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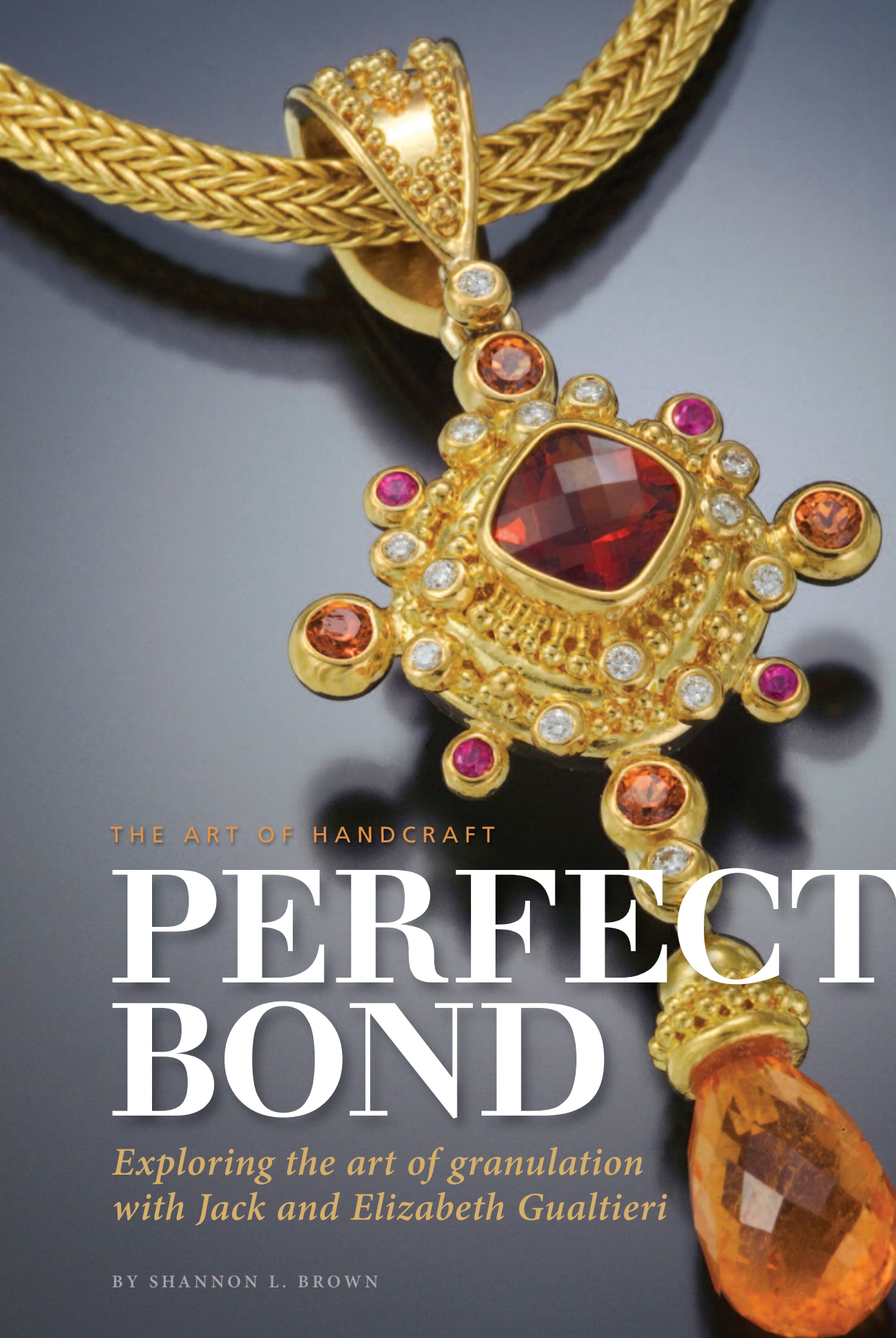
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*Exploring the art of granulation
with Jack and Elizabeth Gualtieri*

BY SHANNON L. BROWN



Jack and Elizabeth Gualtieri fell in love with granulation, and their joint purpose became pursuing the sometimes elusive but always beautiful technique.



The technique of applying tiny spheres of metal to jewelry is both timeless and contemporary, bringing old-world elegance to modern designs. Granulation began more than four millennia ago and became an art in the hands of the Etruscans a thousand years later. Their skills were so highly evolved that modern jewelers studied them for decades before unraveling the technique. Once lost, granulation thrives in the Portland, Oregon studio of Jack and Elizabeth Gualtieri of Zaffiro.

During a college year abroad in Italy, Elizabeth felt so drawn to the Etruscan pieces in museums that their ancient art form became her life's work. When Jack fell in love with her, he also fell in love with granulation, and their joint purpose became pursuing the sometimes elusive but always beautiful technique. In their studio, the Gualtieris craft granulated jewelry using 22k yellow, white, and rose golds, as well as platinum.

MAKING GRANULES

The process of granulation starts with what the Gualtieris refer to as the most tedious part of the job—making the granules. To reduce the tedium, they make granules only twice a year, estimating how much they will need in each metal to build stock and fulfill custom orders. “We’ll make 5 pennyweights of one alloy, 10 pennyweights of another, in sizes that vary from about 0.15 mm to about 4.5 mm in diameter,” says Elizabeth Gualtieri.

Though platinum and other colors of gold can be granulated, the Gualtieris generally choose yellow gold and use a 22k alloy they’ve developed for granulation. “The fusing properties of 22k are superior to 18k,” she says. “The higher karat gold doesn’t oxidize as fast, which is critical for obtaining a good bond when applying the granules.”

Most of their granules are cut from a length of 22k yellow gold wire in a special granule cutter that looks similar to a paper cutter. Granule size is determined by the gauge of wire, which varies from 26 gauge to 12 gauge. To make larger granules, they use the less accurate method of snipping the wire with wire

cutters after measuring one, two, three, or four scissor blades wide.

Once cut, the tiny pieces of gold are distributed onto a highly compressed charcoal block sitting in a standard 9 inch by 13 inch cake pan. Depending on the size of the granules, up to 200 may be placed at once. The Gualtieris hold an acetylene torch over the charcoal block, heating the gold bits until they naturally pull into perfect spheres, except for a little flat piece touching the block. The key is to keep the torch low and close to the granules; if it’s too high the airflow can cause the granules to move and push up against each other. Once formed, they let the spheres cool for a few seconds before dumping them into the cake pan.

When all of the granules are made, they pickle them in a cup that’s impervious to the citric acid pickle they use, rinse them, and sort them through mesh scientific sifting screens to calibrate them. “Over the course of a couple days we make thousands of granules in 12 different sizes,” says Gualtieri. “It’s one of those things that’s best to do all in one shot rather than doing them as you need them.”



THE PROCESS ⤴ **1.** To make granules, the Gualtieris begin by cutting tiny bits of wire—22k yellow gold is shown here—into uniform sizes. This process is made easier by the use of a special granule cutter that resembles a paper cutter.

⤴ **2.** Once cut, the tiny pieces of gold are distributed onto a highly compressed charcoal block sitting in a standard 9 inch by 13 inch cake pan. An acetylene torch is held over the charcoal block, heating the gold bits until they naturally pull into perfect spheres.



⤴ **3.** The Gualtieris make thousands of granules twice a year, estimating how much they will need in each metal used to build stock and fulfill custom orders. They sort the granules through mesh scientific sifting screens to calibrate them, and store them by size and alloy.



⤴ **4.** The base shape for the piece, a 22k ring shank, is fabricated and wires are fused to its edges and within open areas. The wire will act as a base to support the granules, enabling them to be fused not only to the base metal but also to the wire, anchoring them more securely to the piece.

THE GRANULATION PROCESS

The technique of applying the tiny metal granules to another metal surface centers on fusion. “When fusing as opposed to soldering, you’re heating until the surface molecules become liquid,” says Gualtieri. “You’re using the metal itself to fill a seam, and you end up with a piece that’s continuous

in karat and hardness.”

When creating a granulated piece of jewelry, the Gualtieris use the following process:

1. CREATE THE BASE FORM. To begin, the Gualtieris fabricate the basic form for the jewelry piece from sheet. They fuse wire to the edges of the form and often add decorative wire in larger

open areas. The wire will act as a base to support the granules, enabling them to be fused not only to the base metal but also to the wire, anchoring them more securely to the piece.

2. FABRICATE THE STONE SETTINGS. Once the basic form is complete, the Gualtieris fabricate all the bezel settings for the piece from sheet stock. They

5. The bezel for the center stone is fabricated and granulated separately. Because the bezel will be subjected to a number of fusing steps, leaving the top prone to slight overheating and resultant orange peel, the Galtieris make all of their bezels taller than they will ultimately need to be so they can trim off the tops before setting.



6. After applying the granules with a paintbrush and Klyr-Fire glue, the Galtieris carefully torch-heat the piece to temperature on a charcoal block—a process that requires lots of practice to perfect. The key is to watch for the granules to form stems. Too little heat and the tiny stem won't enable the granule to adhere to the base—you'll be able to pick it off after the piece cools. Too much heat and the granule will lose cohesion and slump into the metal. In this piece, the platinum granules, which have a higher melting point, were fused first, followed by all of the 22k yellow gold granules.



7. After a dip in pickle and clean-up, the bezels are soldered on, the stones are set, and the piece is polished. The Galtieris' favorite polishing tools are 3M's Radial Bristle Discs in a flex-shaft, which can be cut and stacked to fit in various areas.



8. The finished 22k gold piece with 22k yellow gold and platinum granules features a tsavorite garnet center stone with alexandrite side stones.

always make the settings taller than they will need to be for the stone, and granulate them separately from the jewelry piece. “Because I will be heating the metal in a number of fusion steps—first fusing the bezel, then fusing the granules to it, and later soldering the bezel to the piece—the top edge of a bezel can get a little hot and fried,” says Galtieri. “I can cut it shorter later before setting the stone.”

3. APPLY THE GRANULES. The Galtieris base the granulation design for every piece on what portion of the stone or design feature they want to emphasize. “I might do patterns to really emphasize the corners or both the corners and a major or minor axis,” Galtieri says. “It depends on what feeling I want, or if I want something more uniform all the way around.”

Using an artist's paintbrush and Klyr-

Fire glue (a plant-based glue that leaves no residue after fusing), they apply the granules to the piece. Because the glue is runnier than they'd like, they leave it out in an open glass jar for a day or so to thicken slightly before use.

The Galtieris have created a granule specifically sized to become a setting for a 1.25 mm stone. If a piece features any of these larger granules, which take more

heat to fuse, they glue them on and fuse them first. After pickling and cleaning the piece, they apply the other granules and fuse them. As a general rule, most of the granules can be fused at once, requiring only one heating step, unless the piece has steep areas that have them working against gravity. In that case, they fuse one plane, flip the piece, and fuse another.

4. FUSE THE GRANULES. With all the granules in place, the piece can be heated on a charcoal block. Using an acetylene torch, the Gualtieris carefully heat the piece, moving the torch around in a circle to ensure even heating. “I want to avoid having hot spots,” says Gualtieri. “I’m watching the color of the metal.”

Finding it easier to see the metal’s true color in lower light, they shut off the light

over the bench before fusing. “It starts glowing and getting hotter,” she explains. “You don’t want one granule getting hotter than the others, so you need to bring everything up to temperature evenly. You want to look for the molecules becoming molten on the surface of the metal.”

The key is to watch for the granules to form stems, “almost like a little stem of a mushroom,” describes Gualtieri. Too little heat and the tiny stem won’t enable the granule to adhere to the base—you’ll be able to pick it off after the piece cools. Too much heat and the granule will lose cohesion and slump into the metal. “There’s a sweet spot you’re looking for. It’s an art that’s perfected by practice.”

To achieve a solid fusing, the Gualtieris prefer for every granule to have two points of contact—the base metal

and the wall of a bezel or a piece of wire, or, at the very least, another granule. “The more contact, the less likely they can be knocked off,” she adds.

And remember: Every time you fuse, the area can get over-fired or get a slight bit of orange peel. To avoid trapping these imperfections under subsequent fusing steps where they would be impossible to remove, and to prevent the residues from interfering with fusing, the Gualtieris begin each step with a pickled, clean piece.

5. CHECK THE FUSION. Once fused, even if the granulation looks right to the naked eye, everything may not be rosy. After pickling, the Gualtieris loupe the piece to see if all the granules are on securely. “I would love to get all done the first time around, but that’s not generally how it happens,” says Gualtieri. “I usually have to go back a couple of times, especially on larger pieces.” To position a granule next to the metal it needs to fuse to, the Gualtieris may push on it with a wooden dowel they’ve sharpened in a pencil sharpener before re-fusing. The entire piece is then brought up to temperature again, and the heat is shifted to the area that needs to be fused.

Once all fusing is complete, the granulated bezels and any other separate pieces can be carefully soldered onto the main piece. Before soldering, the Gualtieris cover the granules with a paste form of yellow ochre. Since the yellow ochre impedes solder flow, they make sure it doesn’t get into the solder seam area.

6. SET STONES. After a dip in pickle and cleanup, the stones are set—including



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any in granules, which is more challenging than the usual process. “Stone setting within granules with all the other granules in place takes a pretty good skill set,” says Gualtieri. “You can’t have any mistakes with metal tools slipping and scraping off a portion of a neighboring granule or the piece is pretty much ruined.”

7. FINISHING. Polishing over granules also takes extra care to avoid flattening them. Stay away from large polishing machines and go with a flex-shaft, advises Gualtieri. Her favorite polishing product



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for granulation is 3M’s Radial Bristle Discs, which come in five grits and can be cut and stacked to fit in various areas.

It’s clear to see that granulation takes a

careful hand and a skilled eye. Knowing when it’s just the right time to pull the torch away and get a perfect bond between the granules and the surface of the piece requires practice

and a jeweler’s intuition. The Gualtieris have been working at it for 18 years, aspiring to make jewelry that will be as admired and beloved as the centuries’ old Etruscan art that inspired it. ♦