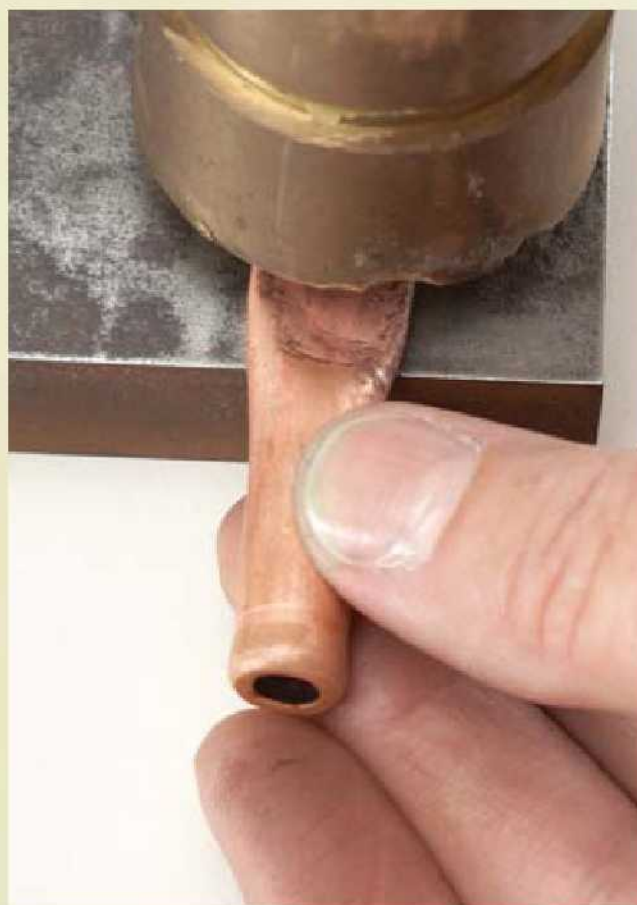
1 Measure a piece of etched copper approximately 33mm square. Center the square in the disc cutter, in the opening for a 12.5mm disc. Punch a disc. Use the disc cutter's centering plugs to center the 12.5mm hole in the opening for a 31mm disc. Punch out the disc to create a washer.



2 Mark the jump-ring hole in the donut with a felt-tip marker. Create a hole with the silver handle end of a two-hole metal punch. Make sure the hole is close enough to the edge of the metal to accommodate a 9mm jump ring.



3 Hold the donut in the flame with a pair of junk pliers. Enamel the half of the donut with the jump ring with three layers of White (see *Torch-Firing Pendants and Charms* on page 18).



4 Use a pipe cutter to cut 2" (5.08cm) of ½" (1.27cm) diameter copper pipe. Anneal the pipe by holding it with junk pliers in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow it to cool. Hammer the top ½" (1.27cm) of the pipe closed with a dead-blow hammer.



5 Use a metal file to round the corners of the hammered section of the pipe. Smooth any rough edges.



6 Use a center punch to create a dimple for the jump-ring hole in the hammered edge of the pipe.



7 Put on protective eyewear. Drill a hole through the hammered portion of the pipe with a flexible shaft and a no. 55 twist drill bit.



8 Hold the pipe with long needle-nose pliers. Steady the drill bit next to the pliers and drill a decorative hole. The pliers help guide and direct the drill bit. Don't worry if the drill bit slips and mars the metal because the enamel will cover any blemishes. Place decorative holes in the pipe as desired.



9 Hold the hammered edge of the pipe with junk pliers. Enamel the lower two-thirds of the pipe in three coats of White.



10 Check the holes in the copper pipe for rough spots and smooth with a diamond bead reamer if necessary. Attach the donut to one end of a 19" (48.26cm) copper chain with a 9mm jump ring (see *Opening and Closing Jump Rings* on page 24). Attach the pipe to the other end of the chain with a 9mm jump ring.



MATERIALS

FINDINGS

- 2¼" × 7" (5.72cm × 17.78cm) dupioni silk
- 4" (10cm) copper chain
- 14-gauge copper wire
- 22-gauge copper wire
- 22-gauge sterling silver wire
- 24-gauge copper sheet
- assorted enamel and manufactured beads and bead caps
- one copper-plated lobster clasp
- three 6mm brass heishi beads
- three 11mm solid copper jump rings

ENAMELS

- Foxglove, opaque (1745)
- Pumpkin, opaque (1850)

TOOLS

- bench block
- center punch
- chain-nose pliers
- chasing hammer
- dapping block with ridged side
- dead-blow hammer
- disc cutter

NOTE: You can also use metal shears, a plastic circle template and a straightedge.

- no. 51 drill bit
- flexible shaft
- metal shears
- scissors
- wire cutters

Fabric Flourish

Fabric was my first love. I feel quite at home in a fabric store, wandering through the aisles and admiring the cottons, organzas and silks. I particularly like dupioni silk for its slubs—those little bumps in the fabric that make for a wonderful texture. Here, dupioni silk provides a perfect contrast to the metal and enamel in this bracelet.



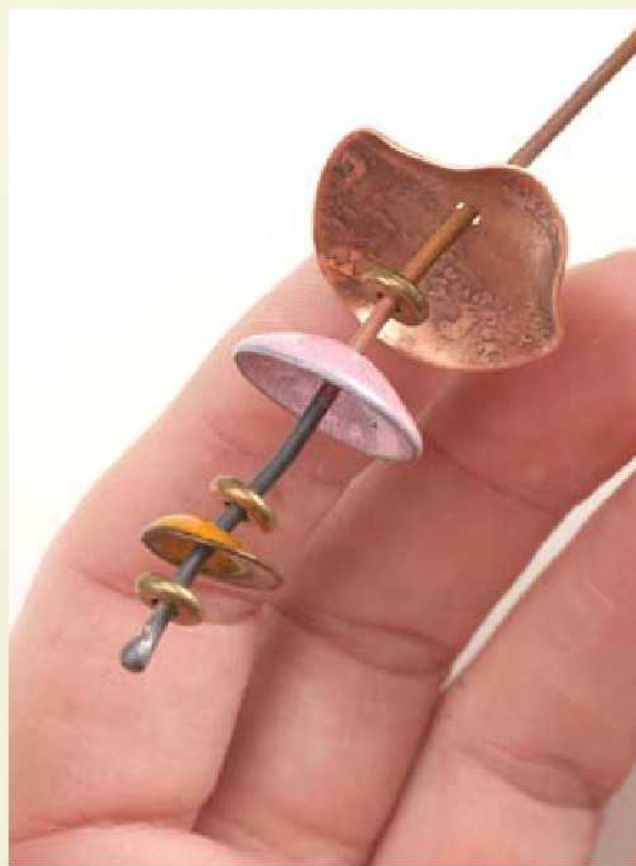
1 Use a disc cutter to cut out a 25mm, a 19mm and a 12mm copper disc from 24-gauge copper sheet. You can also handcut the discs with metal shears. Mark an off-center hole in each disc with a center punch. Drill the holes with a flexible shaft and a no. 51 drill bit. Shape the discs in a dapping block.



2 Anneal the 25mm disc by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow it to cool. Use the handle of a dapping punch, a hammer and a dapping block with a ridged side to create a ruffled edge on the disc.



3 Enamel the 19mm disc in Foxglove and the 12mm disc in Pumpkin (see *Torch-Firing Beads* on page 16).



4 Draw a bead on the end of a 12" (30.48cm) segment of 14-gauge copper wire. Thread a 6mm heishi bead, the 12mm enamel disc, a 6mm heishi bead, the 19mm enamel disc, a 6mm heishi bead and the 25mm hammered copper disc onto the wire. Draw a bead on the other end of the wire.



5 Hold the flower element in your nondominant hand, with the back of the 25mm disc facing you. Make a 45-degree bend in the wire where it exits the back of the hammered copper disc. Start creating a spiral. The wire should hug the back of the disc as you create the spiral.



6 Loop the wire once loosely around the wire where it exits the back of the hammered copper disc. Bring the wire around the first spiral, forming an organic concentric circle.



7 Lash the end of the wire to the first spiral with 22-gauge sterling wire.



8 Hammer the shape on a bench block with a chasing hammer.



9 Cut a 4" (10.16cm) segment of 22-gauge copper wire and begin making a wrapped loop, but before wrapping it, attach it to one side of the focal element (see *Making Wrapped Loops* on page 25). Slide a bead cap, enamel bead and another bead cap onto the wire and make another wrapped loop flush to the bead cap. Trim the excess wires. Continue adding enameled or manufactured beads on wire links to one side of the bracelet in the same manner until the linked portion measures approximately 2" (5.08cm). Before closing the final wrapped loop of the last link, attach an 11mm solid jump ring.



10 Cut a 4" (10.16cm) segment of 22-gauge copper wire and begin making a wrapped loop, but before finishing it, attach it to the other side of the focal element. Slide on an enameled bead cap and a manufactured bead and make a wrapped loop at the other end. The linked portion of this side should measure approximately 1¼" (3.18cm). Before wrapping the last loop, attach an 11mm jump ring (see *Opening and Closing Jump Rings* on page 24). Trim the excess wire. Double over a 4" (10.16cm) piece of copper chain and attach the folded end to the jump ring. Attach another 11mm jump ring to the chain ends. Attach a lobster clasp to the end of the bracelet.



11 Lay a 2¼" × 7" (5.72cm × 17.78cm) wide strip of dupioni silk on a flat surface. Lay the bracelet next to the fabric and cut the silk slightly longer than the bracelet.



12 Wrap 22-gauge copper wire around the end of the fabric strip several times. Then wrap this wire around the last wrapped loop at one end of the bracelet several times to bind the fabric to the bracelet. Repeat on the opposite end. Trim any excess fabric.



13 Wrap 22-gauge sterling wire around the bracelet where the fabric is attached.



MATERIALS

FINDINGS

- $\frac{1}{4}$ " \times 7" (6mm \times 17.78cm) foam tube
- $\frac{1}{4}$ yard (0.23m) woven fabric
- 19-gauge annealed steel wire
- 22-gauge sterling wire
- assorted manufactured beads and flower bead caps
- eight 11 mm solid jump rings
- four 12mm corrugated iron beads
- one copper-plated lobster clasp
- ribbon and fiber strands
- two 17mm iron flower bead caps

ENAMELS

- Clover, opaque (1715)
- Lime Yellow, transparent (2230)
- Pumpkin, opaque (1850)
- Turquoise, transparent (2435)
- White, opaque (1055)

TOOLS

- chain-nose pliers
- iron and ironing board or mat
- round-nose pliers
- scissors
- spray adhesive
- wire cutters

Harem

I can't decide if this is a bracelet or an anklet. It can only be an anklet if you're willing to break out into dance when you wear it! Whatever you decide, this piece is fun and easy to make. It's perfect for the hodgepodge of leftovers on your worktable—a "bench collection" of sorts. Don't dwell on planning your design; if you go with the flow, it will truly reflect you and your work.

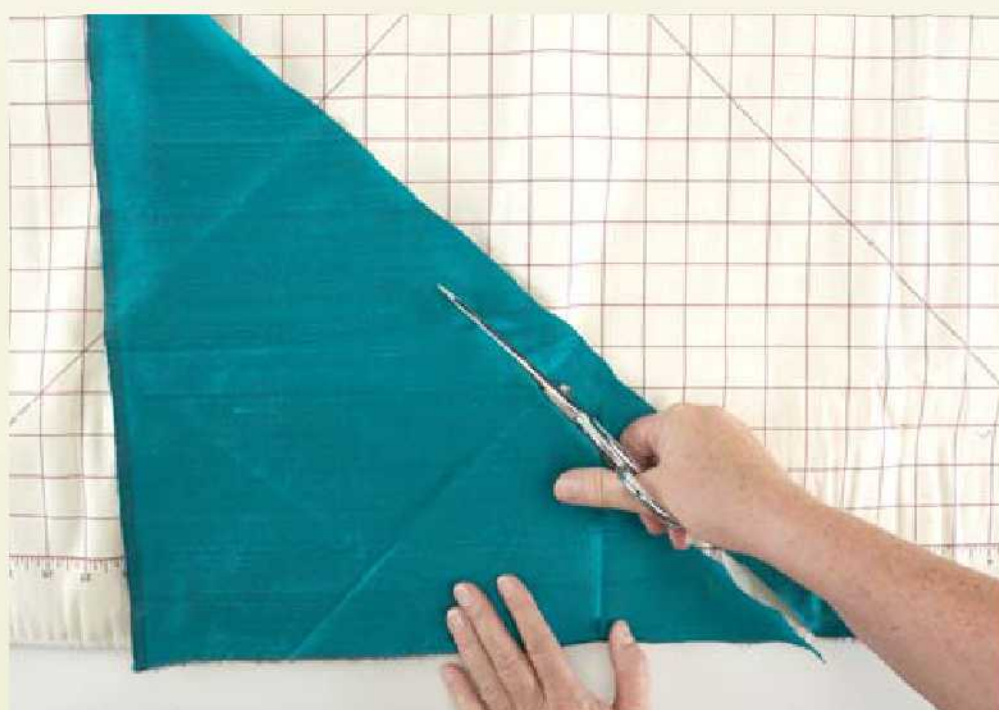
Preparing Fabric for Cutting Bias Strips

Establish the straight of grain: Use scissors to place a snip into the selvedge edge of woven fabric, about 1" (2.54cm) from the cut edge. (The selvedge edges are the two finished edges of the fabric as it comes from the factory.) Tear the fabric at the snip.

Establish the bias grain: Place the fabric on a flat surface. Pick up one corner of the fabric and bring the end diagonally across the fabric so that one torn edge of the fabric will rest on top of one selvedge edge of the fabric. Press the fold with an iron. Cut through the ironed fold in the fabric.



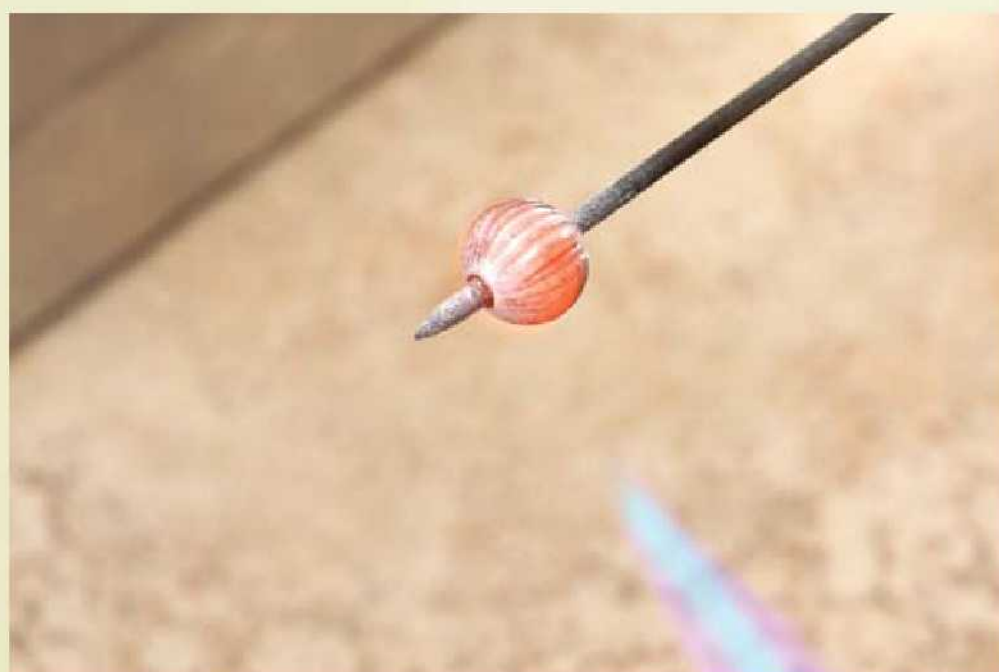
- 1 Use the directions at left to establish the straight of grain and the bias grain for $\frac{1}{4}$ yard (0.23m) of woven fabric. Cut through the ironed fold in the fabric.



- 2 Measure and mark 1" (2.54cm) from the cut edge along the length of the fabric. Cut a 15" (38.1cm) bias strip.



- 3 Spray adhesive on a $\frac{1}{4}$ " \times 7" (6mm \times 17.78cm) piece of foam tubing. Starting at one end and working across, wrap the bias strip around the foam.



- 4 Enamel four 12mm corrugated beads: one in White with Lime Yellow on top, one in White with Turquoise on top, one in Pumpkin and one in Clover (see *Torch-Firing Beads* on page 16). Enamel two 17mm flower bead caps in Pumpkin and Clover.



- 5 Thread a 4" (10.16cm) segment of 22-gauge sterling silver wire through a solid jump ring and make a wrapped loop. Thread a bead cap, an enamel bead and another bead cap onto the wire.



6 Make a wrapped loop flush against the bead cap, but before finishing it, attach a small rhinestone dangle link (see *Making Wrapped Loops* on page 25). Wrap the loop with the excess wire. Create six dangles. You can choose to add different enamel and manufactured findings to the dangles as desired. Go wild!



7 Wrap a bundle of ribbon and fiber strands around the tubing, starting 1" (2.54cm) from the end. Tie the ends in overhand knots to secure.



8 Slide a dangle onto the bracelet. Wrap another ribbon and fiber bundle after the first dangle to keep it from sliding on the bracelet. Continue sliding on dangles and wrapping bundles on the bracelet, stopping 1" (2.54cm) from the end and ending with a ribbon and fiber bundle.



9 Pierce the end of the foam bracelet with 3" (7.62cm) of 19-gauge annealed steel wire. Fold the ends up, keeping one end longer than the other. Wrap the shorter wire end around the longer wire end.



10 Thread an enamel bead cap onto the wire. Trim the excess wire and make a simple loop flush against the bead cap (see *Making Simple Loops* on page 25). Attach an 11mm solid jump ring to the loop.



11 Repeat Steps 8 and 9 on the other side of the bracelet, but attach a lobster clasp before closing the simple loop.



MATERIALS

FINDINGS

- 24-gauge copper sheet
- assorted 3mm–10mm manufactured beads
- nylon bead cord
- one 12mm corrugated iron bead
- one magnetic clasp
- two silver clamshell bead tips

ENAMELS

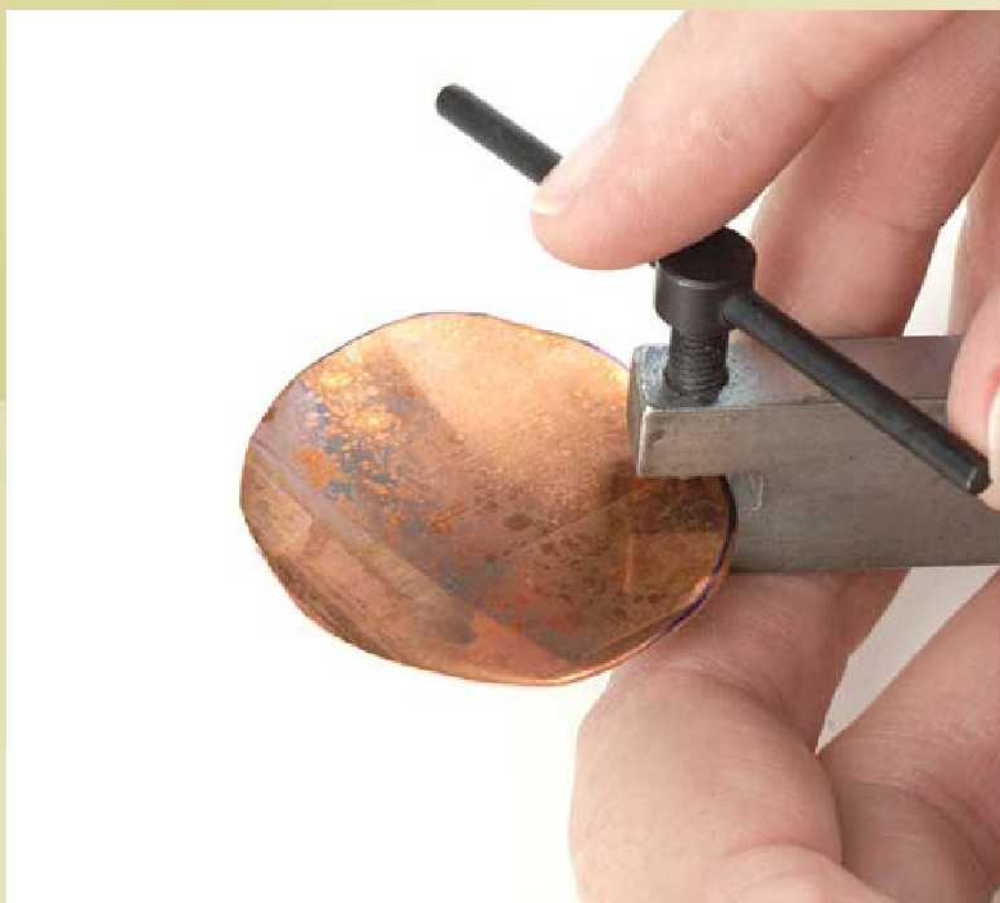
- Clover Pink, opaque (1715)
- White, opaque (1055)

TOOLS

- beading tweezers
- chain-nose pliers
- clear nail polish or glue
- dapping block and punch
- dead-blow hammer
- diamond bead reamer
- dust mask
- enamel sifter
- fine-tip paintbrush (optional)
- large rubber stamp with scroll pattern
- metal file
- metal shears
- scissors
- scrap of paper
- two-hole metal punch
- white opaque ink (Staz-On)

Pink Ink

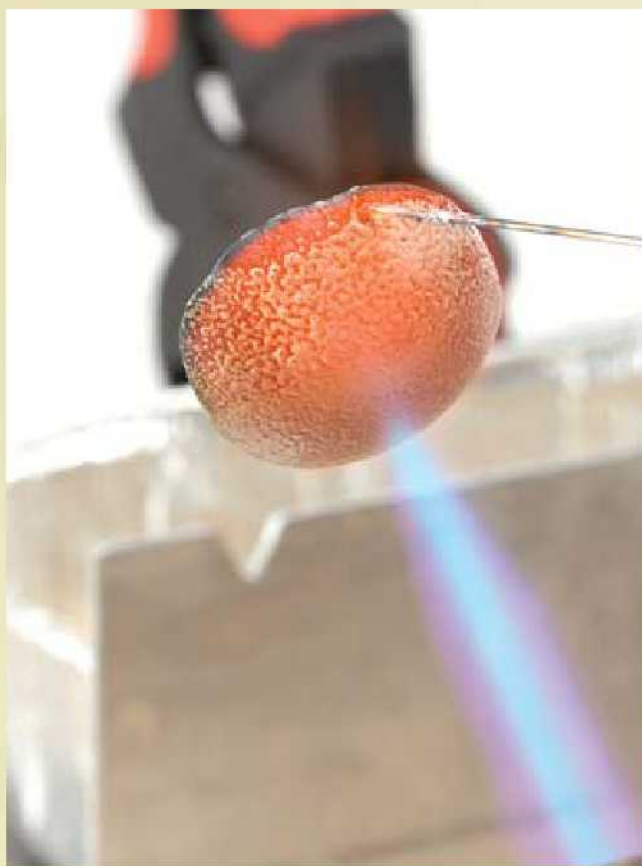
I tend toward matte surfaces and natural materials, but this piece has some definite “bling.” I’ll admit that it’s nice to be dazzled by aurora borealis faceted beads every once in a while. The beads are also a nice contrast to the obviously hand-formed and hammered pendant. The free-form beading means that you’ll be designing throughout the making process. Do a little, take a look and then do some more.



1 Use metal shears to cut a 2" (5.08cm) disc from 24-gauge copper sheet. Smooth the edges with a metal file. Use the black handle end of a two-hole metal punch to make a hole in the edge of the disc that will accommodate four strands of nylon bead cord.



2 Anneal the disc by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow it to cool. Shape the disc in a dapping block. The dapping set has a shallow contour.



3 Dangle the disc from a mandrel in the flame. Apply at least three layers of White enamel (see *Torch-Firing Pendants and Charms* on page 18). Remove the disc from the mandrel and let it cool in vermiculite.



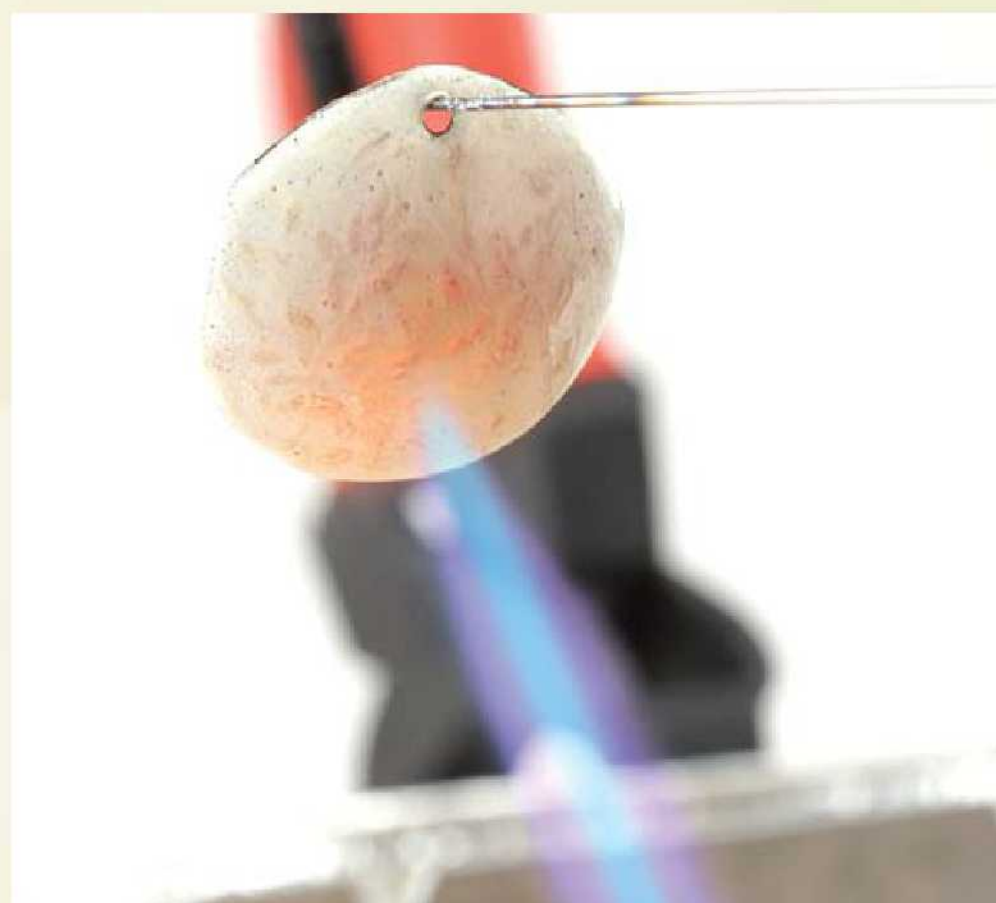
4 Apply a generous amount of white opaque ink to a large rubber stamp with a scroll pattern. Press the convex side of the disc against the stamp, making sure the design is pressed to the edges.



5 Wear a dust mask. While the ink is still wet, sift Clover Pink enamel onto the disc. If the ink dries too quickly, just wipe it off and repeat Step 4.



6 Use a small scrap of paper to press the enamel into the ink. Tap off the excess enamel. You may also use a fine-tip paintbrush to remove unwanted enamel from the stamped design.



7 Slide the pendant onto a mandrel. To prevent thermal shock, warm the pendant gradually by moving it in and out of the flame. When the enamel starts to darken, begin to heat the pendant more aggressively until the enamel is smooth and shiny. Remove the pendant and let it cool in vermiculite.



8 Smooth the hole in the pendant with a diamond bead reamer. Cut two 36" (91.44cm) lengths of nylon bead cord. Thread the loop through the hole and secure with a lark's head knot.




9 Enamel a 12mm corrugated iron bead in three layers of Clover Pink (see *Torch-Firing Beads* on page 16). Let it cool in vermiculite.



10 Thread all four strands through the enamel corrugated bead. Tie an overhand knot with all four strands. As you tighten the knot, grasp the cords where they exit the bead with tweezers so the knot will be flush to the bead.



11 Separate the four strands into two sections. Start working on one side of the necklace. Tie an overhand knot in each of the strands. Thread three or four different-sized beads onto each strand and end each beaded segment with another overhand knot. Tie the two strands together with an overhand knot a little further up the cords.

 **TIP:** When tying the knots, grasp the cord where the knot will be placed with tweezers as you tighten. This ensures that the knot will be where you want it to be!



12 Continue beading one side of the necklace. Each beaded section should have an overhand knot flush against the first and the last bead. After beading each of the cords, tie them both together with an overhand knot a little further up the cord.



13 Create a looped bead cluster for some of the beaded segments. Loop a beaded section over on itself. Bring the free end of the cord through the loop and tie a knot.



14 Continue beading until you are 5" (12.7cm) from the lark's head knot. To maintain balance in both sides of the necklace, you can alternately bead back and forth between the two sections of cord.



15 After beading 5" (12.7cm) of each side of the necklace with bead segments, tie both strands into an overhand knot. Slide a 3mm bead onto one of the cords. Tie an overhand knot with both strands flush against the bead. Continue this process until you have used nine beads. Tie an overhand knot with both strands. Repeat for the other side of the necklace.



16 Place a dab of clear nail polish or glue on the last overhand knot and cover it with a clamshell bead tip. Trim the excess cords. Squeeze the clamshell closed with chain-nose or crimping pliers. Repeat for the other side of the necklace.



17 Attach a magnetic clasp to the clamshell bead tips on each end of the necklace.



MATERIALS

FINDINGS

- 5" (12.7cm) copper chain
- 24-gauge copper sheet
- ceramic decal
- ceramic underglaze crayons
- five 11mm jump rings
- one copper-plated lobster clasp

ENAMELS

- Clear Liquid Enamel (dry form) (BC-303L)
- Copper, transparent (6/20 mesh) (2410)
- Horizon Blue, opaque (1515)
- Medium Fusing Clear (2030)
- millefiori wafers
- Nile Green, transparent (2305)
- White, opaque (1055)

TOOLS

- craft knife or small scissors
- dapping block and punch
- dead-blow hammer
- disc cutter
- dust mask
- enamel sifter
- fine-tip paintbrush
- glass etching cream
- graphite pencil
- latex gloves
- paper towel
- soldering tripod
- Styrofoam plate or other protective surface
- thin mandrel
- three-point trivet
- tweezers
- two-hole metal punch
- two pairs of chain-nose pliers
- water

Luscious Links

You can have fun in the studio experimenting with enameling techniques, and at day's end have enough items for several great pieces of jewelry. Even though the techniques will be different, if you start with metal pieces that are the same size and shape, you can easily integrate them into a single piece of jewelry. Not only will your day of play be fun, it will also be productive!



1 Punch out three 25mm discs from 24-gauge copper sheet. Use the black handle end of a two-hole metal punch to make two jump ring holes in one of the discs. Use this disc as a template for the placement of the jump ring holes for the other discs. Place the template disc on top of another disc. Guide the punch through the hole in the template disc to the disc beneath. Continue turning the handle to pierce the hole. Repeat until all discs have two holes.



2 Anneal each disc by dangling it from a mandrel in the flame until it glows dull cherry red (see *Annealing* on page 23). Quench them in water or allow them to cool gradually.



3 Dome each disc in a dapping block.



4 Enamel a smooth copper disc with three layers of White (see *Torch-Firing Pendants and Charms* on page 18).



5 Hold the mandrel in your nondominant hand and tilt your wrist so the disc is in a more horizontal position. With tweezers, add one or two pieces of 6/20 Copper transparent enamel. Melt the enamel from underneath until it softens. Use a thin mandrel to draw out some of the jewel-toned enamel into the White base enamel.




6 Direct the flame at the area where you want to place millefiori wafers. Hold a millefiori wafer with tweezers and press it into the softened enamel. Heat from underneath until the millefiori flattens. Repeat with more millefiori wafers as desired.

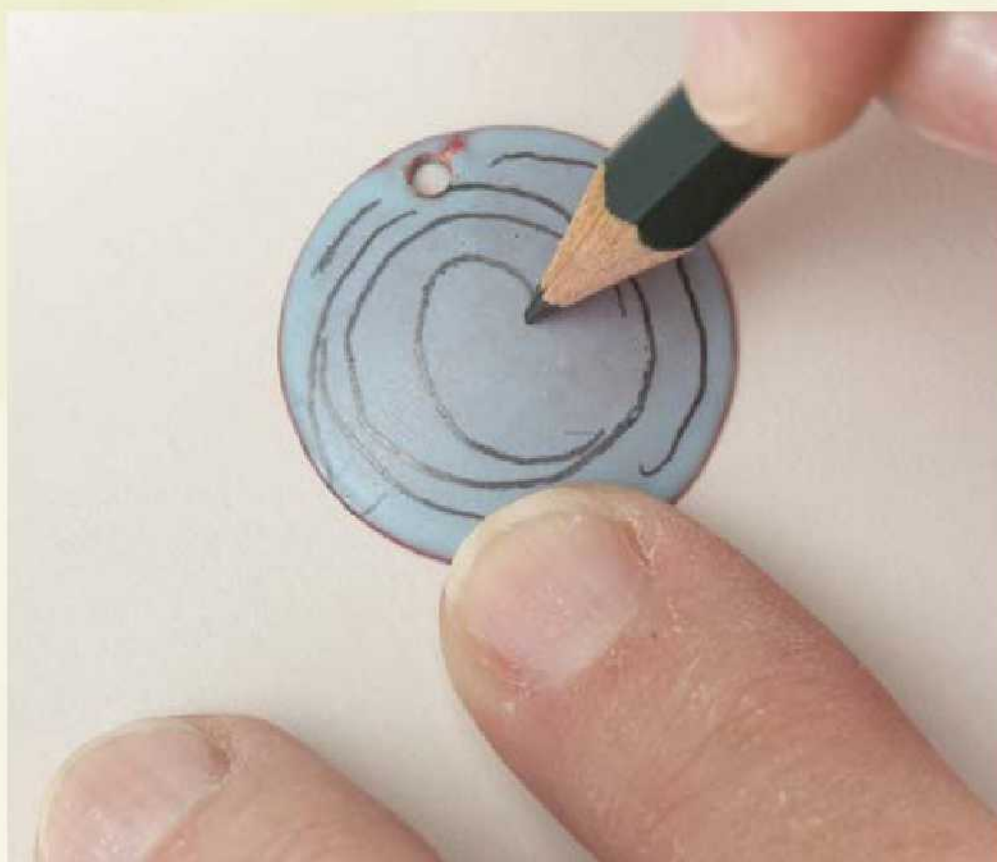


7 Give the disc a general all-over heating and remove it from the mandrel. Let it cool in vermiculite.



8 Enamel a smooth copper disc in three layers of Horizon Blue. Cool. Follow the manufacturer's instructions to etch the enamel surface with glass etching cream using a fine-tip paintbrush. This will provide tooth for graphite and underglaze crayons. Rinse the disc in water and dry.

 **TIP:** When using glass etching cream, protect your work surface with a Styrofoam plate or similar item.



9 Draw a design on the disc with a graphite pencil.



10 Enhance the design with ceramic underglaze crayons.



11 Wear a dust mask. Sift medium fusing clear enamel onto the disc to protect the surface design.



12 Place the disc on a three-point trivet on top of a soldering tripod. During the firing, you can sprinkle colored enamel onto the piece as desired. Fire the disc from beneath until the enamel begins to fuse. Bring the torch topside to finish the firing.

TIPS:

- When firing on a tripod and sifting enamel onto a piece, fire from beneath to avoid blowing the enamel from the piece. When the enamel starts to become shiny, move the torch topside.
- To prevent thermal shock on pre-fired enamel, gradually warm the piece. When the enamel starts to darken, fire the piece more aggressively.



13 Enamel a smooth copper disc with two layers of Horizon Blue and one layer of Nile Green. Cool. Make sure the enamel is free of oil and dirt. Use a craft knife or small scissors to closely trim a ceramic decal from the sheet. Following the manufacturer's instructions, soak the decal with its backing sheet in tepid water. The sheet will curl and then flatten. Remove the backing sheet from the decal and press the decal in place with your fingers. Gently blot the excess water with a paper towel.



14 Wear a dust mask. Sift medium fusing clear enamel onto the disc to protect the decal. Place the disc on a three-point trivet on top of a tripod. Fire the disc from beneath until the enamel begins to fuse. Bring the torch topside to finish the firing.



15 Use chain-nose pliers to link three of the discs together with 11mm jump rings (see *Opening and Closing Jump Rings* on page 24). Add a jump ring at the beginning and end of the bracelet.



16 Thread a 5" (12.7cm) length of copper chain through one of the jump rings and double it in half. Guide an 11mm jump ring through both of the end links of the chain and attach a lobster clasp.



Winged Heart

This is a fun mixed-media jewelry project that integrates fabric, a watch gear, brass wings and beads. What else could you ask for? Remnants from my past as an apparel design major appear in this project. We'll be working with bias strips of fabric that we'll turn into cording. I'll demonstrate a nifty tube-turning device that will open up a realm of fabric possibilities. Can you sew a straight seam? If the answer is yes, then you can make a bias cord necklace. If you don't have access to a sewing machine or can't sew a straight seam, use the bias strip as-is. Remember, I'll be holding your hand as we traverse foreign territory!

MATERIALS

FINDINGS

- ½ yard (0.46m) green lightweight woven fabric
- ½ yard (0.46m) red lightweight woven fabric
- 20" (50.8cm) copper-plated chain
- 18-gauge sterling silver wire
- 24-gauge copper sheet
- 24-gauge sterling silver wire
- approximately 60 brown rainbow color 8/0 seed beads
- four 6mm jump rings
- nylon beading cord
- one brass watch gear
- one copper-plated lobster clasp
- one set of brass wings
- three Shannon LeVart 20mm patinated brass links
- two 3mm jump rings
- two small watch gears or 3mm heishi beads
- two sets of micro nuts and bolts

ENAMELS

- China Pink, transparent (2825)
- Orient Red, opaque (1870)

TOOLS

- bench block
- center punch
- chasing hammer
- clear nail polish or glue
- fabric tube turner
- felt-tip marker
- flexible shaft
- iron and ironing board or mat
- metal shears
- needle file
- no. 60 drill bit
- nut drivers
- sewing machine or a needle and thread
- tweezers
- two-hole metal punch
- two pairs of chain-nose pliers
- wire cutters



1 Use the template on page 83 to cut out a heart shape from 24-gauge copper sheet using metal shears. Refine the shape and remove burs with a needle file.



2 Use the template to determine the placement of the holes in the copper heart. Mark the holes with a felt-tip marker. Use a flexible shaft and a no. 60 drill bit to drill the two holes at the top of the heart as shown. Use either a two-hole metal punch or the drill bit to drill two holes in the sides of the heart as shown for the micro nuts and bolts.



3 Place a set of brass wings under the heart and determine their placement. The wings will be attached to the lower set of holes in the heart. Mark the hole placement on the wings with a felt-tip marker.



4 Dimple the marked holes with a center punch and drill a hole slightly smaller or the same size as the diameter of the micro nut with the flexible shaft (see *Tip* below).



5 Dangle the heart from a mandrel in the flame and enamel with three layers of Orient Red (see *Torch-Firing Pendants and Charms* on page 18).

TIP: Since there are so many different sizes of micro nuts and bolts, you may end up using a different size than I used. Determine the drill bit size you should use by measuring the diameter of the bolt with a measuring bead gauge. Match this diameter to a drill bit or metal punch. Err on the side of a smaller hole rather than a larger one. See *Drill Bits Demystified* on page 15 for some popular drill bit sizes.



6 Tilt your wrist so that the heart is in a relatively horizontal position. The pendant will not slide down the mandrel because the enamel has secured it in place. Grasp a brass watch gear with tweezers, warm it gently and dip it into China Pink enamel.

TIP: Sometimes holes close up during the enameling process. Place the heart under the flame and, as the enamel heats up, use another mandrel to reopen the hole.



7 When the base enamel shows signs of softening, press the gear onto the heart with tweezers. Dip the heart into China Pink enamel in order to seal the gear so it cannot snag clothing or be knocked off. Remove the pendant from the mandrel and allow it to cool in vermiculite.



8 Draw a bead on the end of a 1½" (3.81cm) piece of 18-gauge sterling wire. Thread a small watch gear or a 3mm heishi bead onto the wire. Insert the wire into one of the holes at the top of the heart. From the backside, insert the other end of wire into the other hole and thread on another small watch gear or 3mm heishi bead. Pull the sterling wire tightly toward the front of the heart pendant. Holding the wire with pliers, draw a bead on the other wire end. When cool, bend the wire loop behind the heart up to create a bail. Hammer the wire to reinforce the shape.



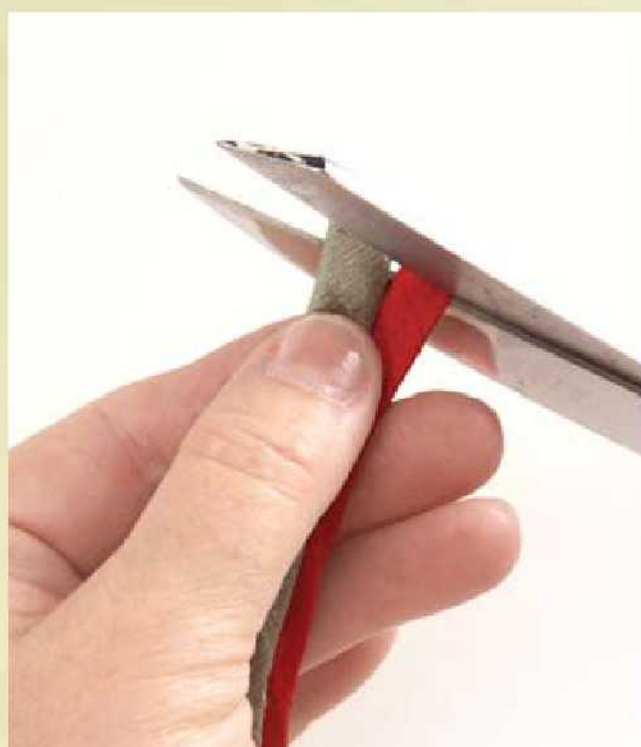
9 Use nut drivers to attach the brass wings to the heart with micro nuts and bolts. Apply a dot of clear nail polish or glue to each nut and bolt to prevent them from unscrewing.



10 Establish the straight of grain and the bias grain for $\frac{1}{2}$ yard (0.46m) of green woven fabric (see *Preparing Fabric for Cutting Bias Strips* on page 67). Measure and mark $1\frac{1}{2}$ " (3.81cm) from the diagonal edge along the length of the fabric and cut a 16" (40.64cm) bias strip. Fold the fabric strip in half lengthwise, with the right sides of the fabric together. Hand or machine sew a straight seam that is approximately $\frac{1}{4}$ "– $\frac{3}{8}$ " (6mm–10mm) from the cut edge. Slide the fabric over the appropriate size metal cylinder of a fabric tube turner.



11 Fold the end of the fabric over the cylinder end and hold it in place with your finger. Insert the turning wire into the cylinder until the pigtail pierces the fabric. Twist to secure the fabric onto the pigtail. Pull on the handle of the turning wire and turn the fabric right side out, making a fabric tube.



12 Repeat Steps 9–11 to make a fabric tube with red fabric. Cut both tubes into 16" (40.64cm) lengths.



13 String 8/0 brown rainbow seed beads onto a 20" (50.8cm) length of nylon beading cord, leaving 2" (5.08cm) empty on each end. At each end, thread the cord through a crimp bead, a 3mm jump ring and then back through the crimp bead. Crimp the bead with chain-nose pliers. Trim the excess cord.



14 Attach each end of the beaded strand to a 20mm patinated brass link using a 6mm jump ring (see *Opening and Closing Jump Rings* on page 24).



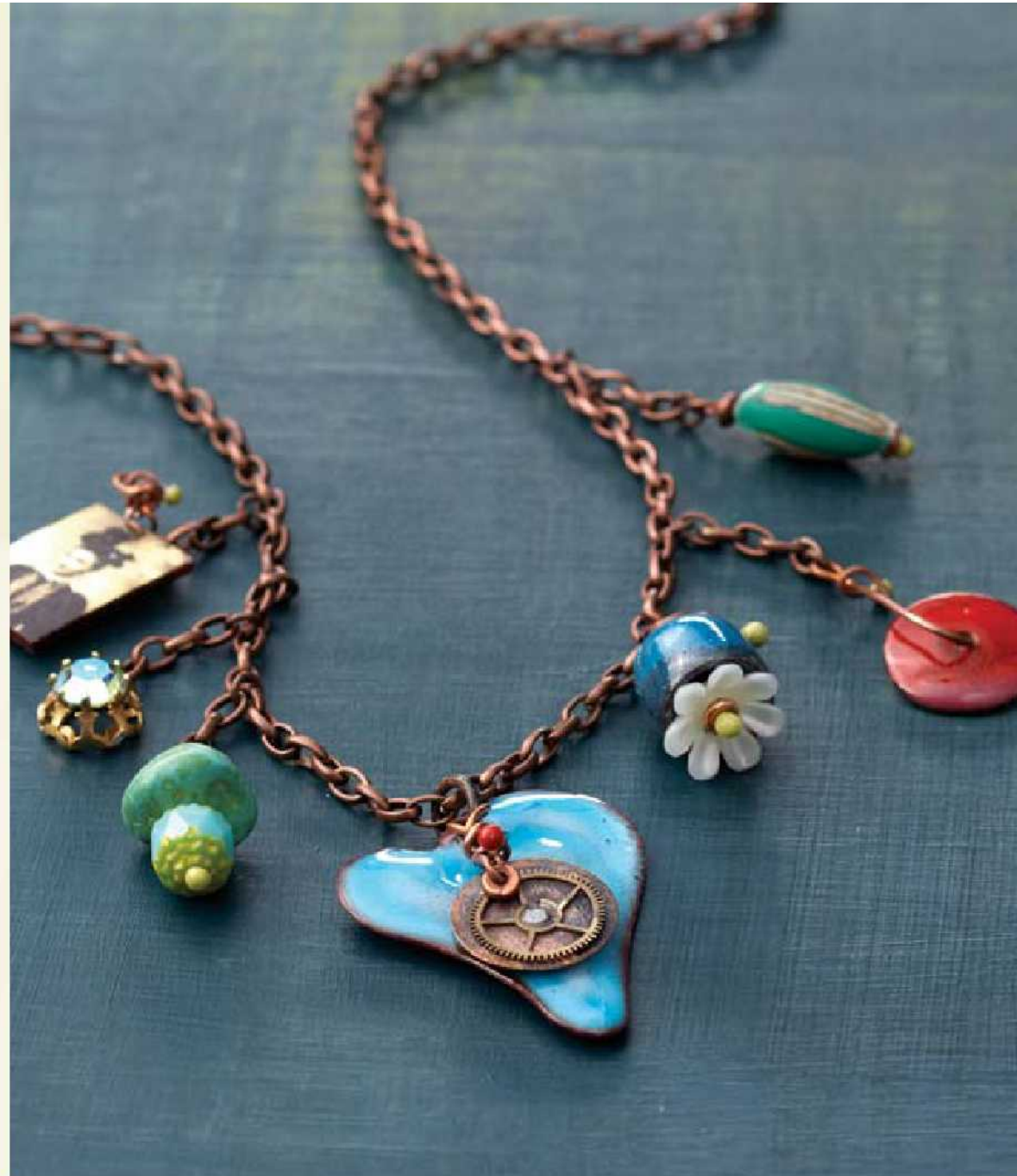
15 Insert the fabric cords through the patinated link at one end of the beaded cord and fold them over about $\frac{1}{2}$ " (1.27cm). Wrap 24-gauge sterling wire around the fabric cords and the beaded necklace to secure them. Repeat for the other end of the beaded cord and the other ends of the fabric cords.



16 Thread a 20" (50.8cm) length of copper chain through the patinated link on one side of the necklace. Double the chain so the ends are even. Slide a 6mm jump ring through the end links of the chain. Repeat for the other side of the necklace, but also attach a lobster clasp to the 6mm jump ring.

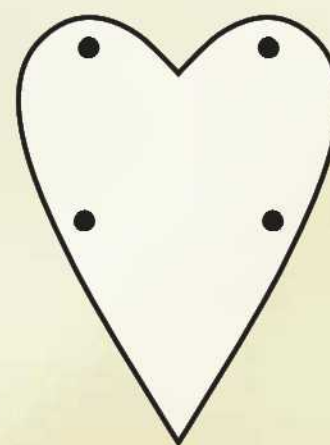


17 Attach the winged heart to the center of the necklace with a 20mm patinated brass link.



Variation: Melange

This necklace is a slightly different take on Winged Heart, with a more vintage and whimsical appeal. Enamel a heart cut from copper sheet, a bead cap, a copper disc and several head pins. Rivet a brass watch gear to a $\frac{3}{8}$ " (0.95cm) copper disc. Create several dangles and charms from an assortment of beads and enamel head pins. Create a dangle using a vintage plastic flower, the bead cap and an enamel head pin, and a Victorian lady charm using shrink plastic. Connect the charms and dangles to a copper chain using jump rings. Attach the enamel heart to the center of the necklace with the watch gear charm in front of it. Add a clasp and a large jump ring for the closure.



Heart Template

Actual size



MATERIALS

FINDINGS

- 14-gauge copper wire
- 16-gauge copper wire
- 18-gauge sterling silver wire
- 22-gauge bronze wire
- assorted Gaea Canaday ceramic beads
- five 6mm brass heishi beads
- ribbons
- three 14mm solid jump rings
- three 16mm copper beads

ENAMELS

- Aquamarine, opaque (1422)
- cat whiskers
- Copper Green, transparent (6/20 mesh) (2410)
- Geranium, transparent (2810)
- millefiori wafers

TOOLS

- $\frac{3}{32}$ " (0.24cm) diameter mandrel
- bench block
- chain-nose pliers
- chasing hammer
- dapping block and punch
- electric drill
- flexible shaft
- no. 51 drill bit
- round-nose pliers
- tweezers
- wire cutters

Forging Ahead

“Forging” sounds like a skill reserved for the most seasoned metalsmith. Not so! It is simply the heating, hammering and moving of metal. When we’re finished, our enamel beads will look like they’ve been plucked from a field of heather. Millefiori, which in Italian means “thousand flowers,” will give your beads the look of an Impressionist painting.



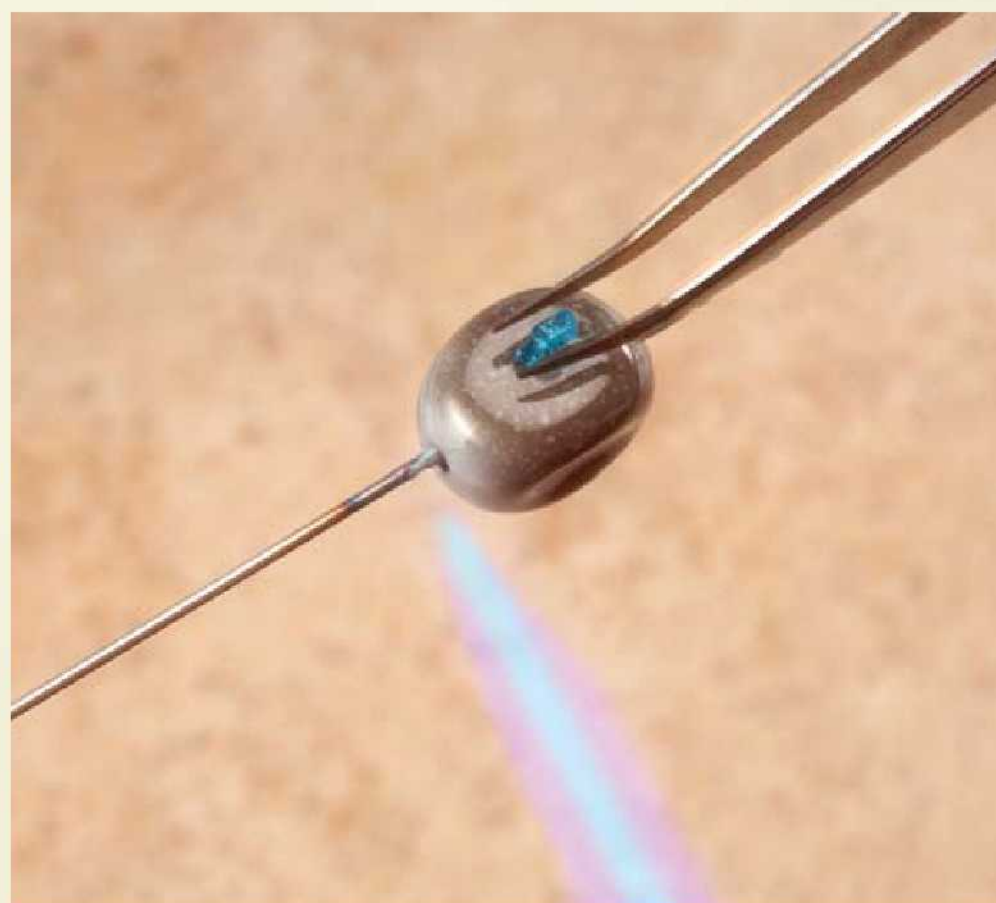
1 Use a flexible shaft and a no. 51 drill bit to enlarge the holes in three 16mm copper beads. Use a dapping block to help hold the bead steady as you drill. Enlarge one hole, then flip the bead over and enlarge the other hole.



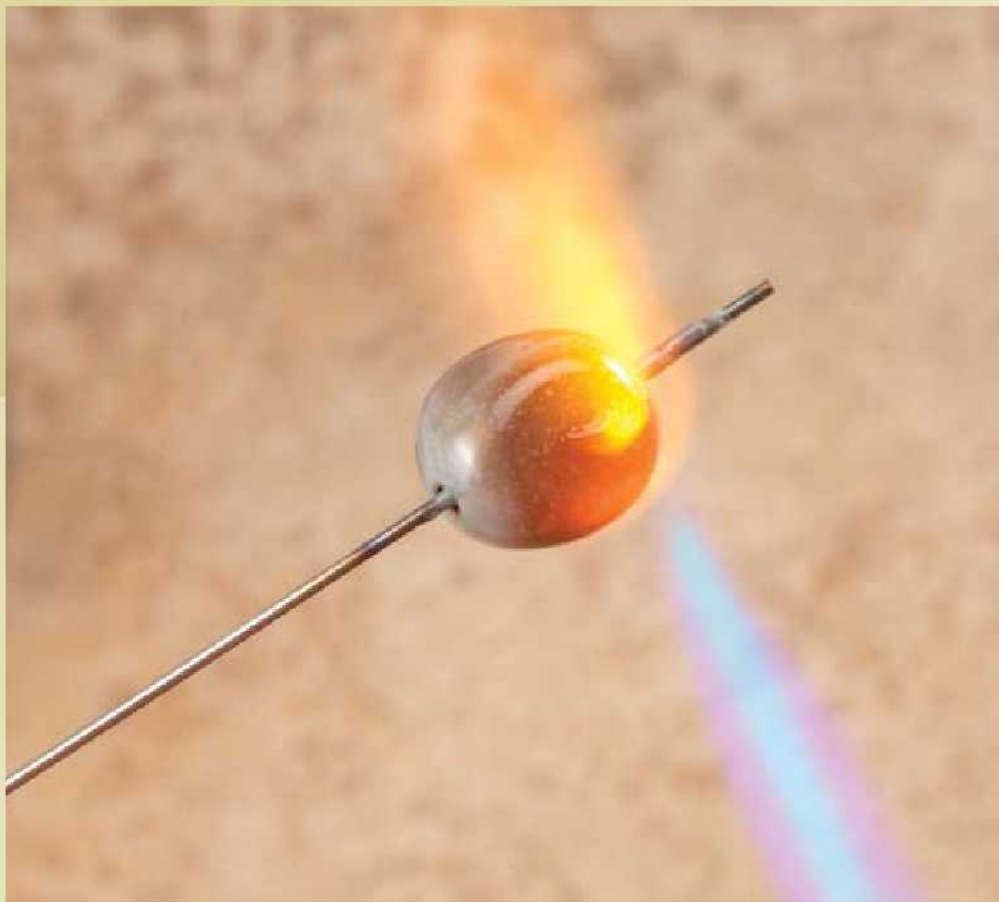
2 Place one of the 16mm beads on the mandrel and heat it in the flame until it glows a dull cherry red. While the hot bead is still on the mandrel, rest it on a bench block and hammer it. Reheat and hammer until you're satisfied with the shape. Repeat for the remaining beads.



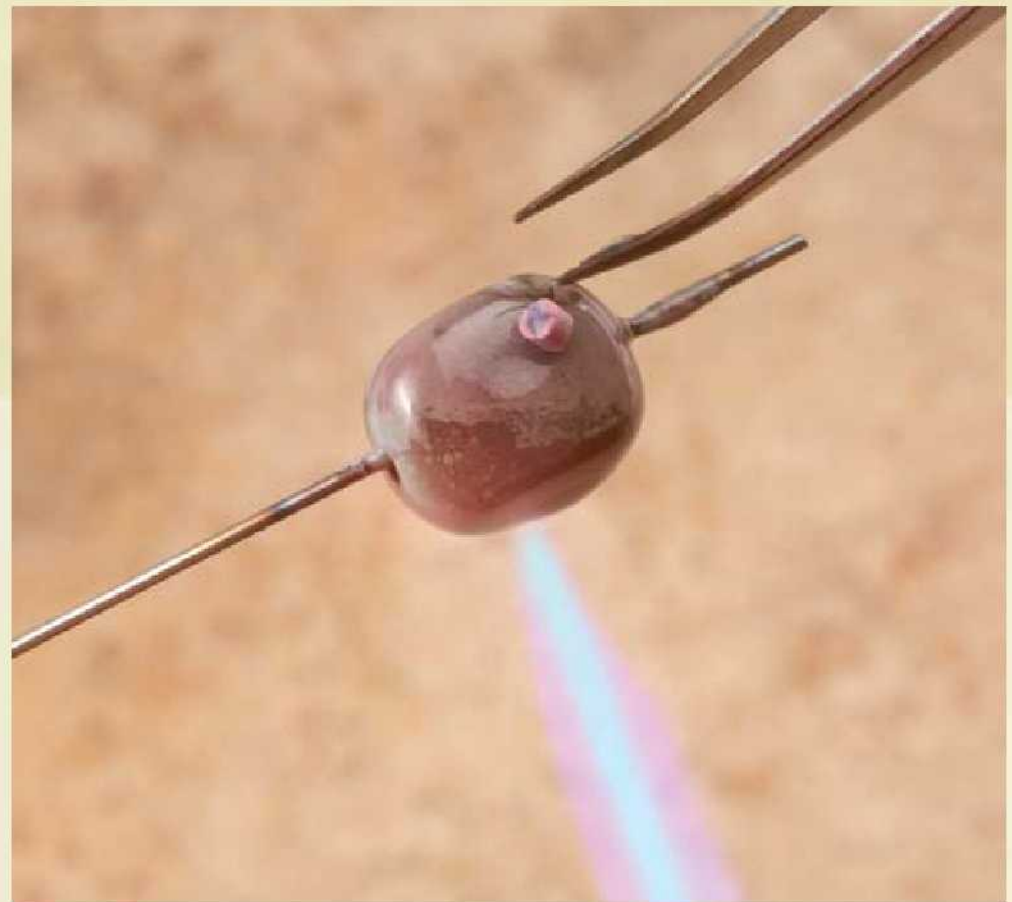
3 Enamel the bead in three layers of Aquamarine (see *Torch-Firing Beads* on page 16). Dip part of the bead into Geranium and fire again.



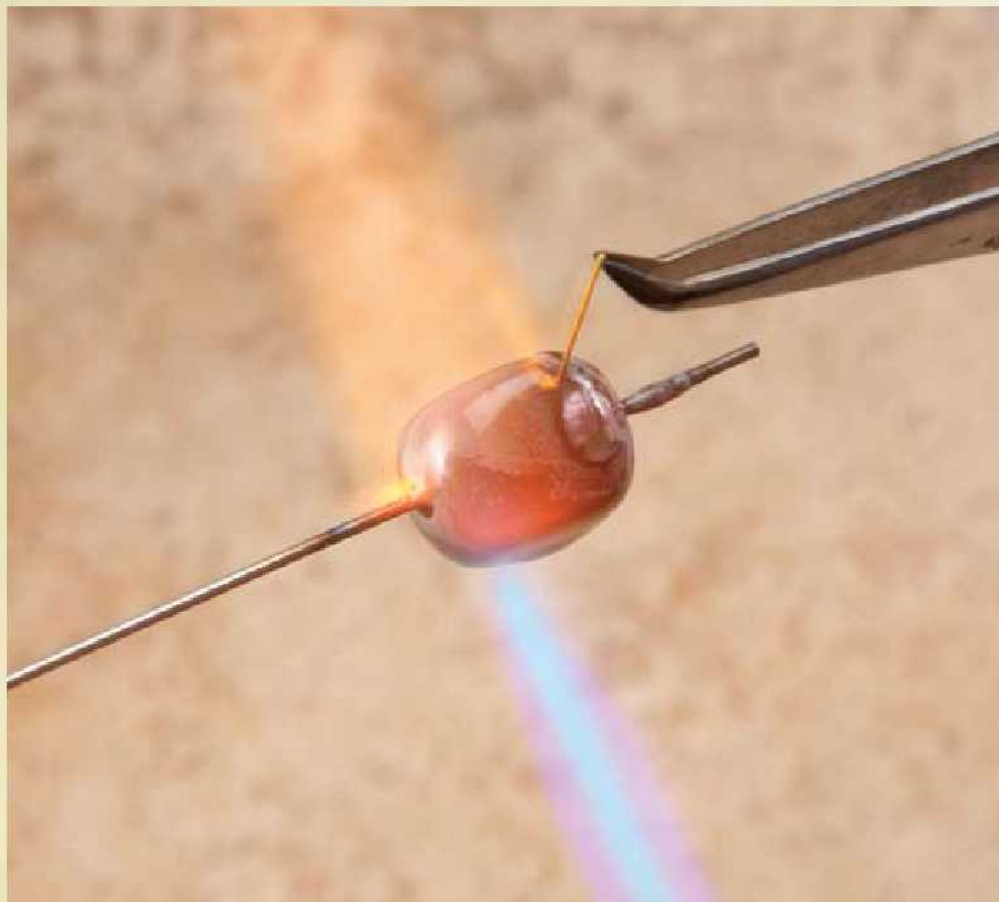
4 Heat a select area of the enamel until it becomes soft. Press a lump of Copper Green enamel onto the bead.



5 Focus the heat on the enamel lump until it flattens. Use a mandrel to draw some of the transparent enamel into the base enamel.



6 Heat a select area of the bead and add a millefiori wafer. Apply heat to the wafer. Repeat as desired.



7 Heat a select area of the bead. Remove the bead from the flame and place a cat whisker onto the enamel.



8 Heat the tip of the whisker so that it flattens into a dot. Heat the bead and lay other whiskers on the bead so they create lines.



TIP: Be careful with cat whiskers; they will sometimes melt from contact with the flame before they even reach the bead!



9 Evenly heat the bead, but not to glowing. Rotate the bead in the cool part of the flame to allow it to cool slowly. Let the bead cool in vermiculite. Repeat Steps 3–9 for the remaining two beads.



10 Place a $\frac{3}{32}$ " (2mm) mandrel into the chuck of an electric drill and secure it. Insert the end of 22-gauge bronze wire into one of the slots of the drill chuck. With the drill speed on slow, guide the wire so that it creates a tight coil bead approximately $\frac{5}{8}$ " (1.59cm) long.



11 Guide the wire randomly back and forth over the tight coil to create a loose spiral bead with a 7mm diameter.



12 Draw a bead on each end of a 4" (10.16cm) length of 18-gauge sterling wire. Wrap the wire around a $\frac{3}{4}$ " (1.91cm) mandrel; the ends should be overlapping. Use 22-gauge bronze wire to close the link by tightly wrapping between the two beaded wire ends. Lightly hammer the wire to reinforce the shape.



13 Make a simple loop at the end of a 4" (10.16cm) piece of 14-gauge copper wire (see *Making Simple Loops* on page 25). Thread on assorted beads, including one of the forged enamel beads and a loose spiral bead, leaving $\frac{1}{2}$ " (1.27cm) of empty wire at the end. Make a second simple loop flush to the last bead. Tie on ribbons as desired.



14 Make a hook clasp from 16-gauge copper wire. Make a simple loop at the end of a 4" (10.16cm) segment of 14-gauge copper wire, but before closing the loop, connect the hook clasp. Thread on assorted beads, including two forged enamel beads, the tight coil bead and three forged solid copper jump rings. Leave $\frac{1}{2}$ " (1.27cm) of empty wire at the end. Make a second simple loop flush to the last bead. Tie on ribbons as desired.



15 Connect the two sections of the bracelet with the sterling link from Step 12 by slightly opening the loops at each of the ends.



VARIATION: Circus Tent

Combine different colors and textures with the forged beads to create an entirely new look. Create a forged bead as you did for Forging Ahead and enamel it in White (1055). Sprinkle on other enamel colors of your choice. Finish with a layer of Medium Fusing Clear (2030).

Create the bracelet by stringing the forged bead, other enamel beads, African glass and brass beads, and a clay bead onto 14-gauge wire. Add an S-clasp and a large jump ring for the closure.



Aqua Ice

It's been rumored that you must "deplete" the copper from sterling silver before you can enamel it, so that you will achieve true, sparkling colors with transparent enamels. Depletion gilding involves heating the silver until the copper comes to the surface. The silver is then placed in pickle, a mild acid solution. This process wouldn't be so bad if you didn't have to do it about ten or eleven times. After that, I'd be too tired to enamel anything! Thankfully, no metal cleaning, depletion gilding, or enamel washing was performed in the making of this piece. It may look like a difficult piece to master, but its preparation and construction are quite simple.

MATERIALS

FINDINGS

- 12" (30.48cm) 2mm sterling silver chain
- 14" (35.56cm) 3mm sterling silver chain with links large enough to accommodate 3mm jump rings
- 16-gauge sterling silver wire
- 20-gauge round sterling wire
- 22-gauge round sterling wire
- 22-gauge sterling silver sheet
- 24-gauge copper sheet
- one 13mm jump ring
- one 15mm sterling silver washer
- nine 3mm jump rings
- nine fine silver precious metal clay thumbprint charms
- twenty-six 10mm amazonite faceted beads
- two 4mm brass heishi beads

ENAMELS

- Bitter, opaque (1319)
- Foxglove, opaque (1745)
- Nile Green, transparent (2305)

TOOLS

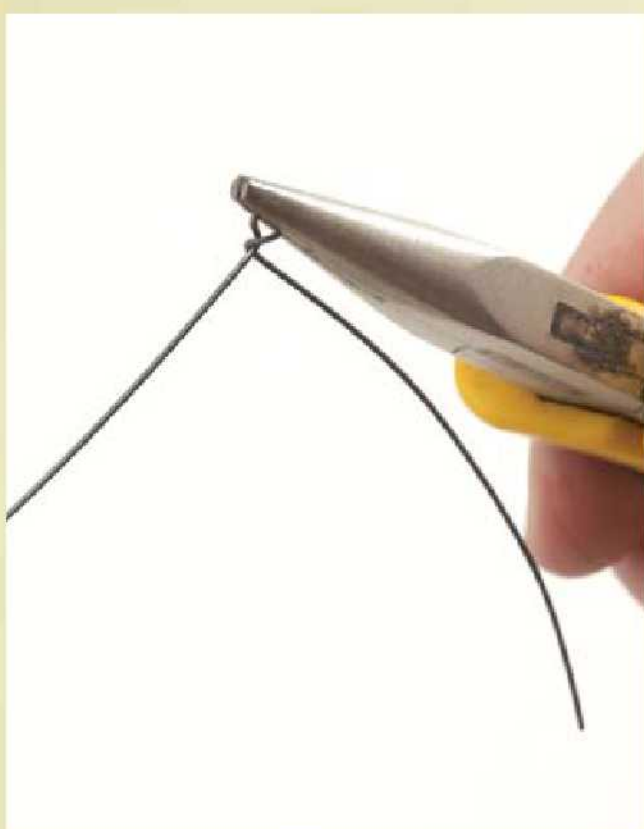
- chain-nose pliers
- chasing hammer
- dapping block and punch
- dead-blow hammer
- disc cutter
- round-nose pliers
- two-hole metal punch
- wire cutters



1 With a disc cutter, punch out a 19mm disc and two 15mm discs from sterling silver sheet. Punch out two 6mm discs from copper sheet. Punch holes in the centers of all discs. Cut evenly spaced wedges from the circumference of the 19mm and one of the 15mm discs to create flowers. Dome the remaining 15mm disc and the two 6mm discs in a dapping block. Enamel the 15mm disc and two 20mm thumbprint charms in Nile Green. Enamel the 6mm discs, one in Bitter and the other in Foxglove (see *Torch-Firing Beads* on page 16).



2 Cut 10" (25.4cm) of 22-gauge round sterling wire. Grasp the wire at the midpoint with chain-nose pliers.



3 Begin making a wrapped loop at the midpoint in the wire (see *Making Wrapped Loops* on page 25). Wrap one wire end around the base of the loop one time.



4 Thread a 10mm amazonite faceted bead onto the wire. Make a wrapped loop flush against the bead. Do not cut the excess wire on either loop.



5 With the bead secured in place, wrap the excess wire down the crown of the bead on each side.



6 Repeat Steps 4 and 5 to wire-wrap and link eleven beads, wrapping the excess wire from the loops down the crowns of each bead. Do not make a loop in the wire after the last bead. For the other side of the necklace, wire-wrap eleven beads using the same process.

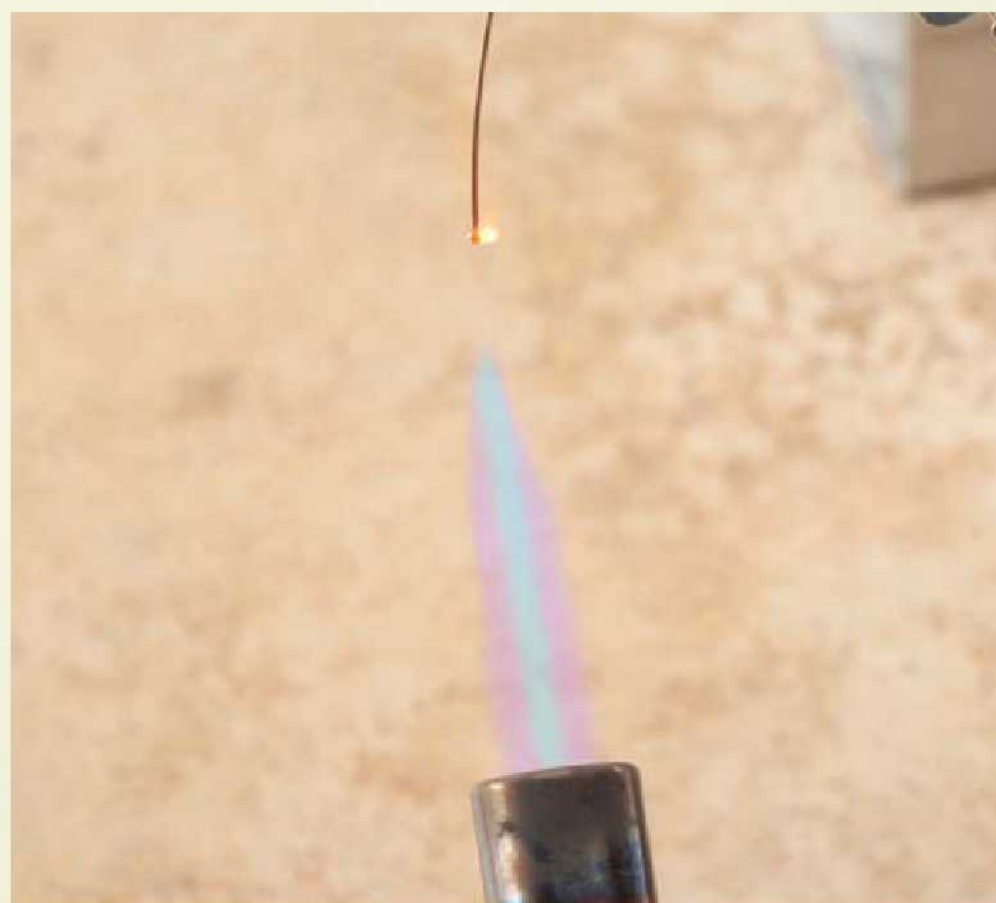


7 Thread the wire of one beaded section through the last link in a 14" (35.56cm) segment of 3mm sterling chain and a 12" (30.48cm) segment of 2mm sterling chain. Make a wrapped loop with the wire and wrap the excess wire down the crown of the bead as before. Repeat for the other beaded section and the other ends of the chains.



8 Draw a bead on the end of 8" (20.32cm) of 20-gauge round sterling wire. Thread a 4mm heishi bead, the 6mm Foxglove enamel disc, a 4mm heishi bead and an enamel flower onto the wire.

For the second flower, repeat this process, but thread on the 6mm Bitter enamel disc, the 15mm enamel dapped disc and the other enamel flower.



9 Thread the wire of the flower with the Bitter enamel disc through the center link in the 3mm chain. Keep the necklace beads and chain away from the flame. Dangle the flower charm wire end in the flame to draw a bead on the end. Dip the end in water to cool.



10 Bring the wire from the back of the enamel flower toward the front, creating a loose curve at the top of the wire so the charm dangles freely. Wrap the wire ends around each other to secure. Repeat Steps 9 and 10 for the other flower charm, positioning it halfway between the center flower and the end of the chain.



11 Connect nine sterling silver thumbprint charms and the enameled thumbprint charm to the 3mm chain using 3mm jump rings (see *Opening and Closing Jump Rings* on page 24). Space the charms evenly and as desired across the chain.



12 Make an S-clasp from 16-gauge sterling wire (see *Making S-Clasps* on page 26). Attach it to one side of the necklace. Sew the end closed with 22-gauge sterling wire. Attach a 13mm jump ring to the other side of the necklace.



Float

Our creative life is powerfully influenced by our subconscious. Long ago, an artist friend gave me an ethereal painting of a Portuguese man o' war, painted in shades of pink, blue and lavender. Twenty years later, as I was finishing up a piece called *Float*, I realized that I had unexpectedly created a 3-D version of my friend's painting, which was packed away, out of sight and out of mind. Even more odd was the discovery, through Internet research, that the misty blue and pink body of the man o' war is called a float. Talk about serendipity!

MATERIALS

FINDINGS

- 18-gauge round sterling silver wire
- 22-gauge round sterling silver wire
- 24-gauge copper sheet
- assorted strands of ribbon
- one cable choker
- three pieces of sea glass

ENAMELS

- Robin's Egg Blue, opaque (1410)
- Nile Green, transparent (2305)

TOOLS

- 2mm diamond drill bit
- 30-gauge wire for needle
- bench block
- chasing hammer
- dead-blow hammer
- disc cutter
- NOTE: You can also use metal shears with a plastic circle template and a straightedge.
- double-sided tape
- felt-tip marker
- flexible shaft
- long chain-nose pliers
- metal file
- metal shears
- scribe
- shallow dish of water
- sponge
- straightedge
- two-hole metal punch
- wire cutters



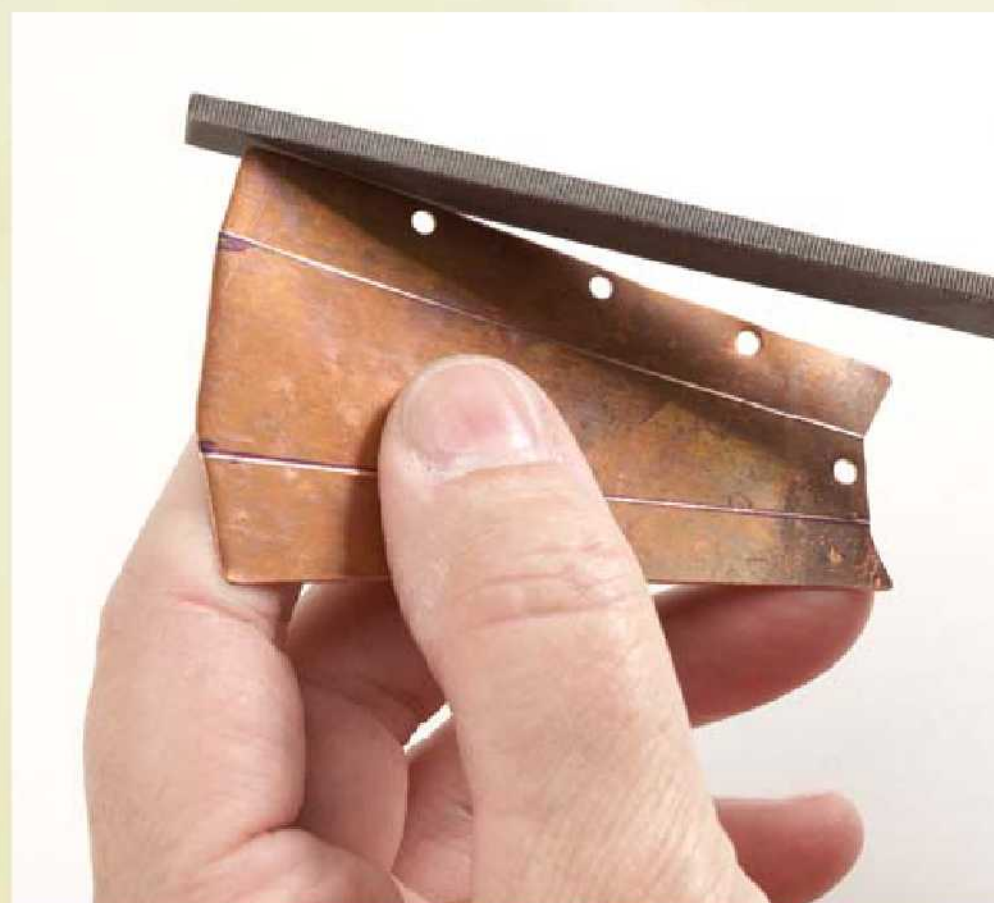
1 Use the template on page 99 to cut out the pendant shape from 24-gauge copper sheet with metal shears. Attach the template with double-sided tape to keep it from shifting.



2 Using the template as a guide, score fold lines using a scribe and a straightedge.



3 Use the black handle end of a two-hole metal punch to create holes where indicated in the template.



4 Use a metal file to refine the pendant shape. Make sure the edges are smooth.



5 Anneal the pendant by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow it to cool.



6 Line up one of the fold lines in the pendant with the edge of a bench block. Hammer the edge of the pendant without holes, folding it down. When the metal becomes resistant to folding, anneal the metal again.



7 Hammer the edge to create a crisp fold.



8 Repeat Steps 6 and 7 for the other edge. At this point, both sides will be hammered flat.




9 Use long chain-nose pliers to lift the edges of the pendant. Unfold the flaps to just short of their upright positions.



10 Use the punched holes as a guide for marking corresponding holes in the opposite edge. Mark hole placement with a felt-tip marker. Punch the holes with the black handle end of the two-hole metal punch.



11 Enamel the pendant in two layers of Robin's Egg Blue, followed by one layer of Nile Green (see *Torch-Firing Pendants and Charms* on page 18). Add extra layers of Nile Green to the lower half until you're satisfied, but be careful not to fill the holes with enamel.

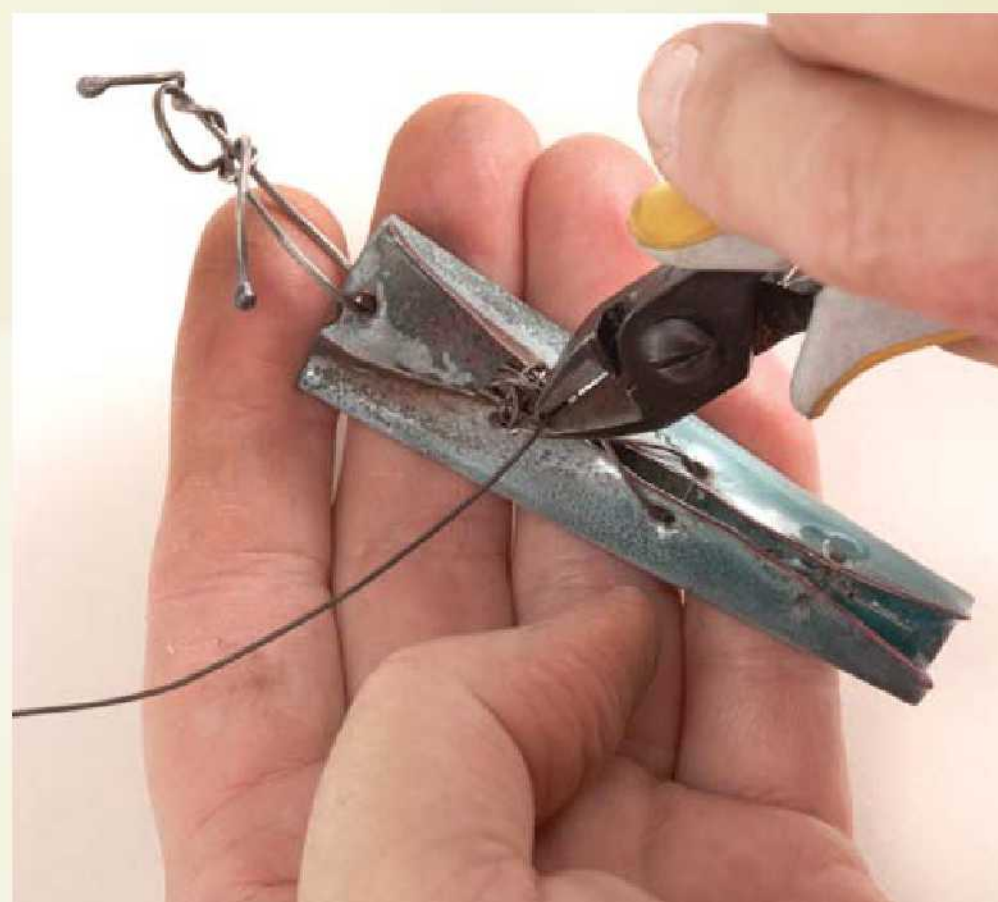
 **TIP:** It might be helpful to put the enamels in a larger container for the pendant, since it's larger than an average bead. You can also sift enamel onto the hot metal while holding it over a container to catch the excess. If you're sifting, please wear a mask.



12 Draw a bead on the end of a 6" (15.24cm) piece of 18-gauge round sterling wire. Dip it into water to cool. Pass the wire end through the hole in the center top of the pendant. Flatten the wire that extends through the hole with a hammer. Hold the pendant with long chain-nose pliers and keep it away from the flame. Dangle the cut end of the wire in the flame to draw a bead and anneal the remaining wire.



13 Bring the wire end at the back of the pendant to the front and twist the two ends together, leaving a loose loop in the wire so the pendant can dangle freely.



14 Thread a 10" (25.4cm) piece of 22-gauge round sterling wire through the pair of holes in the middle of the pendant. Cross the wires and direct each wire into the pair of holes above the middle holes. Continue lacing the wire ends back and forth through these pairs of holes. Cut the excess wire.



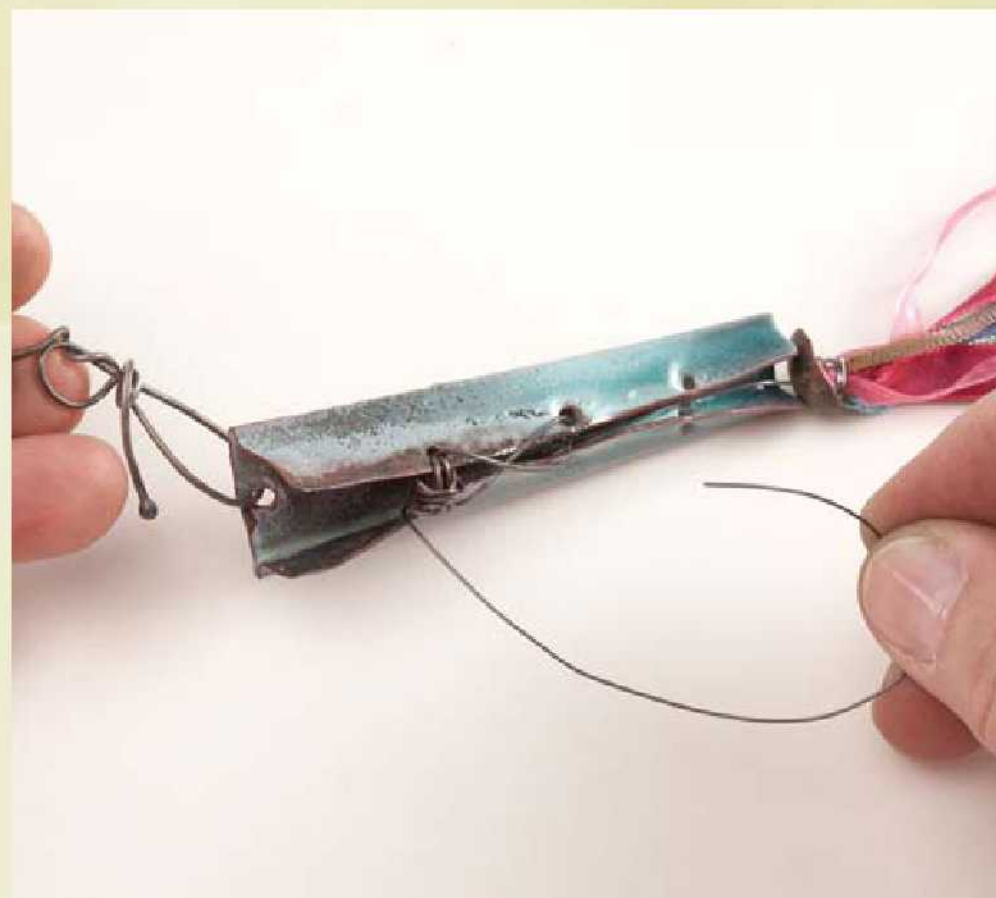
15 Cut a 12mm disc from 24-gauge copper sheet with a disc cutter. You can also handcut the disc with metal shears. Shape the disc by hammering it, causing the edges to curl up. Pierce a hole in the approximate center with the black handle end of the two-hole metal punch.



16 Cut assorted strands of ribbon measuring between 6" and 12" (15.24cm and 30.48cm). Bundle the ribbons together at the midpoint with an 8" (20cm) piece of 22-gauge round silver wire. Double the fiber strands over and continue wrapping the wire around the fold to form the tassel.



17 Bring the wire up through the center of the ribbon tassel. Thread the disc onto the wire so the concave side fits over the top of the tassel.



18 Thread the wire through the bottom of the pendant until the copper disc touches the lower edge. Pass the wire underneath the laced wires. Wrap the tassel wire around the crisscrossed wires in the top pair of holes several times. Cut the excess wire.



19 Thread a 6" (15.24cm) piece of 22-gauge round sterling wire through the bottom pair of holes in the pendant, passing the wire beneath the tassel wire. Bring the wire through the pair of holes several times. Cut the excess wire.



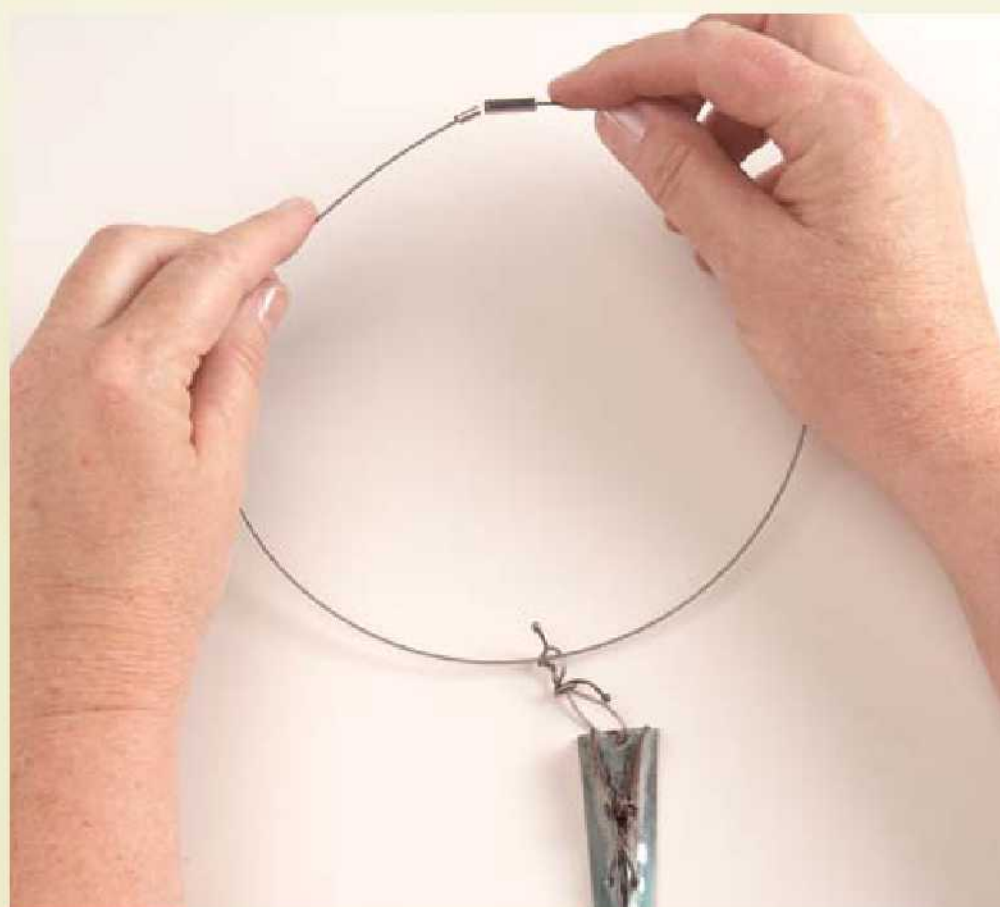
20 Conceal any exposed wire that exists between the top of the copper disc and the bottom of the enamel piece by wrapping with another piece of ribbon.



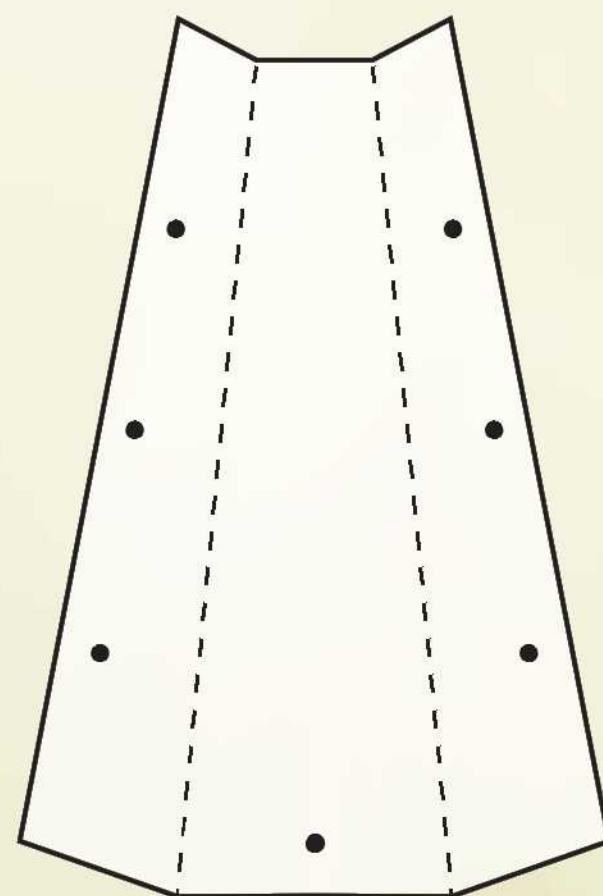
21 Place a sponge in a shallow dish of water. Allow the sponge to absorb the water. Lay a piece of sea glass on top of the sponge. Press down on the sea glass so that the depression fills with water. The water will cool the drill bit during drilling. Drill a hole through each piece of sea glass with a flexible shaft and a 2mm diamond drill bit.



22 Use 30-gauge wire to create a needle for threading some of the tassel ribbons through holes in the sea glass.



23 Thread the pendant bail onto a cable choker.



Float Template
Actual size



Of Space and Time

Besides adding wonderful detail, bezels capture stones or provide recesses for resin and polymer clay. Usually, making a bezel requires soldering, but, in this project, you can make a bezel without solder.

This bezel would be a perfect place for butterfly wings, sea glass, vintage stamps and more. Your bezel pendant can be made from sterling or copper that has been etched, hammered or printed with a rolling mill. Here, our bezel, which is centered in a larger disc, features a copper dome with fused sterling silver.

MATERIALS

FINDINGS

- 16" (40.64cm) sterling silver chain
- 16-gauge sterling silver wire
- 18-gauge sterling wire
- 22-gauge bronze wire
- 22-gauge sterling silver wire
- 24-gauge copper sheet
- small amount of sterling silver or fine silver wire scrap pieces
- tab end of vintage tape measure
- three 7mm sterling silver jump rings
- twelve 14mm filigree beads
- two 10mm x 15mm solid sterling silver oval links

ENAMELS

- Black, opaque (1995)
- Medium Fusing Clear (2030)

TOOLS

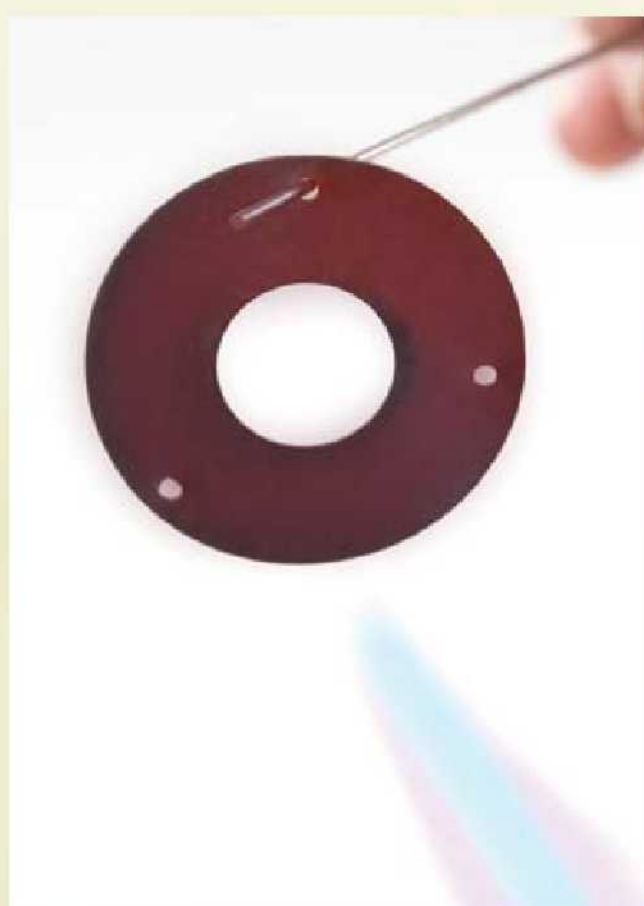
- bench block
- chain-nose pliers
- chasing hammer
- dapping block and punch
- dead-blow hammer
- disc cutter with centering plugs
- felt-tip marker
- fine-tip paintbrush
- flux for hard soldering
- plastic circle template with divisional lines
- soldering tripod
- three-point trivet
- tweezers
- two-hole metal punch
- water
- wire cutters



1 Measure a piece of etched copper approximately 33mm square. Center the square in the disc cutter, in the opening for a 12.5mm disc. Punch a disc. Use the disc cutter's centering plugs to center the 12.5mm hole in the opening for a 31mm disc. Punch out the disc to create a washer.



2 Use a plastic circle template with divisional lines to mark three holes evenly spaced along the edge of the circle. Punch the holes with the silver handle end of a two-hole metal punch, placing them as close to the outer edge of the donut as possible.



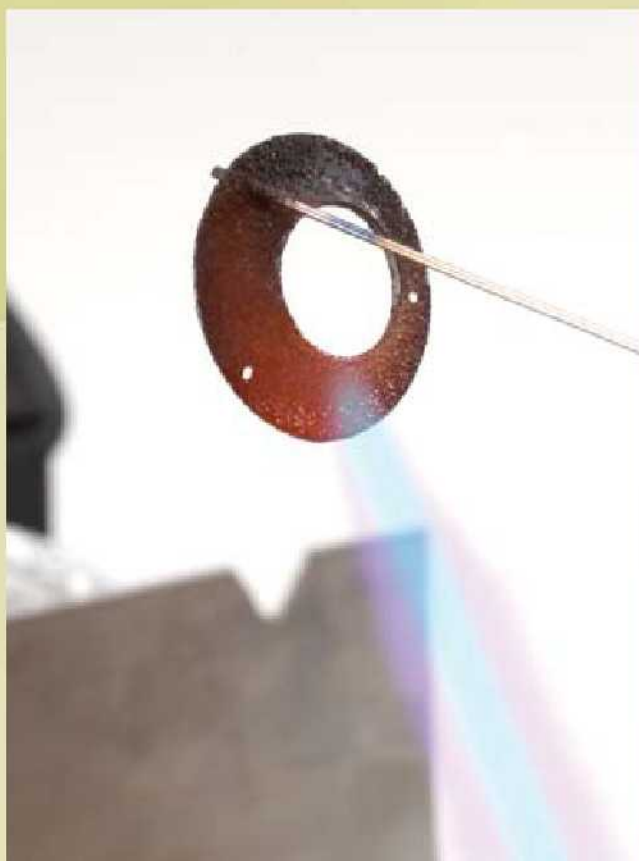
3 Anneal the donut by dangling it from a mandrel in the flame until it glows a dull cherry red (see *Annealing* on page 23). Allow it to cool.



4 Lay the donut metal face down on a dapping block. Center the donut over a depression that is slightly larger than the opening. Place a dapping punch that is slightly larger than the opening in the depression and tap it with a dead-blow hammer. Continue raising the sides of the opening by dapping it in successively larger openings. This should be done gradually to prevent the metal from splitting.



5 Flatten the edges of the bezel with a chasing hammer.



6 Enamel the bezel in three layers of Black (see *Torch-Firing Pendants and Charms* on page 18). Let the bezel cool in vermiculite.



7 Punch out a 22mm copper disc from 24-gauge copper sheet. Place the disc on a soldering tripod. Brush hard soldering flux onto the metal. Cut a small amount of sterling or fine silver wire into four to six 5mm pieces. Place the wire pieces on top of the disc with tweezers.



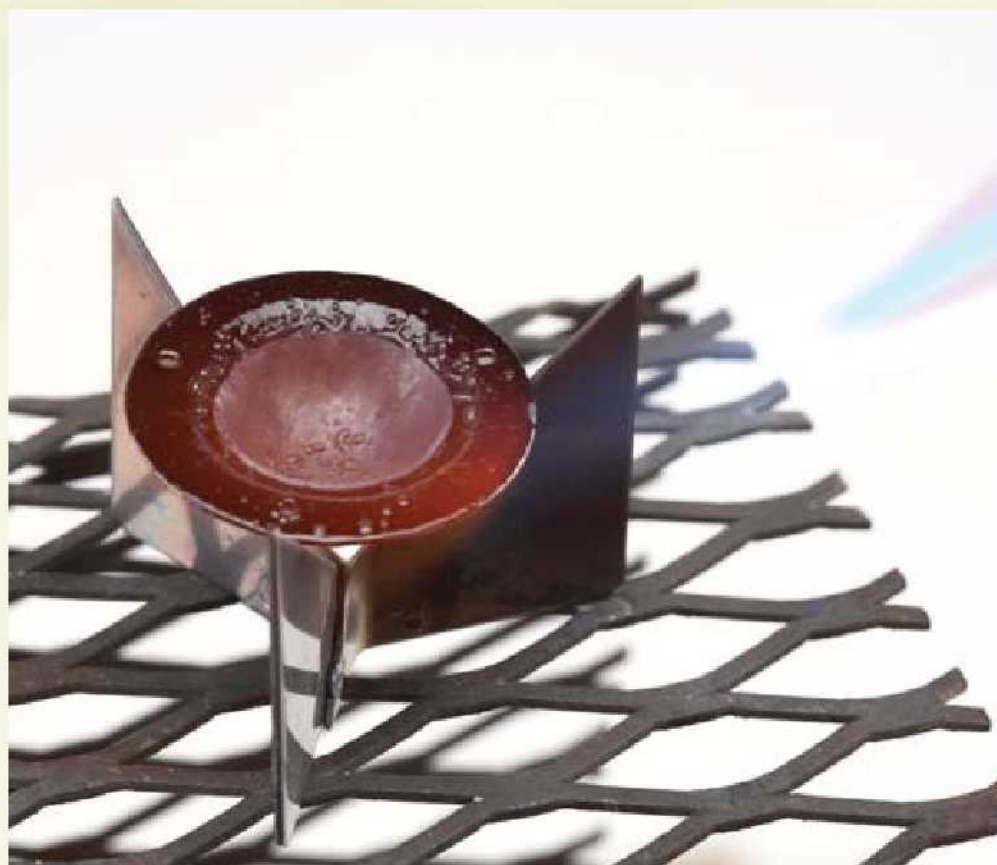
8 Starting beneath the disc, aggressively heat the copper as quickly as possible to prevent the buildup of firescale. When the copper starts to glow, move the torch topside to fuse the wires to the disc. Quench the disc in water to cool.



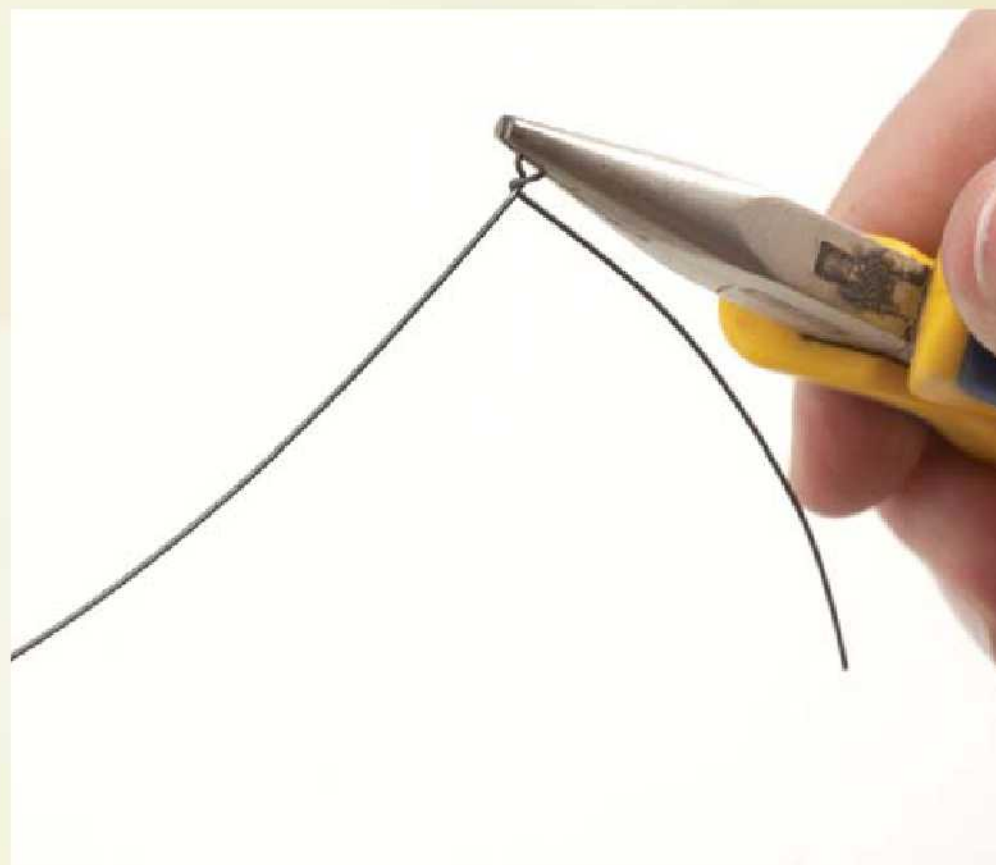
9 With the sterling side down, dome the 22mm disc in a dapping block. Check the fit of the dome with the bezel opening and continue to dome in successively smaller openings as needed.



10 Place the bezel in a three-point trivet on top of the tripod with the copper dome resting convex side down in the opening. Sift medium fusing clear enamel onto the piece. Use a fine-tip paintbrush to brush the enamel toward the seam.



11 Gently warm the piece from the underneath. As you see the enamel start to darken in appearance, bring the torch topside. Focus on the seam between the bezel and the copper dome. When the enamel is clear and shiny, turn off the torch. Allow the piece to cool for a few seconds. Pick up the trivet with chain-nose pliers. Drop the piece into vermiculite for continued cooling.



12 Cut 10" (25.4cm) of 22-gauge sterling wire. Grasp the wire at the midpoint with chain-nose pliers. Begin making a wrapped loop at the midpoint in the wire (see *Making Wrapped Loops* on page 25). Wrap one wire end around the base of the loop one time.



13 Thread a 14mm filigree bead onto the wire. Make a wrapped loop flush against the bead. Do not cut the excess wire on either loop. With the bead secured in place, wrap the excess wire down the crown of the bead on each side. Slide a 10" (25.4cm) piece of 22-gauge sterling wire midway into the last wrapped loop from the first bead. Repeat Steps 12 and 13 for each bead, wrapping the excess wire from the loops down the crowns of each bead. Wire-wrap six beads in this manner for each side of the necklace. For each side of the necklace, do not wire-wrap a loop in the wire after the last bead.



14 Use a 7mm jump ring to connect each section of wire-wrapped beads to a hole in the focal element.



15 On one unfinished side of the necklace, begin making a wrapped loop, but before finishing it, slide on a closed oval link. Finish the loop, wrapping the excess wire down the crown of the bead. Thread 8" (20.32cm) of sterling chain and double it over. Make an S-clasp from 2½"–3" (6.35cm–7.62cm) of 16-gauge sterling wire (see *Making S-Clasps* on page 26). Slip the last links of the chain onto the S-clasp. Sew the clasp closed with 22-gauge bronze wire.



16 Repeat Step 15 for the other end of the necklace, but instead of adding an S-clasp, add a link that has been created by drawing a bead on both ends of 1½" (3.81cm) of 18-gauge sterling wire. Wrap the wire around a mandrel so the ends overlap slightly. Hammer the shape. Wrap the link with 22-gauge bronze wire to close.



17 Use the silver handle end of a two-hole metal punch to create a hole in a piece of a vintage metal tape measure. Attach it to the pendant with a 7mm jump ring.



Going Tribal

Texture, color and organic elements are the things I love about ethnic jewelry. Many times, though, the jewelry can be heavy in both weight and appearance. Hammered 14-gauge copper wire provides a lightweight foundation for an ethnic-inspired choker with ribbons, enameled discs and beads, and coiled wire. Horsehair from a friend's Arabian unites with a shield-shaped pendant to create a dynamic focal piece.

MATERIALS

FINDINGS

- 14-gauge copper wire
- 20-gauge sterling silver wire
- 22-gauge sterling silver wire
- 24-gauge sterling silver wire
- 24-gauge copper sheet
- horsehair
- multicolor rayon ribbon
- one 10mm enamel bead
- several 10mm bone beads
- three 12mm enamel corrugated beads
- two 9mm solid jump rings

ENAMELS

- Pumpkin, opaque (1850)
- White, opaque (1055)

TOOLS

- $\frac{3}{32}$ " (2mm) diameter steel mandrel
- baking soda
- bench block
- chain-nose pliers
- chasing hammer
- electric drill
- fine sanding pad
- junk pliers
- liver of sulfur for copper and Black Max or Silver Black for silver
- metal file
- metal shears
- piercing hole punch
- round-nose pliers
- water
- wire cutters



1 Cut a shield shape measuring approximately $1\frac{1}{2}" \times 2\frac{1}{2}"$ (3.81cm \times 6.35cm) from 24-gauge copper sheet with metal shears. Save one of the copper spirals that results from trimming the shield. Smooth the edges of the shape with a metal file. Punch holes throughout the shape, including one for the bail.



2 Enamel the pendant in three layers of White (see *Torch-Firing Pendants and Charms* on page 18). Use pliers to partially close the vent holes of the torch during the firing. This fuel-rich flame will create carbon deposits in the enamel and darkened ridges at the pierced holes. Overfiring will cause copper oxides to bubble to the surface and add green or rust speckling. As a final step in the firing, sparingly sprinkle Pumpkin enamel in selected areas.



3 Hold the copper spiral from Step 1 with junk pliers and enamel it in three layers of Pumpkin.



4 Lay one end of a $22\frac{1}{2}"$ (57.15cm) piece of 14-gauge copper wire on a bench block. Hammer the entire length of the wire with a chasing hammer. The wire will begin to curve to create the shape of the choker.



5 Loosely coil generous lengths of 20-, 22- and 24-gauge sterling wire. Create a patina on all the sterling wire (see *Patinas* on page 23). Rinse in baking soda solution, then in water. Pat dry. Lightly remove some of the oxidation with a fine sanding pad.



6 Insert a $\frac{3}{32}$ " (2mm) mandrel in the chuck of an electric drill. Slide the end of 22-gauge sterling wire into one of the slots of the drill chuck. With the drill at a slow speed, coil the wire along the length of the mandrel for approximately 1" (2.54cm). Loosen your grip on the wire and allow the wire to glide loosely back and forth over the base coil. Continue until you're satisfied with the size and look of the bead. Create eight coil beads.



7 Lash a bundle of horsehair together with 6"–8" (15.24cm–20.32cm) of 24-gauge sterling silver wire. Tuck in the wire tail.



8 Grasp 14" (35.56cm) of 20-gauge sterling wire approximately 4" (10.16cm) from the end and create an elongated loop. Slide the shield pendant onto the loop. Loosely wrap the loop closed, allowing room in the loop for movement of the pendant.



9 Rest the horsehair bundle above the wrapped portion of the pendant loop. With a criss-crossing motion, attach the horsehair bundle to the top of the pendant with the excess wire from the pendant loop. Create another loop in the wire that will allow the pendant to dangle loosely from the choker. Finish wrapping the loop and continue to loosely wrap the exposed single wire above the horsehair.



10 Use a 6" (15.24cm) piece of 22-gauge sterling wire to wrap the Pumpkin enamel spiral element to the first loop of the pendant.



11 Slide the pendant onto the center of the 14-gauge hammered wire. Slide a coil bead onto each side of the pendant. Continue to add enamel, bone and coil beads to the necklace as desired, stopping when half of the wire is beaded on each side.



12 Thread a 12" (30.48cm) segment of ribbon halfway through a 9mm solid jump ring. Begin wrapping the jump ring completely with ribbon. Tie the ends in a double overhand knot to secure. Tie the jump ring to the necklace.



13 Wrap additional 22-gauge sterling wire around the coil beads that look sparse. Tie small segments of ribbon to the necklace as desired.



14 Bend each end of the choker down into an elongated open loop to serve as a closure.



On a Flying Trapeze

Do you want to capture the rich elements of texture, color and movement in one piece? Of course you do! This pendant is an example of using the flame to your advantage in controlled overheating. Just follow the directions and it will be yours! We will also create what I like to call a “rustic and romantic” bead, which looks like a combination of vintage lace and rusty metal. The unique qualities of liquid enamel will create texture on a common household object: the humble copper pipe.

MATERIALS

FINDINGS

- ½" (1.27cm) diameter thin-walled copper pipe
- 16" (40.64cm) oxidized sterling silver chain
- 16-gauge sterling silver wire
- 22-gauge sterling silver wire
- 22-gauge bronze wire
- 22-gauge copper wire
- 24-gauge copper sheet
- assorted ribbons
- four 4mm brass heishi beads
- large rubber stamp with scroll design
- one 9mm jump ring
- two 7mm jump rings
- white opaque ink (Staz-On)

ENAMELS

- White Liquid Enamel (dry form) (BC-1070)
- White, opaque (1055)

TOOLS

- ammonia
- dead-blow hammer
- diamond bead reamer
- disc cutter
- double-sided tape
- dust mask
- etching tank and solution
- felt-tip marker
- fine-tip paintbrush
- fine sanding pad
- long chain-nose pliers
- metal shears
- parallel pliers
- piercing hole punch
- pipe cutter
- plastic knife
- soldering tripod
- three-point trivet
- two-hole metal punch
- vise
- water
- wax paper



1 Use a pipe cutter to cut an 8" (20.32cm) section of ½" (1.27cm) diameter copper pipe, or a length suitable for your etching container. Sand the pipe with a fine sanding pad. Apply white opaque Staz-On ink to a rubber stamp. Place the stamp on the pipe and roll the pipe away from you to apply the design. Continue to stamp the entire pipe. Etch the pipe in your etching container (see *Etching Copper Sheet* on page 22). Place the pipe in an ammonia solution. Rinse it with water and let it dry.



2 Place the etched copper pipe in a vise. With the pipe cutter, cut off a 1" (2.54cm) piece. Save the rest of the pipe for other projects.



3 Use a disc cutter to punch out two 16mm discs from 24-gauge copper sheet. Mark the center of each disc with a felt-tip marker. Pierce a hole in the center of each disc with the silver handle end of a two-hole metal punch.

TIP: It's important for both holes to be in the center of the discs. Determine the center for one disc and place it on top of the second disc. Guide the punch through the first hole to drill a hole in the second disc in exactly the same spot.



4 Mix water with white liquid enamel until it is the consistency of heavy cream. Dip the pipe in the enamel. Suspend the pipe to dry by threading it onto a thin mandrel. Support the mandrel on objects at your work table (jars, etc.).



5 While the liquid enamel is drying, enamel the two 16mm discs in three layers of White (see *Torch-Firing Beads* on page 16).



6 When the discs have cooled, ream the holes with a diamond bead reamer to prevent a potential enamel flow from filling the hole during the final firing.



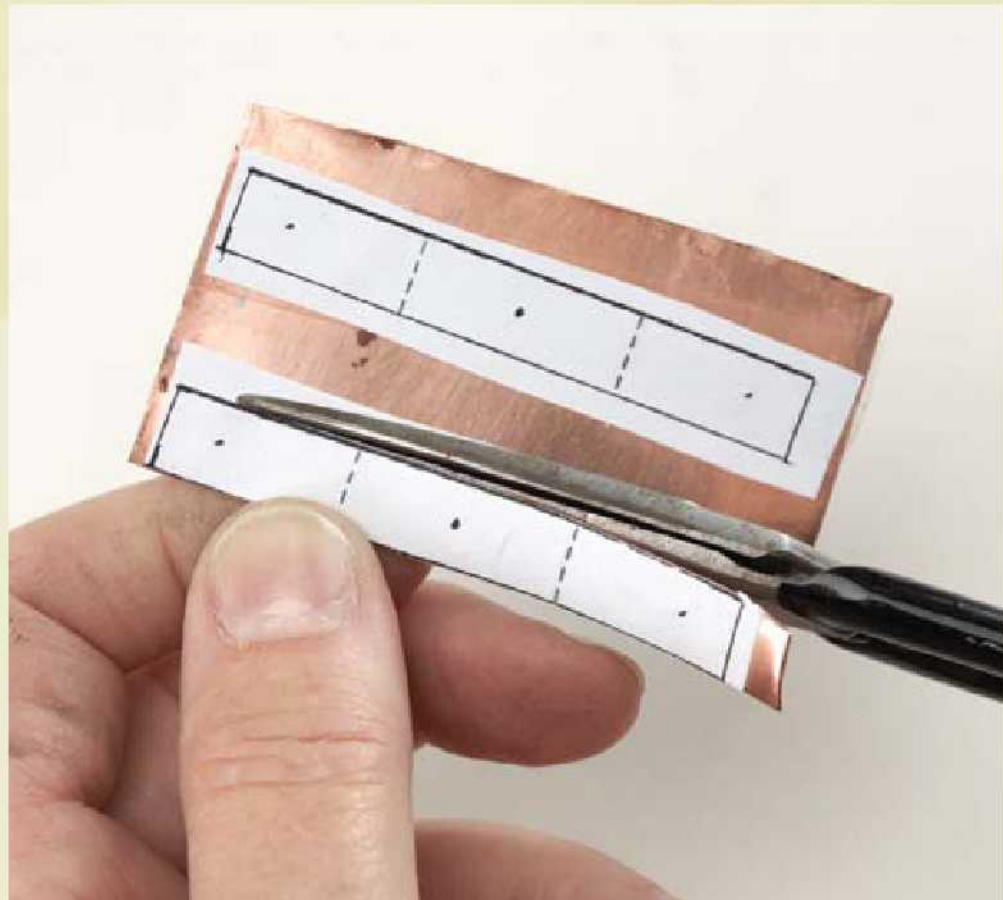
7 Wear a dust mask. Use a plastic knife to remove the liquid enamel from the high points on the copper pipe. Do this over wax paper; the excess liquid enamel can be returned to its container. Be gentle so you don't remove enamel from the recesses of the design.



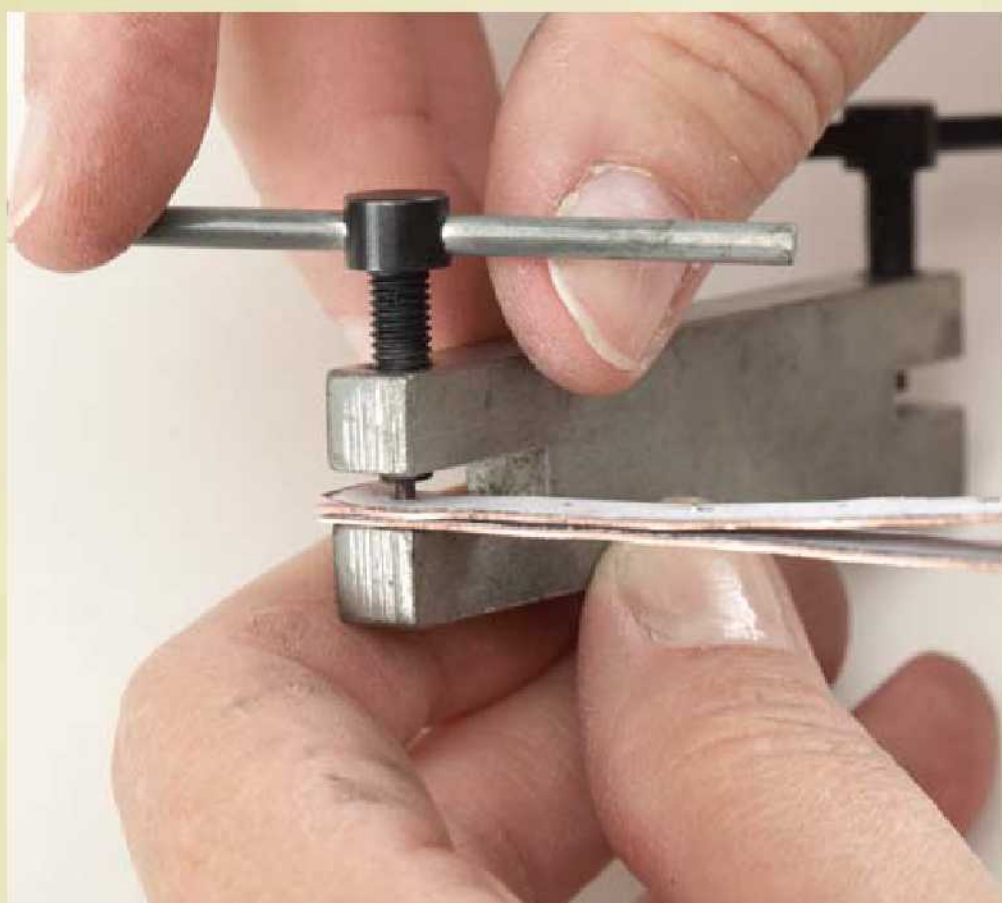
8 If liquid enamel has chipped off the bottom edge of the pipe, use your finger to dab on more. Use a fine-tip paintbrush to paint one of the sides of a 16mm enamel disc with liquid enamel and center the pipe on the disc. The enamel acts like glue. Check the top of the pipe for missing liquid enamel and touch up as needed. Allow the enamel to dry slightly.



9 Balance the other white enamel disc on a three-point trivet on a soldering tripod. Flip the pipe over and center it on top of the white disc. Gently heat the stack from below. As the enamel starts to darken, focus the flame on the pipe and the seams. The liquid enamel on the pipe will not appear glassy. Check for the metals to start to glow, as this indicates firing maturity.



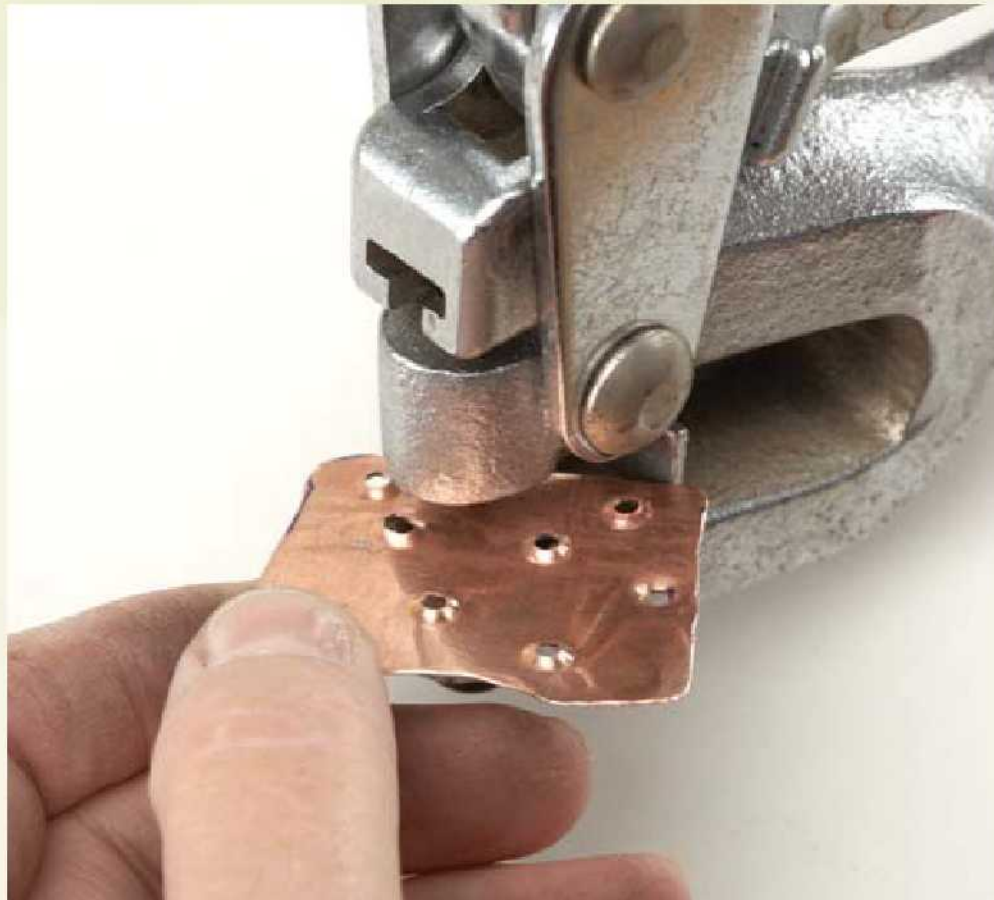
10 Make two copies of the template on page 115. Attach the templates to 24-gauge copper sheet with double-sided tape. Cut two rectangle shapes from 24-gauge copper with metal shears.



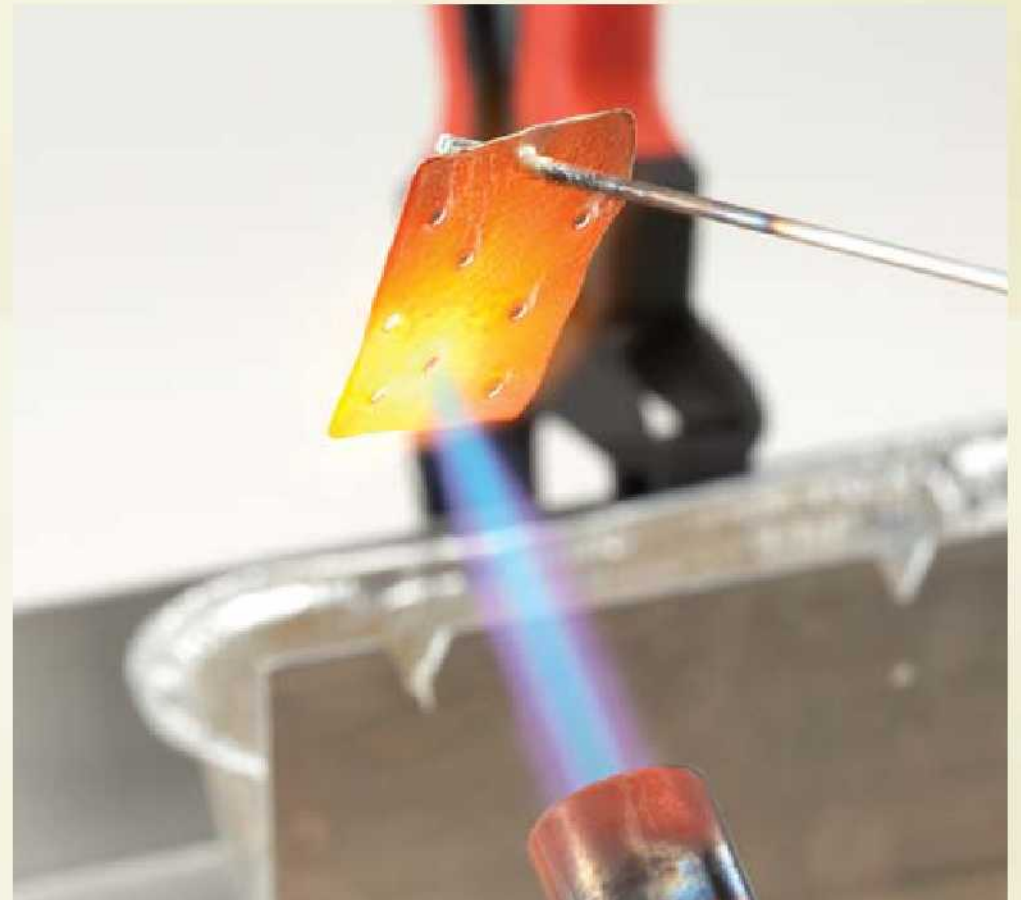
11 Leave the templates on the copper sheet. Using the guide holes in the template, punch holes in one copper rectangle using the silver handle end of a two-hole metal punch. Place this rectangle on top of the second rectangle. Guide the punch through the holes in the first rectangle to punch holes in the second rectangle in exactly the same spots.



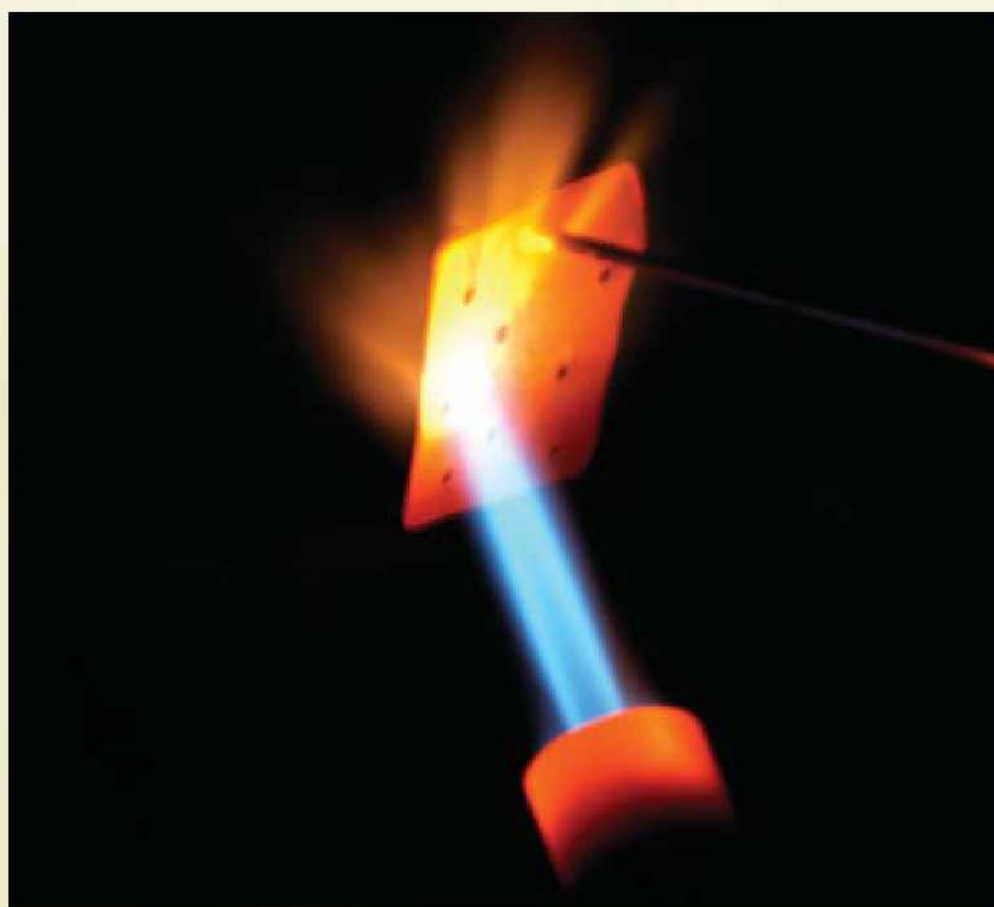
12 Use parallel pliers to fold the metal on the fold lines to create a U-shape.



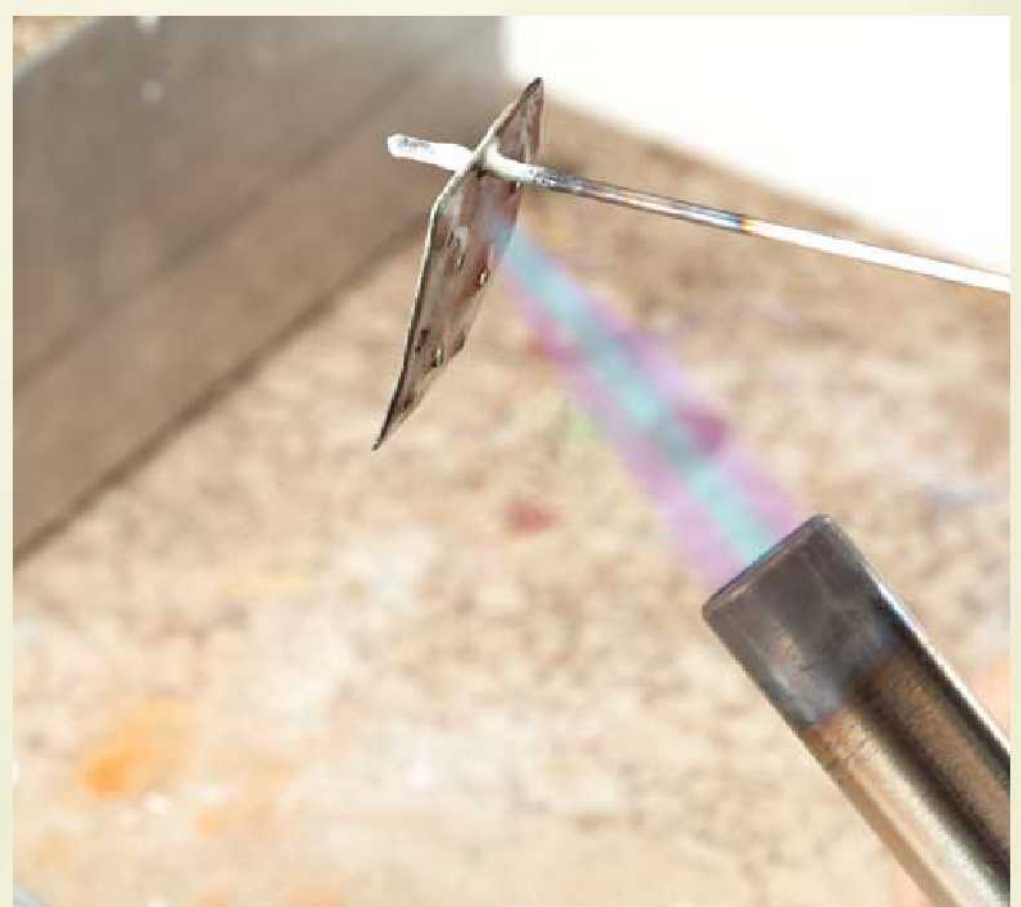
13 Cut a free-form rectangle from 24-gauge copper sheet. You can also look through your metal scraps to find a piece to use for the pendant. Many times, these unplanned shapes are the most interesting. Using a piercing hole punch, punch a hole at the top of the pendant for the bail and at the bottom for ribbons, as well as several decorative holes throughout the pendant.



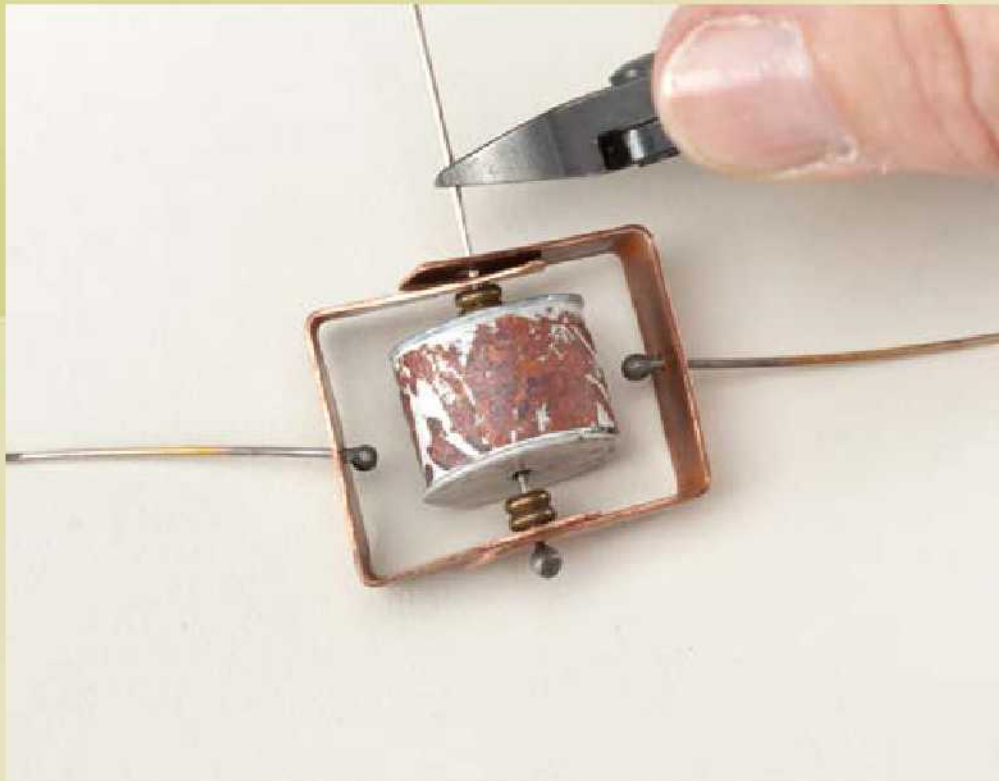
14 Start with a full tank of gas. Enamel the pendant in at least three layers of White. We want a good application of enamel so we can ensure texture in the enamel as we reduce the oxygen coming to the flame.



15 After the enamel has fully fused to the copper, turn the gas knob to increase the intensity of the flame. A controlled overfiring will bring copper oxides to the surface as green dots. Focus on the edges of the metal. The enamel will pull away from the edges and leave them “crispy.”



16 Use pliers to partially close the vent holes in the torch and reduce the oxygen coming to the flame. Continue firing until you are satisfied with the colors. The lack of oxygen will cause some of the green dots to flash pink and rust-colored. Remove the pendant from the mandrel and let it cool in vermiculite.



17 Cut three 2" (5.08cm) lengths of 20-gauge copper wire and draw a bead on one end of each to make head pins (see *Torch-Firing Head Pins and Twisty Tendrils* on pages 20-21). Slide a head pin into the center hole of each U-shaped copper piece. Align the side holes of the U's with the side holes of the etched bead. Slide a head pin through both holes on one side of the U-shape. As the wire enters the interior of the box, slide on two 4mm heishi beads, the copper bead, and two 4mm heishi beads. Thread the wire through the other two end holes in the U-shape. Make a simple loop flush to the U-shape to secure the box and beads (see *Making Simple Loops* on page 25).



18 Create an elongated loop with one of the head pins in the box and attach the pendant to the box.



19 Cut assorted strands of ribbon measuring between 3" and 6" (7.62cm and 15.24cm). Bundle the ribbons together at the midpoint with an 8" (20.32cm) piece of 22-gauge copper wire. Double the fiber strands over and continue wrapping the wire around the fold to form the tassel. Attach the tassel to the bottom of the pendant using the excess wire.



20 Draw a bead on both ends of a 7" (17.78cm) piece of 18-gauge sterling wire. Flame patina the wire by gently passing the flame over the wire to oxidize it. Wrap the wire around a $\frac{3}{4}$ " (1.91cm) mandrel so that both wire ends overlap. Lash the link together with 4" (10.16cm) of 22-gauge bronze wire.



21 Use the final head pin in the box to attach the link to the box with a wrapped loop (see *Making Wrapped Loops* on page 25).



22 Enamel three twisty tendrils, or use some from your stash. Wrap the twisty tendrils around the connection point between the tassel and the pendant, the pendant and the box, and the box and the link.



23 Attach two 8" (20.32cm) segments of oxidized sterling chain to the link using two 7mm jump rings (see *Opening and Closing Jump Rings* on page 24).



24 Make a second link identical to the link in Step 20. Before closing the link, slip one end of the wire through the link at one end of the necklace. Attach a 9mm jump ring to the other end of the necklace. Make an S-clasp from 2½" (6.35cm) of 16-gauge sterling wire (see *Making S-Clasps* on page 26). Attach the clasp to the jump ring and sew one end closed with 22-gauge sterling wire.



On a Flying Trapeze Template
Actual size



MATERIALS

FINDINGS

- 22-gauge wire
- 24-gauge copper wire
- 36" (91.44cm) copper chain
- assorted filigree iron beads
- assorted flower bead caps
- assorted seed beads and bugle beads
- one 5mm jump ring
- one copper-plated lobster clasp
- six to eight 4mm heishi beads
- 3mm jump rings as needed
- two 7mm jump rings

ENAMELS

- Bitter, opaque (1319)
- Clover Pink, opaque (1715)
- Foxglove, opaque (1745)
- Nile Green, transparent (2305)
- Nut, opaque (1125)
- Orient Red, opaque (1870)
- Pumpkin, opaque (1850)
- Robin's Egg Blue, opaque (1410)

TOOLS

- round-nose pliers
- two pairs of chain-nose pliers
- wire cutters

Floral Cascade

The making of this necklace reminds me of cooking Chinese food; it's all in the preparation, the slicing and dicing and chopping. However, in this case, it's in making the vines, flowers and stamens. In this piece, we will enamel "cannibalized" beads that we will then combine to create fantasy flowers. Forget about color combinations—use 'em all!



1 Many filigree iron beads can be separated at their invisible seams. Some beads fold in on themselves, and can be easily pried open with pliers.



2 Enamel the cannibalized beads and an assortment of bead caps and flower shapes with your desired enamel colors (see *Torch-Firing Beads* on page 16). This is your opportunity to go wild: overlap, sprinkle and intensify the enamel colors.



3 Cut six to eight 4" (10.16cm) segments of 24-gauge copper wire. Use these segments to enamel head pins in a variety of colors to serve as flower stamens (see *Torch-Firing Head Pins and Twisty Tendrils* on pages 20-21). Cut six to eight 6" (15.24cm) segments of 24-gauge copper wire. Use these segments to enamel twisty tendrils in a variety of colors. Of course, you can also use head pins and twisty tendrils from your stash as well.



4 Thread several seed beads or heishi beads onto an enamel head pin. Thread an enamel flower shape, an enamel cannibalized bead or an enamel bead cap onto the head pin to create flower petals. There is no wrong way to do this; try combining different shapes for different flowers. Reference the arching of a hibiscus stamen for guidance. When the flower is complete, make a wrapped loop flush against the last bead (see *Making Wrapped Loops* on page 25). Make six to eight flowers.



5 Double a 36" (91.44cm) copper chain in half. Connect the chain together with a 5mm jump ring 4" (10.16cm) from the folded end (see *Opening and Closing Jump Rings* on page 24).



6 Working on the 4" (10.16cm) section of chain between the jump ring and the folded end, attach flowers to the chain with 3mm jump rings. Attach one flower to the fold in the chain. The remaining flowers should cascade.



7 Loop each twisty tendril once in the middle, and use round-nose pliers to spiral each end.



8 Attach the tendrils to the necklace with 3mm jump rings to fill in the empty spaces in the cascade.



9 Attach a 7mm jump ring to each end of the chain. Attach a lobster clasp to one of the jump rings.



Variation: Orchid Cascade

An organic enamel orchid is the focal point of this necklace, which is constructed in much the same way as Floral Cascade. Enamel three 10mm round beads in three different colors by enameling the entire bead with two coats of an opaque enamel, dipping the bead halfway into a contrasting opaque enamel, and then finally rolling the circumference of the bead in enamel that has been sprinkled on a ceramic tile.

Punch out three 10mm etched copper discs. Use the silver handle end of a two-hole metal punch to create a center hole in each disc. Dome the discs in a dapping block.

Create enamel-tipped “ribbons” by cutting 3" (7.62cm) pieces of 16-gauge copper wire. Use round-nose pliers to grasp the wire at the midpoint and create a U-shape. Cross the ends of the wire. Draw beads on the ends of the ribbons

and enamel them as you would a head pin or a twisty tendrill.

Enamel manufactured copper flowers by dipping the entire flower into Bitter opaque enamel (1319) two times. For the third layer, dip only the bottom edge of the flower in Orchid opaque enamel (1750).

Assemble the flowers on enamel head pins. Create dangles using the 10mm enamel beads, the domed 10mm copper discs, and enamel head pins. Make more flower dangles as you did in Floral Cascade.

Double a 36" (91.44cm) copper chain in half. Connect the chain together with a 5mm jump ring approximately 4" (10.16cm) from the folded end. Attach the flowers and ribbons to the chain with 3mm jump rings.



MATERIALS

FINDINGS

- ½" (1.27cm) diameter thin-walled copper pipe
- 7' (2.13m) multicolor rayon ribbon
- 16" (40.64cm) each of two different styles of copper chain
- 22-gauge bronze wire
- 24-gauge copper sheet
- four 11mm jump rings
- one 16" (40.64cm) square hemstitched vintage linen napkin
- one BronzClay branch (LeAnn Weih)
- one copper-plated lobster clasp
- one porcelain bird charm (LeAnn Weih)
- three 4mm heishi beads
- two 6mm jump rings
- white opaque ink (Staz-On)

ENAMELS

- White Liquid Enamel (dry form) (BC-1070)
- White, opaque (1055)
- Nile Green, transparent (2305)

Wings of a Dove

The birdhouse in this piece is a whimsical focal point that avoids the need for soldering. The heat of the flame provides the primary “glue,” and the bronze wire is the “insurance” for holding together all of the enamel components. To create colorful, fluttering necklace cords, I tea dyed the edge of a hemstitched vintage linen napkin. I then wove a variegated rayon ribbon through the ladder-like slots in the edging and gathered the linen strip. Finally, I attached a darling ceramic bird charm above the birdhouse for the perfect finishing touch.

TOOLS

- 0000 steel wool or 600 wet/dry sandpaper
- 1/8" (3mm) twist or cobalt drill bit
- ammonia
- bench block
- center punch
- chasing hammer
- dapping block and punch
- dead-blow hammer
- diamond bead reamer
- disc cutter
- dust mask
- etching tank and solution
- fine-tip paintbrush
- flexible shaft
- large rubber stamp with scroll design
- long chain-nose pliers
- medium-grit sandpaper
- metal file
- pipe cutter
- rawhide mallet
- round-nose pliers
- scissors
- soldering tripod
- tapestry needle
- three tea bags
- three-point trivet
- two pairs of chain-nose pliers
- two-hole metal punch
- vise
- water
- wire cutters



1 Cut an 8" (20.32cm) section of 1/2" (1.27cm) copper pipe with a pipe cutter, or a size that will fit in your etching container. Sand the pipe with 0000 steel wool or 600 wet/dry sandpaper to clean it and create tooth for the rubber stamp. Apply white opaque Staz-On ink to a rubber stamp and press it on the pipe. Roll the pipe away from you. Continue stamping the length of the pipe. Etch the copper pipe in your etching container (see *Etching Copper Sheet* on page 22). Place the pipe in an ammonia solution. Rinse it with water and let it dry.



2 Place the etched pipe in a vise and cut a 1" (2.54cm) section from the pipe with a pipe cutter. You can use the rest of the pipe for other projects.



3 Hammer the cut edges of the pipe on a bench block with a chasing hammer.



4 Mark the pipe $\frac{3}{8}$ " (10mm) from one end with a center punch for the birdhouse entrance hole. Grip the pipe with long chain-nose pliers, aligning the edge of one of the jaws with the approximate edge of the hole. As you drill, rest the edge of the drill bit next to the edge of the pliers.



5 Insert long chain-nose pliers into the center of the pipe and open up the pliers. Mix white liquid enamel with water until it is the consistency of heavy cream. Dip the pipe in white liquid enamel. Suspend the pipe on a mandrel to dry.



6 Wear a dust mask. When the pipe is dry, use a medium-grit sanding pad to remove the liquid enamel from the high points. Be careful not to remove the enamel from the recesses.



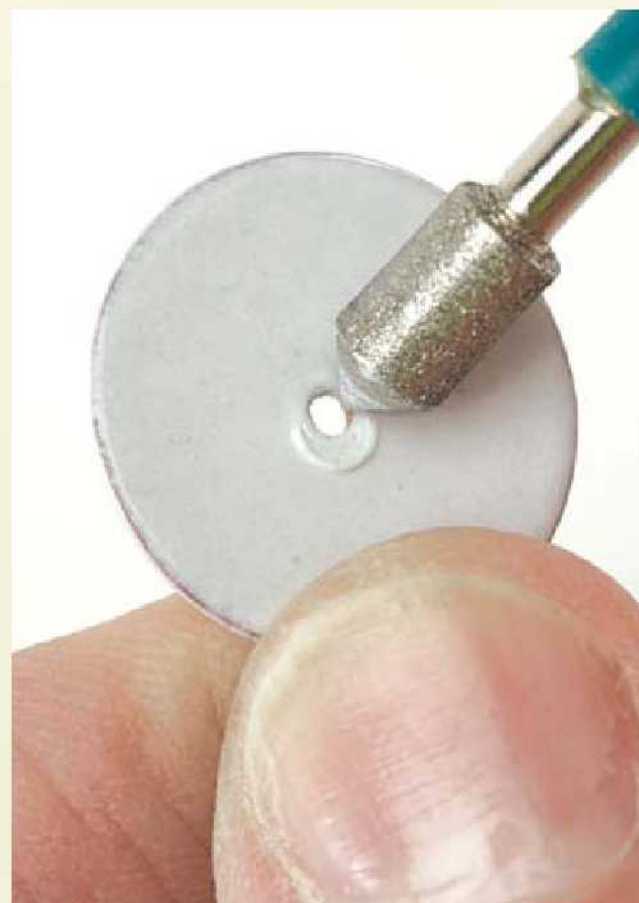
7 Punch three 19mm discs from 24-gauge copper sheet. Smooth the edges with a metal file. Punch a hole in the center of each disc using the silver handle end of a two-hole metal punch. Using a chasing hammer, hammer two of the discs on top of a bench block to make sure they are absolutely flat. These will be the ceiling and the floor.



8 Dome the third disc in a dapping block.



9 Thread a mandrel through the drilled hole in the copper pipe and fire it. Enamel the ceiling and floor discs in three layers of White (see *Torch-Firing Pendants and Charms* on page 18). Enamel the domed roof in two layers of White and one layer of Nile Green.



10 Clean the holes of the floor and ceiling discs with a diamond bead reamer.



11 Rest the floor disc on a three-point trivet on a soldering tripod. Apply a small amount of liquid enamel to the base of the birdhouse with a fine-tip paintbrush and place it on top of the disc.



12 Check to make sure the birdhouse is centered within the disc. Direct a gentle flame from beneath. When the colors start to darken, bring the flame topside, concentrating on the seam. Let the piece cool. Remove the piece and place the ceiling disc on the tripod. Repeat Steps 11 and 12 to attach the ceiling disc to the birdhouse.



13 Paint a small amount of liquid enamel on the edge of the disc at the approximate spot where the dome will rest. Center the domed roof on top of the birdhouse. Torch-fire and allow to cool gradually.



14 Cut each edge from a vintage hemstitched napkin, resulting in four 16" (40.64cm) pieces. Tea dye the strips and let them dry (see the Tip below). Weave a 20" (50.8cm) piece of variegated ribbon through each strip with a tapestry needle.

TIP: To tea dye fabric, make a cup of tea with three tea bags. Place the fabric into the cup until the desired color is achieved. Remove and let the fabric dry.



15 Thread a 1½" (3.81cm) length of rayon ribbon under one of the "ladder rungs" of the hemstitching and bring the end up through the next hole. Tie the ends with a double overhand knot. Trim the ribbon, leaving 1" (2.54cm) tails. Repeat this step for the entire length of each strip.



16 Draw a bead on the end of a 6" (15.24cm) piece of 22-gauge bronze wire. Thread on a 4mm heishi bead, the birdhouse, a 4mm heishi bead and a porcelain bird charm. Use the excess wire at the top to attach the pendant to a BronzClay branch. Attach an 11mm jump ring to each end of the branch (see *Opening and Closing Jump Rings* on page 24).



17 Cut two 8" (20.32cm) lengths of two different-sized copper chains for each side of the necklace. Attach the chains on both ends with 11mm jump rings. Bunch up the linen strip to measure 8" (20.32cm) and use the excess rayon ribbon to tie the strip to the jump rings on each end with double overhand knots.



18 Enamel two twisty tendrils (see *Torch-Firing Head Pins and Twisty Tendrils* on pages 20 and 21) or use ones from your stash. Wrap a twisty tendril around each end of the chain, where the fabric meets the jump ring. Repeat Steps 17 and 18 for the other side of the necklace.



19 Connect the two sides of the necklace to the BronzClay branch with 6mm jump rings.



20 Attach a lobster clasp to the jump ring at one end of the necklace.

About the Author

Barbara Lewis has a unique understanding of the effects of the flame on torch-fired enamels, due in large part to her Fine Arts degree in ceramics from The George Washington University in Washington, D. C. She explores the impact of oxygenated and reduced flames on enamel color, a process that parallels her experience with glazes on ceramics. She is truly “painting with fire” when she sits at the torch to make enamel jewelry. As a ceramic artist, Barbara’s studio has several kilns that she could use to enamel metal. However, she prefers to watch the flame do its work to create color and texture in the enamel.

Barbara is a popular teacher of a unique immersion process of torch-fired enamel, developed by Joseph Spencer, creator of multi-torch-fired enamel. She has developed several novel enameling techniques, such as a heat rivet and a bezel that require no solder. These two techniques are particularly suited to enamel jewelry because they address the inherent problems normally present when creating a rivet on glass or using special solders for enameled jewelry.



Barbara is a Thompson Enamel distributor and provides all of the tools necessary to torch-fire enamel at www.paintingwithfireartwear.com. She is also the creator and moderator of www.paintingwithfire.ning.com. The ning provides moral and technical support to beginning enamelists, as well as to more experienced artists looking to push the limits of torch-firing. Barbara has studios in southern Maryland and St. Petersburg, Florida.

Resources

BEAD PULLING STATION (BPS)

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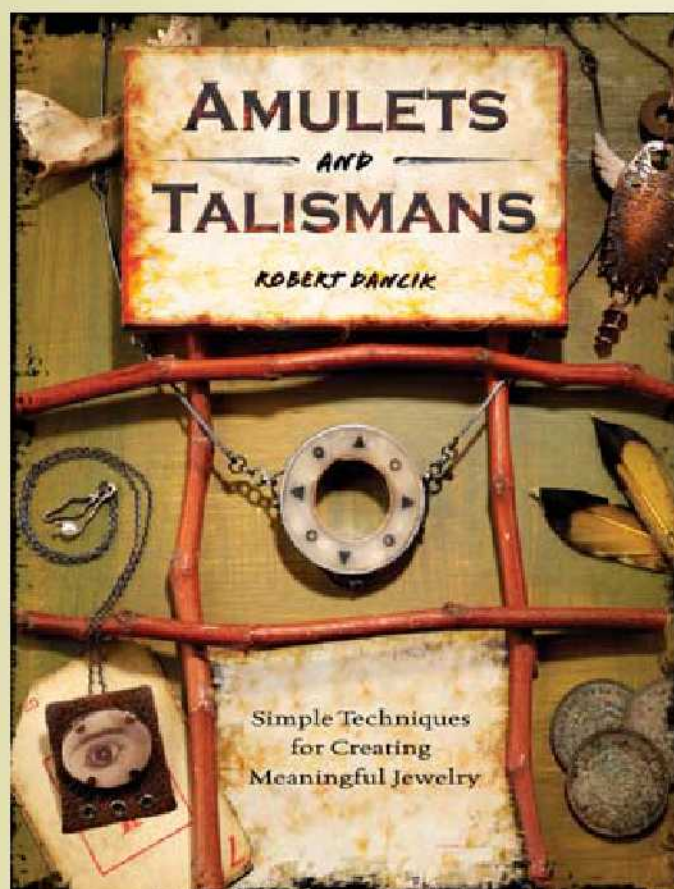
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Create jewelry with unexpected materials



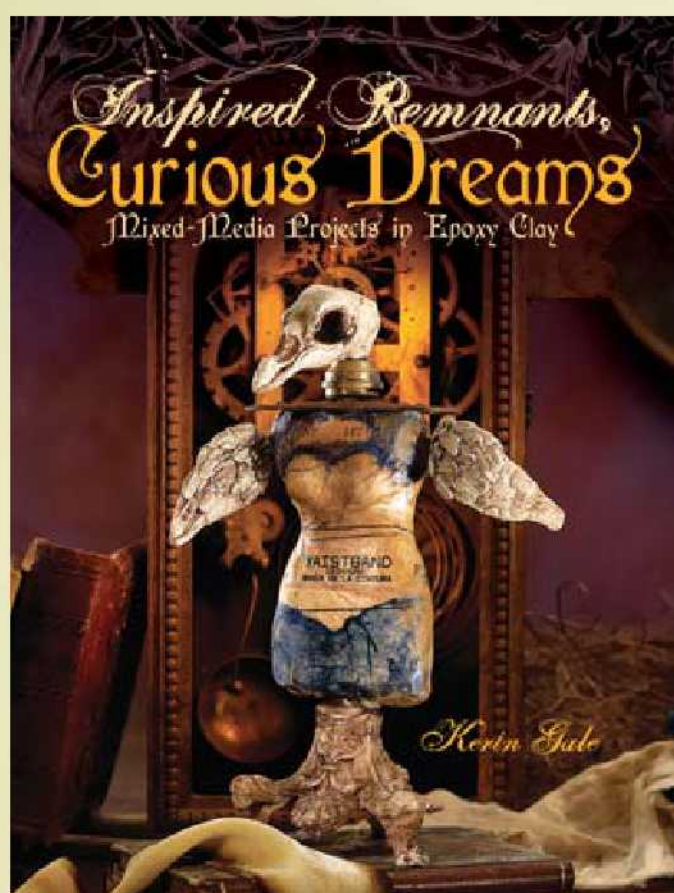
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