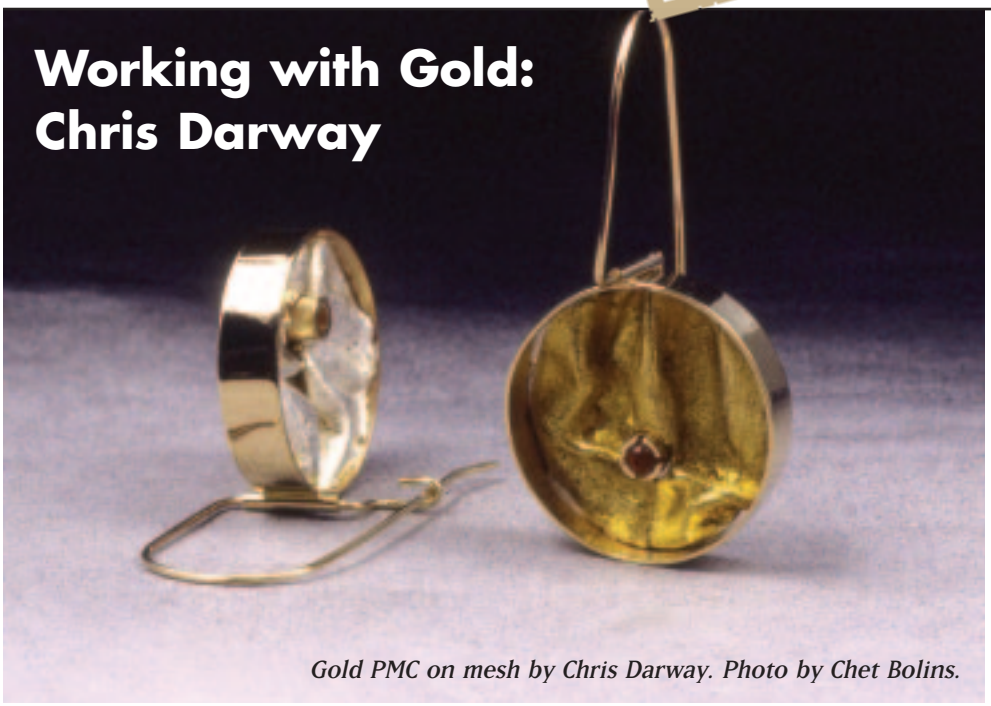
Studio

Latest News, Views, and Breakthroughs in Precious Metal Clay!

Summer 2003
Vol. 6 No. 2

# Working with Gold: Chris Darway



*Gold PMC on mesh by Chris Darway. Photo by Chet Bolins.*

Gold gives a sense of richness and quality to almost anything it is associated with. Just a hint of gold on a piece lifts it into a higher bracket in the eyes of the beholder. This may be just a matter of perception, but it is a reality, and we do have to consider it when making and selling jewelry.

There are many ways to incorporate gold in its different forms with PMC. Metalsmiths and jewelers have an advantage here, since we can apply basic metal working techniques such as filing, sawing, and soldering. Combining PMC silver and gold elements with solder is one of the most obvious techniques for adding a little gold to your work. But lack of prior experience in metalwork doesn't mean this option is closed to you. Soldering can be done with a minimum amount of equipment, and basic technique can be learned through an introductory jewelry class or through a local metal person who is willing to give you one or two days of instruction in soldering.

Before soldering on PMC, you must burnish the area to be soldered to close the surface. Then solder using silver solder to attach gold to silver PMC, or gold solder to attach gold to gold PMC. You may use any silver solder flux that you like.

Another technique I use is to electroplate 24k gold on PMC. This is something not done at home because the process generally uses cyanide solutions. However, you can send your work out to be plated. One plating company is Red Sky, which is associated with Rio Grande. The company has an informative package that explains everything you need to know about the process. Other companies that specialize in plating jewelry can be located through Manufacturing Jewelers and Suppliers of America, a trade association based in Providence, Rhode Island. A pen plating system is another way to add spot gold. Rio Grande offers one that provides good results at home.

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# Love & Hate in the Computer Age



I am the first person to admit I have a love-hate relationship with my computer. I love what the computer does for me. I'm a better writer because it gives me limitless freedom to tweak and alter my sentences, to try out one wording, discard it, and try another. It allows me to edit this newsletter in one state, send it to our technical editor in another state for timely review, and then on to our art director in a third state for layout and design, all in less time than it would normally take an envelope to get across town. And I absolutely love the way computers allow me to connect with artists all over the globe, and even become friends with people I've never met.

But there's a dark side to all this technology, too. The computer that normally makes me so much more efficient had the opposite effect on me this month, as I attempted to install a new machine with predictably frustrating results.

It's also made it easier for the boors to ruin my day. There is something about the anonymity of the Internet that encourages some people to say unpleasant things they'd probably never say to your face. The flame wars those comments start often make me wish I'd never logged on.

Into the midst of this love-hate relationship comes the new PMC Guild online bulletin board. The old board had its charms, certainly, but it had a few flaws too — not least of which was the inability to delete individual comments. That meant good, informative threads could be hijacked by backbiting and bickering. The only solution available to the Guild moderators was to kill the entire thread, good and bad alike. Understandably, this was a step the Guild took reluctantly, and only when it was clear that a thread had turned nasty beyond redemption.

The new bulletin board gives Guild moderators the ability to remove a single message from a thread, without affecting the rest of the posts. It also requires posters to register a screen name, providing a means of identifying the source of a post and perhaps eliminating some of the anonymity that encourages nastiness. When people know their remarks will be associated with them — even if it's just their online persona — they are sometimes more inclined to choose their words with care.

Ideally, this new ability to remove messages is something we'll rarely need to implement. I am confident that this community can form a warm, supportive online environment without someone standing over them to remind them to play nice. But the updated technology means that we no longer have to worry about threads being taken prisoner by a single, anonymous troll. We can stop flame wars before they start. And that will, hopefully, make the bulletin board a better, more caring place — and the kind of technology that I love.



Suzanne Wade
*Editor*

***Studio PMC Newsletter***
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**• How to SUBMIT WORK to *Studio PMC*...**

We welcome your PMC photos, articles and ideas. You may submit by mail or electronically. Please include your name, address, e-mail, phone, plus a full description of your PMC piece and a brief bio. Slides are preferred, but color prints and digital images are OK.

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**ELECTRONICALLY:** E-mail articles in the body of the e-mail, or as attachments. E-mail photos as attachments. We require an image resolution of 300 dpi.
• E-mail files (under 4 MB) to editor@PMCguild.com
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# CeCe Says... Overcoming the Fear Factor



*CeCe Wire, Director of the PMC Guild*

Many of our members are itching to work with gold PMC, and there are a lot of reasons to want to work with this alluring medium. My friend Connie Lehman wanted to use gold because she knew the selling price of gold jewelry is many times more than that of silver. I wanted to experience making a piece in 24k gold because of its inherent beauty.

Often, though, something holds us back — FEAR. Fear of the unknown, and fear of making mistakes. I had been working with PMC for several years before I had the courage to try working with gold, so I can relate to this Fear Factor. I thought I had to make the best piece of my entire artistic career because the material is so expensive. It's 24k gold! The pressure I placed on myself took away all the fun.

I did eventually start working with gold PMC though. You can, too. Here's some advice for breaking through the Fear Factor.

**Preparation**

Before you open the package, you need to feel confident about what you are making. Reduce your fears by spending as much time as you need designing a piece you will be happy with. Some artists design with pencil and paper, while others prefer a direct approach and make models with Creative Paperclay or polymer clay. The trick is to use whatever process works for you, and that brings you to a design you feel totally confident about making. Then, just as a presenter practices a speech several times before delivering it to an audience of 200 people, practice making the piece in original silver PMC. Original PMC has the same shrinkage ( between 28 percent and 30 percent) as gold PMC, so it is the best material for practicing.

**Set the Mood**

You are bound to feel your blood pressure rising as you peel the tape from the lid of the plastic box. I found setting a relaxing mood helps immensely. Perhaps you could do some yoga before you go to work, or some relaxed breathing exercises, or meditate on your final creation. The idea here is to calm your mind. You can also pipe relaxing music into your work space. I am sure you have a favorite CD that always puts you in a great mood. Pleasant smelling candles and incense are nice for your auditory senses and work as aromatherapy. You will be at your best if you are relaxed. Plan to do something that establishes the best atmosphere for creativity.

**Economy: Think Small**

A ring is a great idea for your first piece made of gold. It is small, personal, and can be sold or given as a gift to that special someone. Tim McCreight designed some nice small gold pieces shown in the original PMC video. Looking at his work gave me the confidence to create my own ring.

Another good way to use the quarter-ounce package of gold PMC is to make small accent pieces that are part of a larger silver piece. This is the way I like to work with gold PMC. The gold glows nicely against the fine silver background. You also have the marketing benefits of gold without making the entire piece out of gold. Combined work of silver and gold is also a popular look.

Your quarter-ounce of gold can go a long way if you turn it into slip and paint it on unfired silver PMC. The best way to fire work made in this way is with a torch. Celie Fago and Carl Stanley have pioneered this technique. (See "Adding Accents with Gold PMC Slip" page 8, this issue.)

If you have the craving for gold, you will one day have the courage to work with it. I hope my suggestions give you the confidence you need to break through the Gold Fear Factor!

Happy PMCing!

CeCe



*CeCe's "Golden Vein," leaf shaped pendant of gold PMC and PMC+, sterling silver ball chain. Photos by Craig DeMartino.*

# The Gold Standard

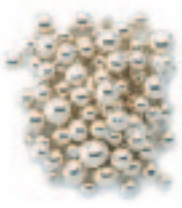
*By Tim McCreight*













The chemical symbol for gold is Au, from the Latin word aurum. In most cultures, it is a symbol of wealth, purity, and value. From Olympic medals to the color of Oscar, gold is part of our culture, too. Unless you were paying close attention in your middle school earth science class, though, you might not know a lot about this important metal.

Gold combines near perfect qualities in its physical characteristics, scarcity, history, and mythology. Gold appears at or near the top of many lists. It is the most malleable metal and the most ductile. It is number three in its ability to conduct electricity, and also third in heat conduction. Because it is chemically inert, it does not tarnish: gold coins retrieved after centuries on the ocean floor are as bright as the day they were minted. No wonder gold has played an important role in art since it was discovered more than 5,000 years ago.

Most gold today comes not from the pans of leather-faced prospectors, but as a secondary product of silver and copper mining. Pure gold, technically written as Au .999, is too soft for many applications. Centuries ago it was discovered that small amounts of silver and copper increased the strength of gold without seriously compromising its color, luster, and malleability. Over the years, specific proportions came into use and were standardized by law.

In the United States, we identify the purity of gold alloys by a system that hypothetically divides a given sample into 24 parts called karats. "If we broke this mixture into its components, then divided the whole into 24 equal-size piles, how many of those piles would be pure gold?" We write this number in the top of a fraction whose denominator is 24. If 18 of the piles are gold, for example, the result is 18/24, which reduces to 3/4, or 75 percent. In the U.S., we normally write this as 18k; in Europe the same alloy would be marked .750, which indicates that 750 parts per thousand are gold. The chart shows some other familiar alloys.

Whatever system is used, the numbers refer only to the gold content. All 18k alloys contain the same proportion of gold: the remaining 25 percent can be whatever the refiner chooses. These are the ingredients that make a gold alloy pink or green or white. Each refiner uses their own closely-guarded recipes.

You might have gold on your fingers, and maybe you have some in your teeth. And if you own a computer, you've got some there, too. More than that, there's a good chance that the gold in your computer came from the same facility as the PMC on your workbench. The hair-like wires that carry electric current to microchips are made of gold and they are an important product of Mitsubishi Materials Corp. in Japan. Down the hall from the PMC manufacturing area is a state-of-the-art laboratory where gold is refined to super high purity — 99.999 percent pure — and spun into threads Rumplestiltskin could only dream of making. Dozens of machines wind pure gold thread neatly onto spools for distribution to chip manufacturers around the world. In this regard, gold is keeping to its ancient tradition: a unique material whose use and value transcend boundaries.

| | |
|---|---|
| Au 1000 | 24k(gold PMC) |
| Au 950 | 22 3/4 karat |
| Au 900 | 21 3/4 karat |
| Au 800 | 19 1/4 karat |
| Au 750 | 18 karat |
| Au 650 | 15 3/4 karat |
| Au 583 | 14 karat |
| Au 417 | 10 karat |

# Working with Gold: Shahasp Valentine



Shahasp Valentine combined original PMC and gold PMC to create this mixed metal pendant, called Wave Necklace #14. "I use original PMC because of its malleability and similar texture to gold PMC," she says.

This design derives from Shahasp's Knife Edge design, one of which can be seen on page 15. "To create Wave Necklace #14, I started with the rough Knife Edge form, and attached a small roll of gold PMC at the crest along the entire length, using PMC+ slip," she writes. "With texturing tools, I meld the two metals and form the wave shape."

Shahasp says she doesn't sketch or otherwise plan the design in advance. "The shapes just flow through me," she says. "I've found that if I try to think about it or force it, the pieces turn out contrived or simply uninspired."

Once shaped, Shahasp embeds fine silver posts for the pearls into the wet clay. The pendant is then fired for two hours at 1650°F. "I have found with necklaces that I can get away with firing gold PMC at the silver temperature, as they don't take much abuse or wear, like a ring would," she notes.

To finish the pieces in this series, Shahasp first uses 3M Radial Bristle Disks, a wire brush, or a wire wheel, followed by sandpaper, files, and wire brushes to create a matte finish. Finally, the high surfaces are burnished with a stainless steel burnisher. "I use a lot of tools meant for ceramics and acrylic fingernails in addition to traditional jewelry tools [for finishing]," she notes. "If the piece is going to be oxidized, that's the first step before any brushing. I like the texture I can get if the piece is oxidized right out of the kiln."

Finally, the pearls are fixed on their posts with a two-part non-yellowing epoxy. The result: a mixed metal piece that looks grown, rather than man-made. "It's almost as if the best pieces create themselves," says Shahasp. "These are the moments that make me feel like I'm doing the right thing in life and in art."

***Shahasp Valentine*** *is a San Francisco jeweler who creates a line of jewelry she calls "Precieux." Her work has appeared in* Studio PMC *on numerous occasions.*

# Chris Darway

*continued from page 1.*

Pure gold and fine silver love to alloy. This quality to pass into each other with a little heat and pressure is the source of the Korean technique called Keum-boo. Scissor-cut pieces of Keum-boo gold foil are burnished onto the surface of warmed fine silver. The foil adheres without solder or adhesive. (For more on this technique, see "Keum-boo & PMC" in the Spring, 2003 issue and "A Keum-boo Project," page 12 this issue.)

PMC can also be gilded with 23k or 24k gold leaf using a sticky varnish called "Japan size" or "French size" as an adhesive. This is the same method used to gild picture frames. Both gilding and Keum-boo are rather low tech, but produce wonderful results. Although care must be taken not to scratch the gilded surface, the gold accents will last for years if applied properly.

Finally, there is the method that I've developed by firing PMC+ on fine stainless steel mesh. I paint several layers of PMC+ slip or trowel a lump of PMC+ onto the mesh, dry, and then fire the piece. The fired sheet can be pressed using a hydraulic press, bent, sawed, or soldered. The painted PMC slip on the mesh gives a look of gesso on canvas, while the trowel lump has the texture of wall spackle. I recently used this technique on gold PMC. I thinned the PMC gold lump with a little water, a few drops of vinegar, and a drop or two of PMC extender.

The mesh is made to look like crumpled cloth, and then the gold is painted on the mesh. A hot plate is used to dry each consecutive coating until the strands of steel mesh are no longer visible. The finished piece is fired for two hours at 1830°F. I've been able to saw and solder this material in the same manner as other metals. The color of the pure gold is gorgeous!

*Keum-boo PMC pin by Chris Darway.*
*Photo by Chet Bolins.*

*Metalworker* ***Chris Darway*** *creates carefully engineered jewelry and constructions, frequently using tools he makes himself. Chris began studying industrial design at Philadelphia College of Art (PCA) but switched to metals. Today he's back at PCA (now revitalized and renamed University of the Arts) in a teaching capacity — metals, of course. Chris lives in Lambertville, Pennsylvania.*



# Working with Gold: Dawn Hale

Dawn Hale thinks snakes have gotten a bad rap. Although the Bible blames the snake for Eve's downfall, Dawn points out that until Christianity became the dominant religion in the West, snakes were pretty popular. The snake's ability to shed its skin made it a symbol of rebirth, and the snake with its tail in its mouth was used to represent eternity. Fertility goddesses were often depicted holding snakes.

It was that ancient symbolism — and the later demonization of the snake by Christians — that inspired Dawn to create her Out of Eden collection, which includes this piece with a snake wrapped around a cross-shaped pearl. "When Christianity came along, it was threatened by the old [female-dominated theology], so it had to make the snake into something evil. So we get the Garden of Eden, where the snake was the cause of all the trouble," says Dawn. "I see this piece as embracing them both: the male and the female, the pagan and Christian."



*Gold PMC snakes from Dawn Hale's Out of Eden collection.*

When designing a new piece, Dawn first works out her ideas in Sculpey polymer clay, and later silver PMC, before making the leap into gold PMC. "It's terrifying [to work in gold PMC] because it's so expensive," she admits. "If I like it in silver, I [move on to] gold."

For models, Dawn turns to the local toy store for rubber snakes. "They're small, and not alive," she explains. "They're three dimensional and textured, with ridges on the bottom and scales on the top. And they show the shape of the head and eye placement."

With the toy snake as a model, she works out the design in Sculpey. She makes scale patterns with a wood stick the thickness of a bamboo skewer, with a v-shaped notch cut into the end. She then drapes the Sculpey snake over the pearl until she is happy with the arrangement—in this piece, the snake resting its head over one arm of the cross with the rest of the body wrapped around the base.

Once she's satisfied with the size and shape of the Sculpey snake, she replicates the snake design in PMC. She uses a rigid plastic sheet to roll out the PMC, since fingers produce ridges and a more uneven shape. By pressing harder on one end of the sheet, she gets a graduated snake shape, thicker at the head end, and thinner toward the tail. Then she flattens the head and forms it into a diamond shape.

Dawn uses natural rubies and sapphires for the eyes, and a diamond-shaped stone as an accent on the head. She sets the stone in the green PMC and fires it in place. Dawn uses primarily rubies and sapphires because corundum can withstand the higher firing temperatures needed for gold PMC.

Because the pearl cannot be heated without damaging it, Dawn uses bread squished into a cross shape to arrange the unfired gold PMC snake. After drying, the PMC is fired normally. Dawn allows her pieces to air cool because quenching could crack the stones.

The snake is assembled onto the pearl in its just-fired state, prior to burnishing or other activities that could work harden the metal. The basic shape is gently squeezed to fit around the pearl, then epoxied in place using a two-part, slow-drying epoxy. Dawn uses a third-hand, or occasionally two third-hands, to hold the snake in place while the epoxy hardens, since the slow drying epoxies can take eight hours or more to set completely. Dawn's favorite finish is a soft brass brush with soap and water.

The finished piece recalls the ancient jewelry that Dawn fell in love with as a child. "I like my pieces to look ancient," she says. "I don't want it to look like Hong Kong produced it."

***Dawn Hale** is a professional jewelry artist who specializes in incorporating antiquities and ancient themes into her work. Her jewelry can be found in the Fragments showroom in Soho, New York, at the New York Metropolitan Museum of Art gift store, and in catalogs and galleries throughout the United States and in Japan and Korea. Her work has been featured in* InStyle, Lustre, *and* Flaunt *magazines.*

# Working with Gold: Anne Lingener-Reece

I have been using gold PMC since it first arrived on the scene. Through experimentation, I have found that gold PMC gives an added range to my work that is not available to me any other way. It's an organic, richly colored high karat gold that allows for finely detailed wearable art. However, I do find gold PMC a little trickier to work with than silver PMC because it is not as strong.

When I first began using gold PMC, the major drawback — besides the cost — was the sometimes fragile nature of large, highly detailed pieces. My solution to this was twofold. To strengthen large pieces, I added enough silver PMC+ to create a 22k gold clay. This not only produced a stronger gold, it also gave me a more pliable gold clay. (There are several good books that list the ratio of silver to gold to change the 24k to 22k or even 18k gold, including *Jewelry Concepts and Technology* by Oppi Untracht, *The Theory and Practice of Goldsmithing* by Erhard Brepohl, and *Jeweler's Resource* by Bruce Knuth.) Personally, I prefer to stay with the 22k to keep the color as rich as possible and maintain the beauty of high karat gold.

My second technique for strengthening longer pieces is to build a skeleton of 24k wire. (I also do this with silver PMC+ when the piece is going to be large.) The 24k wire adds strength to a piece and does not discolor during firing. When I experimented with other gold wires, I found that both 18k and 22k wire required extensive sanding to get rid of the black surface oxidation that occurred during firing. This, in turn, can often damage the detail of the design.

When I wish to add stones to a piece, I have found it easiest to embed 24k gold or platinum settings directly in the clay. After placing the settings, I let my pieces air dry for several days, allowing for much of the shrinkage to take place before firing the piece. While sometimes it is hard to let several days go by before firing, it is easier to make adjustments before firing, but after the piece is completely dry. You can also make surface embellishments directly in the dry clay with gravers at this stage.

I find clients love having the chance to own and wear a piece of high karat gold jewelry. While the gold PMC is more costly than sheet gold, it affords me a greater range of creativity, and it is hard to beat the sensual feel of gold PMC's rich, high karat color.

*Artist **Anne Lingener-Reece's** work has been seen in galleries in Louisiana, Washington, and Alaska. A metalsmith, painter, and graphic designer, she has taught art at several universities and colleges in Alaska and Louisiana. She divides her time between her New Orleans and Anchorage studios.*



*22k gold (24k gold PMC and silver PMC+) 22k wire, 24k wire and sheet, 18k bezel, tsavorite garnet, and three emerald cabochons by Anne Lingener-Reece.*

*BELOW: "Golden Leaves Necklace" 24k gold (PMC, wire, and sheet) and green tourmaline.*



# Adding Accents with Gold PMC Slip



1. Place PMC+ ball on texture plate.



2. Roll it into an oval.



3. Fold it over a straw.



4. Mix gold slip.



5. Attach dangles, stamp and allow to dry.

*by Carl Stanley*

As an artist and metalsmith, I am always exploring new techniques and materials. This use of gold PMC developed from my experiments with torch firing.

I especially enjoy the interesting textures made by firing wet PMC+, and I wanted to add gold accents to my deeply textured work. One day I mixed a little bit of dried-out gold PMC into a thin paste with a few drops of distilled water. I painted it on some unfired PMC+ and torch-fired the piece. It worked like a charm.

I have been using this method ever since with great success. It is a wonderful way to add gold accents to silver work, and a little bit of gold PMC goes a long way.

The gold is added to a PMC+ or PMC3 piece that is not fired but is completely dry. Although I have had success adding gold PMC to fired pieces, I find the gold adheres better when the silver and gold are fired together. The base silver PMC piece may be a flat or three-dimensional shape, and may have a flat, unadorned surface, or have designs stamped, molded, or carved on the surface.

In this project, I describe making a bead from PMC+ and adding gold accents.

**Step 1: Making the Bead.**
Form a marble-sized ball of PMC+, and roll or push it into a textured sheet until it makes a patterned oval slab about four cards thick. Fold the slab over a straw and pinch the hanging ends together.

Make two balls the size of peas. Hold them in place back to back overlapping and hanging off the ends of the folded slab half way. Flatten and stamp them both at the same time to create a hanging bottom element that is decorated on both sides. Add a drop of water between all joined pieces. Hang the bead from a fixture and allow it to dry completely.



**Step 2: Add the gold accents**
Make gold slip by adding a few drops of distilled water to some dry gold PMC in a small bottle. Crush and mix this together with a plastic stick until the slip is about the same consistency as fingernail polish, or a little thinner. It is easier to mix the gold slip if you allow the gold and water mixture to sit with the lid on until the gold softens.

Use a fine-tipped paintbrush to paint the gold slip onto the bead. If the slip is too thick to flow easily, thin it down with a drop of water. (Even in a tightly closed jar, the slip can thicken over time.)

After the first coat has dried, apply a second coat, and then a third, in order to create a thick layer of gold. The thicker the gold layer, the richer the finished color. With slip that is a bit thinner than fingernail polish, I find that three layers create a rich 24k gold color. I have also fired two layers to get a beautiful 18k gold look, while firing just one layer will often create a mottled look of gold and silver. This can be a great effect if one is looking for something subtle.

The dry but unfired gold should have a deep, ochre-brown color that is even and smooth. If the gold flows where you don't want it, allow it to dry, then scrape it away. Be gentle so you don't disturb the unfired silver PMC.

**Step 3: Fire the Bead**

Once dry, fire the gold and silver simultaneously with a torch. Any propane, butane, or acetylene jeweler's torch will work. It also helps to have an electronic timer on hand.

To fire, hang the dry bead from a fixture made of heavy stainless steel wire, such as welding rod, placed on a heat-proof tile. Place the tile on a heat-proof surface, such as brick.

Light the torch and bring the torch flame onto the piece, taking care to avoid blowing the piece off the fixture with the gas pressure. As the heat increases, the binder catches fire and starts to smoke. The smoke only lasts a few seconds and it can easily be vented away with a small fan.

After the smoke and fire are gone, the clay begins to turn red. When the piece reaches a bright red color (dim the lights to see this best), start the timer and hold this temperature for five minutes. You can fire for as little as three minutes, but the piece will be stronger if the firing temperature is held longer.

Near the end of the firing time raise the temperature of the piece by moving the torch closer. Be very careful not to melt the work. Keep the flame moving in and out, holding this extra hot temperature for the last 20 or 30 seconds. This makes the gold stronger and creates a better bond to the silver base.

When time is up, turn off the torch and allow the bead to cool. After the red glow is gone, the piece can be quenched in cool water.

**Step 4: Finish**

Finish the bead as you would any other silver piece. Wire brush, tumble polish, or spot burnish the gold area.

Twenty-four karat gold bonded onto silver PMC can be burnished to a high shine or given a satin finish. A Silver Black or liver of sulfur patina can be beautiful with gold accents. However you finish your piece, the contrast of color is beautiful and striking.

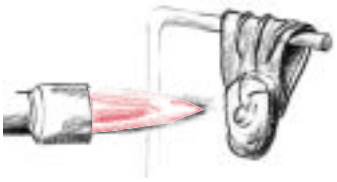
***Carl Stanley** is a jewelry artist from Santa Barbara, California. He has been working and experimenting with PMC for six years, and is a senior instructor with the PMC Guild.*



6. Paint gold and dry.



7. Hang from fixture.



8. Fire and finish.



*Silver and gold PMC beads with enamel accents by Carl Stanley. Photos by Patrick Flannery.*

# GALLERY

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**MAILING ADDRESS**
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Mansfield, MA 02048.

Please include your name, address, country if outside the U.S., phone, e-mail address, a brief bio, photo credit, plus the size and materials used in your piece.

All designs are the property of the artists.

## Biographies

**Jill Bush** received her certification at the first PMC certification class in St. Louis with Tim McCreight. She sells jewelry at art fairs across the country, and has sold her work wholesale to many galleries, boutiques, and stores, including Nordstrom.

A native of Richmond, Virginia, **Cathy Wheless** was the first PMC instructor in Virginia. She teaches at several schools and workshops in Richmond, and her work has been seen in galleries and shows in Richmond, Washington D.C., New York City, Malvern, Pennsylvania, and Minneapolis, Minnesota.

**Jeanette Landenwitch** is a self-taught jewelry designer with a background in dress-making, interior design, art history, and ceramics. A certified PMC instructor, she teaches workshops and classes in northern Virginia. Her work has been shown throughout the United States. She has written a book, *Creating with Precious Metal Clay*.

**R. Merrill Bollerud** teaches PMC workshops at the Tucson, Arizona, Parks and Recreation Visual Arts Department. Her work has appeared several times in *Studio PMC*. She was a finalist in the 2002 Saul Bell awards in the PMC category.

PMC has been **Kathy Van Kleek's** primary medium for more than five years. "I am a devoted PMC artist, with a level of enthusiasm that borders on rabid and, some would say, militant," writes Kathy. "Basically, I'm a very vocal cheerleader for PMC." Kathy's work includes production-oriented, limited edition, and one-of-a-kind pieces.



© Cathy Wheless

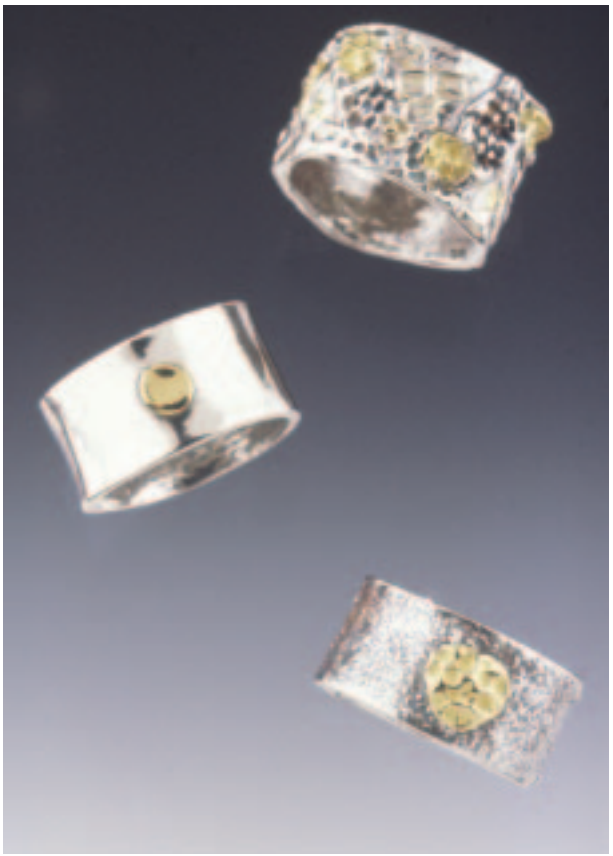
**Cathy Wheless**
"My Mother's Gift" 24k gold PMC.
1/2" x 1"



**Jeanette Landenwitch**
Silver and gold PMC earrings.



**R. Merrill Bollerud**
Gold PMC pendant.



**Jill Bush**
Silver and gold PMC rings.
1/2" to 3/4" diameter.
Photo by Jerry Anthony.



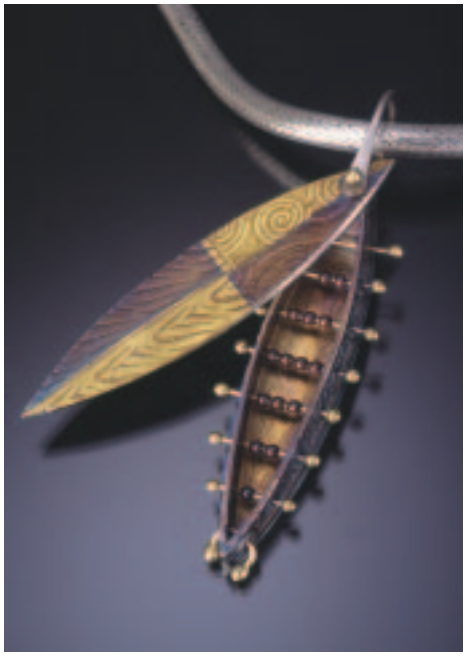
**Kathy Van Kleek**
"Spirit Vessel" fine silver and gold PMC, sterling wire.
Photo by Seth Tice Lewis. 1 3/4" x 1 3/4"

# A Keum-boo Project

*By Celie Fago*



*Silver PMC with 24k gold Keum-boo by Celie Fago. 1 3/4" diameter. Photo by Robert Diamante.*



*"Pierced pendant #2" by Celie Fago. Silver PMC with 24k gold Keum-boo. Photo by Robert Diamante.*

*Editor's note: Estelle Vernon's article on Keum-boo published in the Spring 2003 issue of Studio PMC inspired PMC Guild Senior Instructor Celie Fago to share her own experience and tips for working with Keum-boo. The following project offers Studio PMC readers step-by-step instructions for adding gold Keum-boo to a silver PMC piece.*

Keum-boo, which means "attached gold," is a simple, reliable process through which 24k gold foil is bonded to the surface of another metal, usually fine silver. This ancient Asian metalworking technique, adapted here for Precious Metal Clay, offers a relatively easy and inexpensive way to add the luster of gold to your PMC. The beauty of using Keum-boo with PMC is that silver metal clay, unlike conventional fine silver sheet, needs no preparation.

In this project we'll burnish gold foil shapes onto freshly fired PMC that's been heated on a hot plate. The gold attaches to the fine silver through a diffusion bond, an atom exchange at the interface of the two metals, not by fusion, which is the selective melting of one metal to another to create a bond. This diffusion bond is possible because fine silver and fine gold produce no oxides: As long as there is no oxide and no air between the metals to act as a barrier, the gold and silver molecules will co-mingle, or link up at the interface, and create a durable, permanent bond. (Heat and pressure accelerate this bonding.)

In Keum-boo, the heat, the pressure of the burnishing, and the cleanliness of the metal all contribute to the success of the process. If you have problems with getting the gold foil to adhere, chances are one of these three things is the culprit.

**Step 1: PMC.** All types of PMC work equally well with Keum-boo. However, low relief textures are much easier to apply Keum-boo to than deep textures. The process follows simple rules of logic: If the parent silver has deep gullies and mountains it will be difficult to work the gold into the crevices with the burnisher. So start with low relief, or none at all, on your PMC.

Another tip for beginners is to start with a small, flat piece. Curved PMC pieces, beads, rings, volumetric, and large pieces are also candidates for Keum-boo, but are more challenging. I suggest you tackle these types of pieces after you develop a feel for the process. *Safety note: Although PMC hollow-form pieces do not require a hole for gasses to escape during firing, they do need a hole for heating during the Keum-boo process. As the air trapped inside the hollow form expands during heating, it puts pressure on the now-solid metal. If the air cannot escape, it may cause the piece to explode.*

PMC is never cleaner than when it comes out of the kiln fresh from firing. It doesn't need pickling, degreasing, or preparation of any kind to receive the Keum-boo gold. In fact, if you have an old piece of fired or patinated PMC that you want to apply Keum-boo to, re-fire it. When it comes out of the kiln, it will be pristine and ready for the gold.

**Step 2: Hotplate.** Place the hotplate on a counter top, high enough so you're not forced to bend over it. If it's a counter that can be damaged by heat, protect the countertop with unglazed tiles (or other fireproof materials) under the hotplate so you'll have a place to set hot tools and pieces of work.

Although copper and steel can both be used to cover the hot plate burner, I prefer 20 gauge red brass (sometimes called "new gold"). Copper is a better heat conductor, but it sheds oxides when heated, making a mess. I've improved my Keum-boo station by pounding out various-size concave depressions in my brass sheet with dapping dies and punches. These

depressions hold both big and little beads for Keum-boo. To allow the sheet to rest on the hot plate without teetering, turn down the corners of the brass sheet.

**Step 3: Gold Foil.** Although it is possible to roll your own gold foil for Keum-boo, I prefer to purchase my foil from Allcraft. It's thinner than I can roll with my unmotorized rolling mill, and therefore more economical. Also, because it's thinner, it follows the topography of the textured surface more closely.



*Hollow form lentil bead earrings by Celie Fago. Silver PMC with 24k Keum-boo. Photo by Robert Diamante.*

Gold leaf and most enameling foils are too thin for Keum-boo. Unless doubled or tripled, they will diffuse into the surface, leaving a disappointing greenish color. Doubling them is difficult, and I don't recommend it except as an experiment.

The easiest way to cut shapes from the gold foil is to place it in a folded piece of plain paper. To use decorative paper punches, put a square of gold in a folded piece of paper just a bit larger than the gold. Hold it up to the light so you can see the gold square and lightly mark the center with your pencil. Use the mark to position this "sandwich" in a punch. (Holding the punch upside down will facilitate positioning.) Larger and more complex shapes can be drawn on paper and the drawn line used as a cutting guide.

**Step 4: Setting Up.** When you've cut your gold shapes, place the freshly fired PMC piece on the brass sheet on the hotplate. With experience you'll be able to add foil to the piece after it's heated up, but for now, place the gold on the silver before you turn on the hotplate. You can use tweezers (clean, no flux residue) to place the gold. If a piece of foil drops, pick it up with a dampened finger.

Turn the hotplate to high. Until you develop a feel for your equipment, use a chopstick or wood skewer to test for the correct temperature. Press the stick against the silver: it will char when the silver is hot enough to attach the gold, approximately 550˚F.

A note about temperature: The diffusion bond occurs between 550˚F and 850˚F (850˚F is the top end of most hot plates). I usually work in the 700˚F to 800˚F range. With experience, you will develop a feel for the correct hotplate temperature. The best way to tell if the metal is hot enough is if the gold adheres, but if you prefer to measure the temperature, the least expensive way to go is a wood stove thermometer. They cost about $20 and sit on the brass plate atop your burner.

**Step 5: Burnishing.** Use one burnisher to hold the piece steady, and the tip of the other to tack the middle of the gold shape down. Don't rub, just press to make the the initial tack. Then work from the center of the gold shape outward, using medium pressure, circular movement, and the belly of the tool to burnish the gold firmly onto the silver. Be careful not to trap air as you move from the middle out to the edges.

If the foil sticks to the steel, it means the burnisher is too hot. If you only have one burnisher, let it air-cool or dunk it in water. (Make sure it's dry before resuming.) You may also want to try agate burnishers, but don't quench them in water. If they get too hot, air-cool them. Keep all burnishers highly polished.

Until you become accustomed to the process, you may want to repeat these steps for successive pieces of foil. Eventually you'll become adept at adding gold foil to hot silver. Wear leather gloves that fit well to protect your hands from the heat.

Add more pieces of gold, overlapping if you like, until you are satisfied with the design. Once you've finished the first side, you can turn it over and do the other side. When you are finished, air-cool the piece.

Hold the cooled piece up to good light and examine the border of the attached gold. Run your fingernail along the border and try to pick up the edge. Well-attached foil is smooth, and does not make an abrupt transition at its borders. If you can see an edge, or feel it with your fingernail, simply re-heat and re-burnish.

The larger the piece of gold foil, the more difficult it will be to get it on, particularly on a curved surface. If a piece of foil creases or folds, just burnish it down, being careful not to trap air. If it tears, finish burnishing and patch it with a second piece of gold.

If upon heating during subsequent steps the attached gold develops little bubbles, it indicates trapped air. Sometimes you can cool the piece and re-burnish with your fingernail. A large bubble can be poked with a pin, heated, and re-burnished.

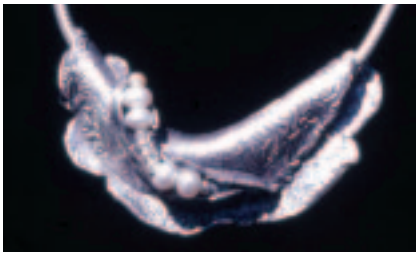
*Continued on page 15.*

# Happenings —News from the world of PMC

## PMC Guild Celebrates 2,000th Member



*Janet Crampton Pipes.*



*PMC pendant by Janet.*

On Jan. 15, the PMC Guild reached a major milestone — our 2,000th member! The 2,000th member is Janet Crampton Pipes, an artist from Livermore, California.

In college, Janet majored in ceramics. She went on to work for several years as a graphic designer for technical publications, until the increasingly technical nature of her job made her decide to follow a more artistic path. For the last several years, she has sold her sculptural bead jewelry at local craft fairs and galleries.

Her passion is beads. "I can never have too many beads," she says. "When I told my husband we could share an office, he said, 'No, I'll put the computer in the kitchen or the garage.' He knew every horizontal space would be taken over by beads."

It was the beads that led her to PMC. Five years ago, she traveled to Embellishment, planning to take a glass-bead-making class. She arrived too late: The class was already full. So she signed up for a PMC class instead.

"I have a ceramics background, and I had just started to get into metal," she says. "The PMC class was instant gratification. Clay is so immediate. When I got out of class, I saw a kiln and said [to my mother], when I can afford it, that's what I'm going to buy."

As it happened, she didn't have to wait for a bigger balance in the checking account: Her mother bought a kiln for her as a gift. And Janet began incorporating PMC into her necklaces of glass beads and polymer clay.

Several years passed between Janet's introduction to PMC and her decision to join the PMC Guild, however. In the interim, Janet and her husband of 15 years bought and began renovating a house. "It was built in 1950 and had suffered from a lack of interest and money," she explains. Repairing the damage and turning it from handyman's special to home consumed most of her waking hours. Between the time spent on the renovations and the lack of space due to construction, her art languished.

When she was finally able to begin moving back into her studio, she decided it was time to join the Guild. "I don't think the Guild had been formed when I first learned about PMC," she says. "One day I was sitting at the computer and I punched in precious metal clay [in a search engine]. Finding the Guild site was a happy accident."

For being the Guild's 2,000th member, Janet received five packages of PMC, two original, two PMC+, and one of PMC3. She also received two CD-ROMS, the *Beads 2002* CD featuring the catalog exhibition first displayed at the PMC Conference in Wooster, Ohio, and *Studio PMC, Five Years of the PMC Guild Newsletter, 1997-2002*, which features a complete collection of *Studio PMC* issues in a searchable format.

"I never win things, and when I do, it's never something I want," she laughs. "This was the most wonderful thing I've ever won."

**PMC in *Bead & Button***

Glass bead artist Kim Wertz helped put PMC on the cover of *Bead & Button* in February. Her article, "Creative Imagining and Making Silver Components," described how she designed a necklace featuring PMC beads and an art-glass centerpiece. The magazine's editors chose her necklace to appear on the cover — without telling Kim. "I got a call from a friend who said, 'Oh my God, your necklace looks great on the cover,'" she remembers. "I hadn't even gotten my copy yet."

The *Bead & Button* project was Kim's first PMC work after taking her initial PMC class — a PMC certification course. "After I sent [the article] off, I thought, my goodness, I have a lot of nerve," she recalls. "I felt like such a novice. But this stuff is too much fun. Once I learned, I couldn't wait to do it."

While the *Bead & Button* article may have been her first project in PMC, it won't be her last, says Kim, who with her husband produces and sells handmade glass beads. "We always wanted to do the whole thing and make [finished jewelry], but we were so busy," she says. Kim didn't feel comfortable combining the couple's handmade beads with manufactured findings, but both partners felt overwhelmed by the time and money needed to master metalsmithing. "PMC was like a miracle from heaven. You don't have to invest in a lot of equipment, you don't have to take a lot of classes, and you don't have to start with the really rudimentary," says Kim. "You can just go off and do your own thing."

**Local Guild Forms in Connecticut**

A local PMC Guild is now forming in southern Connecticut for PMC artists in Fairfield and Westchester counties. Meetings will be held the second Monday of each month at 7 p.m. at the Ridgefield Guild of Artists in Ridgefield, Connecticut. For more information and a schedule of upcoming demonstrations, e-mail Pam Lacey at pam@inspiredpieces.com or Robert Dancik at playcik@yahoo.com.

**Rio Grande Names PMC Liaison**

Rio Grande has named Judi Anderson as the company's PMC Technical Liaison. Judi is certified by the PMC Guild, and teaches classes at the company's Catalog in Motion show.



*Judi Anderson*

In her new position, Judi will be available for any questions relating to the PMC line, including technical concerns, product inquiries, and to place orders. She will also help develop PMC projects and offer classes for Rio Grande. Judi's new phone number, dedicated to serving PMC enthusiasts, is 888-tech-PMC. She can also be reached via fax at (505) 839-3541 or by e-mail at judi.anderson@tbg.riogrande.com.

**Anne Lingener-Reece's PMC on Display in Alaska**

Anne Lingener-Reece's "Cuff of Falling Leaves" bracelet was one of 63 pieces chosen to be displayed in the Earth, Fire, and Fibre XXIV Exhibition at the Anchorage Museum of History and Art. The exhibition attracted 356 submissions from 140 artists, with works from 52 artists selected for display.

After its January-February appearance at the Anchorage museum, the biennial juried craft exhibition was scheduled to travel to Juneau, Fairbanks, Kenai, and Homer, Alaska.

**Beyond the Mines**

A gold PMC piece by Shahasp Valentine was part of a recent exhibit of the work of California goldsmiths organized by the Crocker Art Museum in Sacramento California. The exhibit was offered in conjunction with "Beyond the Mines: The Art of Gold," a touring exhibit of gold artworks organized by the Society of North American Goldsmiths, which made its first appearance at the Crocker Art Museum. The "California Gold" exhibit featured the works of 40 artists from the state, including Shahasp, Petra Class, Marilyn and Jack daSilva, Jennifer Fecker, Kent Raible, Alexandra Hart, and Marianne Hunter.

**New Gold PMC Video from Linda Bernstein**

Pre-release orders are now being taken for a new video from Linda Bernstein, produced by abba dabba Productions LLC. In the video, *Working with Gold PMC,* Linda demonstrates how to form gold elements by sculpting, stamping, and using molds, cutters, and textures, as well as explaining how to fire and use these elements. The video also shows how to fire stones in place; make, use, and fire gold paste; and make and use molds.

The video will be available starting Sept. 1. To place a pre-release order, visit Linda's website at www.artique.org.



*Knife Edge Necklace #26. 24k PMC and cultured pearls, by Shahasp Valentine. Photo by Hap Sakwa.*



*Linda Bernstein demonstrates the creation of bracelets like this one in her upcoming video,* Working with Gold PMC.

# A Keum-boo Project *Continued from page 13.*

**Step 6: Finishing.** You can now go on to solder, patinate, etch, hammer, or form your piece in other ways.

Traditionally, all fabrication work (soldering, etc.) was done prior to applying Keum-boo. However, I solder posts to my pieces with medium solder after finishing the Keum-boo. If you do solder first, you must pickle, boil with baking soda, and clean with denatured alcohol prior to applying the gold.

When you are finished putting the foil on, remove the burnishing marks in any of the following ways: rub the piece with a little dampened pumice on your finger for a soft satin finish; use pumice on a soapy brass brush for a higher shine; or substitute baking soda for pumice for a slightly softer look. The finer the abrasive, the less contrast you'll get between the two metals. You can also tumble your piece. You can use liver of sulfur to apply a patina to the silver. (Liver of sulfur will not affect gold.)

**For more about Keum-boo, visit the Orchid forum archives at www.ganoksin.com.**

# Readers' Writes

## This Month's Question:

## How have you used gold PMC?

***Editor's Note:*** *Welcome to Readers' Writes, a new column written by you, the readers of* Studio PMC. *Each issue, we'll pose a question and ask you to let us know your answer. We'll print as many responses as possible in the next issue. To respond to this issue's question, or to suggest a question we should ask in a future issue, e-mail editor@pmcguild.com or write Readers' Writes,* Studio PMC, *P.O. Box 265, Mansfield, MA 02048.*



*"Golden Eye" by Jean Vormelker. Gold and silver PMC with enamel. 3 1/4" x 2 3/4"*

◆ I have done only two things with gold PMC so far. The first was to combine it with a silver PMC piece. I rolled a small rope and placed it on the wet PMC piece, and rolled that in. Then I textured the whole piece and fired at 1650˚F. It worked well. Even though the gold firing temperature is much higher, I'm under the impression you can get away with the lower temperature for small spots of gold.

The other thing I do a lot is to use the gold as a "wash." I will make my piece, let it dry thoroughly, and then use thinned down gold as a wash over the high spots of the texture. This is tricky, but produces a nice effect.

—Andi Callahan

◆ If it weren't for a private student asking me, "How do you use gold PMC?" I probably still would not have tried it. That chicklet-sized piece of "fine gold clay, 1/4 troy ounce" in its clear plastic box had been sitting on my table tormenting me for a while.



*Gold PMC slip on silver PMC. By Marcia Herson.*

Thus challenged, but still being a classic New Englander, I attempted to find the cheap way out. So I made a wash (created as a watery slip) and painted layers of gold onto a leather-hard PMC+ piece. As each layer dried, I added another. Though I didn't count, I'd say there were five to six thin layers. Then I fired it at 1650˚F for two hours and voila! All I did after that was wire brush and burnish. My beginner's luck has given me the desire to go further. Oh, and I only used up a tiny corner of my "chicklet."

—Marcia Herson



*Dragonfly pendant with gold PMC wash on wings by Andi Callihan.*

◆ My Golden Eye pendant was made with 24k gold PMC and an 18k green gold made by blending 24k and silver PMC together. I formed a thin rope of each karat gold, and placed them side by side. The double rope was made into a spiral, and then rolled to the thickness I wanted to make one sheet of clay. This was then pressed into a Belicold push mold of an abalone shell. After drying, this "eye" of the abalone was fired at 1830˚F for the full two hours.

Next, I pressed silver PMC into the mold for the body of the shell and dried it to leather hard. I lined up the gold on the silver to follow the pattern in the silver. The silver was cut away from behind the "eye" and the two pieces attached, dried, and fired for an additional two hours. (It took several firings to get all the holes filled between the pieces.)

Success! But the piece looked unfinished with the gold just sitting there. Bringing the gold colors up into the silver with enamel was the solution. After a little experimenting with leaded and lead-free enamels, I found four colors that were close to correct. When two transparent enamels for each color (18k and 24k) were mixed they exactly matched the two colors of gold. I just brushed the glass enamel on the top surfaces of some of the ridges on the completed shell and fired the enamel in the usual way.

—Jean Vormelker

## Next Question:

**How did you first discover PMC?**

# Tips & Tricks for PMC

*Edited by Celie Fago*

**Instant Stamp**

Senior instructor Carl Stanley offers this quick solution for a mini mold stamp for use on PMC.

"Take a hard glue stick, normally used in hot glue guns. You can buy these at art supply stores in a variety of lengths. I usually use 12-inch lengths and cut them into two-inch pieces, but other sizes would work as well.

"Take an object that you would like a mini mold stamp made of, such as a button or a detail on some toy. Put a drop of liquid dish soap on your finger and wipe it onto the area you want to make a stamp from. This acts as a release agent, so the glue doesn't stick. Heat one end of the glue stick over a candle or lighter until it is soft, but not so hot that it drips.

"Push the soft glue onto the area you have chosen. It will harden in a few seconds. You can trim any excess away with a safety knife. Now you have an instant stamp that gives a duplicate of the original detail. And remember you have two ends per piece. The cost and effort works out to about five minutes and five cents per stamp.

**More Household Shapes for PMC**

In a recent article, CeCe suggested using kitchen items to give texture and shape to PMC. For Mary Ann Warren, the article provided the inspiration to look around for other items.

"I had a prescription filled for Flonase and when I removed the top from the bottle, I realized it would make a wonderful oval shape for PMC," she writes. "A light bulb went on: What about other products we buy that are just disposed of after use, such as tooth paste caps and perfume bottle caps?" (Mary Ann suggests burning small holes in the plastic caps, which you can then blow through to facilitate removal of the PMC.)

And those caps are just the beginning. "There is a wonderful world out there of different shapes and sizes," she writes. "If you cross the lines of other crafts — sewing, carpentry, plumbing, etc. — you will also find really neat ideas."

**Alternatives to Liver of Sulfur**

Liver of sulfur is one of the most popular methods of patination used by PMC artists, but it has a short shelf life. As a result, many artists have experimented with other ways of getting the same results.

Happy coincidence led Guild member Mark Lattanzi to one viable alternative. "I needed to patina a piece but I had run out of liver of sulfur," he writes. "I remembered that I had just been to an Indian market and purchased some black salt, which is a salt used in curries, lassies and so on (and is actually pink). It smelled, as my daughter said, 'like the beach.' Sulfurous! I mixed some up in water and heated it, dropped the piece in and got a very nice patina!"

Another liver of sulfur alternative comes via the Orchid e-mail forum. "Instead of liver of sulfur, I use lime sulfur in liquid form from my local hardware/garden store," writes Marianne Kerby. "I mix approximately 5 ml of the liquid to about 250 ml of hot water. (About 1 teaspoon to 1 cup)."

"The results are almost the same, [although] I find the lime sulfur is more controllable. The stages of the color change are slightly slower and have more variety — lots of variation from cream, gold, bronze, bluey-purples, right through to black. I stop each stage with a quick dip in cold water and then continue if I want a deeper color.

"The contents of my bottle were manufactured in 1998. I've used about 1/8 of the bottle, and it is still working just as well as the first time I used it. Its long life is one of the reasons I like it so much."

**Keeping your Cards Together**

Measuring the thickness of PMC with playing cards is a tried-and-true technique, but one that can be frustrating as the slick cards slip around. To avoid this problem, many artists tape or glue the playing cards together. (A disappearing purple glue stick works well for this task, notes Carol Avery.)

To quickly identify how thick a stack is, make sure the top card shows the number of cards in the stack, writes Alice Alper-Rein. For example, a stack of five cards would have the five of hearts on top, and four other cards taped or glued underneath.

According to Carol, who also uses this technique, one deck of cards yields a pair of aces (for a one-card stack), two pairs of twos (two cards glued together with number two cards on top), plus stacks of threes, fours, fives, and sevens, with several single cards left over for holding works in progress. The stacks can then be combined for other thicknesses: for example, if a six-card stack is needed, Carol uses a four-stack and a two-stack.

For longer strips of PMC, try Bed and Bath, the home furnishings store, for longer, narrower cards, which come in a handy plastic case. (Thanks to CeCe, who first discovered them.)

**Deadlines for Submissions**

Fall 2003: May 1
Winter 2003: August 1

Special Focus for Winter 2003:
**Enameling on PMC**

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# Gold PMC FAQ

*by Tim McCreight*

**Q:** What is the correct firing sequence for gold PMC?

**A:** As with silver PMC, it is important to dry the work before firing. Bring the piece to 1830˚F (1000˚C) and hold it there for two hours. Gold PMC can be air cooled or quenched.

**Q:** What is the shrinkage rate of gold PMC?

**A:** It is 28 percent, the same as original silver PMC.

**Q:** Can I fire stones in place in gold PMC?

**A:** All laboratory-grown stones will withstand the higher temperature of firing gold, but very few natural stones will survive this temperature.

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