STEP by STEP

Opal Intarsia Pendant

Intarsia without fear

BY TOM & KAY BENHAM,
Contributing Editors

Part I of II

Photo of finished piece by Robert Brodie; all other photos courtesy of the authors

Skill level

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What you need

- Synthetic opal, rough cut to kite shape, ¾" W x 3/16" T x 1 ⅛" L
- 2 black jade strips (¼" W x ¼" T x ¾" L)
- 2 black jade strips (¼" W x ¼" T x 1 ¼" L)
- 2 Malachite strips (¼" W x ¼" T x ⅞" L)
- 2 Malachite strips (¼" W x ¼" T x 1 ⅜" L)
- Malachite back plate (1 ⅛" W x ⅛" T x 1 ⅝" L)
- Dop sticks
- Transfer fixture
- Two-part, five-minute clear epoxy
- Mixing pad and mixing stick
- Tube of cyanoacrylate superglue
- Pint of alcohol
- Superglue solvent
- Faceting machine with complete set of diamond laps (100-, 180-, 220-, 325-, 600- 1200- and 3000-grit and white poly pad) and 96-division index wheel
- 6" trim saw with blade
- No. 2 pencil
- Spray bottle and water
- Holy Cow polishing compound
- Dial calipers

How would you like to create this beautiful opal intarsia? Well, you can. This step-by-step project will show you how. Creating an opal intarsia is just like creating any other intarsia except you are using a more expensive material, sometimes worth hundreds, even thousands, of dollars. The fear of ruining such expensive material can make even the bravest lapidary reluctant to tackle an opal intarsia project. However, using a piece of synthetic or lab-created opal or opal simulant only costs about $12 and, because the color is dispersed throughout the synthetic opal material, you needn't worry about grinding to expose the color line or, even worse, grinding through the color line. Which would you be more comfortable learning and experimenting with? We teach several intarsia workshops each year and our beginning students usually successfully complete this beginning opal intarsia project within a day and a half. After mastering these intarsia techniques, you'll be brave enough to create an intarsia masterpiece using some of that precious opal you have stashed away.

Before we get to the steps for this project, here are some helpful hints about intarsia in general.

Bonding

Always clean each bonding surface with alcohol to remove any grease, oil, or water residue caused by handling. Failure to clean bonding surfaces can lead to failure of the epoxy and superglue bonds.

Two-part, five-minute epoxy

It is important to measure carefully equal amounts of resin and curing agent and to mix these components thoroughly. Improper measuring and mixing also result in failed epoxy bonds.

Allow adequate curing time in a warm place before handling or applying stress to the bonded joint. Inadequate curing time results in failed epoxy bonds.

Clean your mixing pad and stirrer with alcohol as soon as possible, before the epoxy has a chance to set. It is much easier to clean off the uncured epoxy than it is to remove the hardened epoxy.

Cyanoacrylate or superglue

Apply the superglue in a small amount — just a drop. Place the two surfaces together and apply pressure to squeeze out the excess. Always recap the superglue immediately. Note: Excessive amounts of superglue result in weak and slow-curing bonds.

If, by chance, your fingers become bonded to the piece, *do not panic!* Use a smooth, constant tension to separate your fingers slowly from the piece. The sooner you attempt to disengage your bonded fingers, the quicker they will come apart. Application of superglue solvent to the finger/bond joint will speed up your rescue. Note: Always have superglue solvent on hand for such emergencies.

Preparation for bonding

One of the secrets of creating quality intarsia is using a #2 pencil. When preparing surfaces for bonding, get in the habit of marking opposing surfaces of the strips with your #2 pencil. Grind one marked surface of each strip flat on the 180 lap. Be sure to check the piece often: if any pencil marks remain, you still have low spots and the piece will not be flat. By covering the opposing sides with pencil marks and removing the marks by grinding on one surface, you know immediately which surface to bond — the surface opposite the remaining pencil marks.

Polishing

Once you've assembled the intarsia and ground the surface flat, polish by switching to the 220-grit lap and grinding out all the scratches left by the 180-grit lap. Then move to the 325-grit lap and remove the scratches produced by the 220-grit lap, repeating this process on through the 600-, 1200- and 3000-grit laps. Be sure to check your progress often and to rinse off the intarsia with clean water before progressing to the next lap. For the final polish, dampen a white poly pad with a water spray bottle and apply a thin paste of Holy Cow polishing compound. Keep the intarsia moving continuously against the pad.

Polishing actually begins when the poly pad starts to dry out and you feel the intarsia begin to pull. Check the intarsia often as overheating can cause the intarsia to come off the dop stick. If your intarsia has been properly prepared, polishing should only take a few seconds.

Construction

1 Using your trim saw, cut the opal centerpiece to the kite shape shown.

2 Place a large-diameter, flat-topped dop stick in the lower clamp of your transfer fixture. Place the opal centerpiece on the flat-topped dop stick. Mix the two-part epoxy and place a large drop on the center of the opal centerpiece. Place a ¼" dop stick in the top of the transfer fixture and slide it down until it pushes the epoxy aside and touches the centerpiece. Carefully center it under the dop stick, then tighten the clamping screw to hold the dop in place. Align the tail end of the centerpiece with the alignment device of your dop stick. Add more of the mixed epoxy around the dop stick to form a fillet (or narrow strip). Allow the epoxy to cure thoroughly before removing the dop stick from the transfer fixture. Note: Transfer fixtures differ widely from manufacturer to manufacturer, so you may need to adapt these instructions to fit your particular setup.

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3 Place the dop stick into the faceting machine with the faceting machine head set at 0 degrees (dop stick is parallel to the lap) and set the 96-tooth index wheel to the 66 division mark (96 or 0 less 30 divisions = 66 division mark). Using a 180-grit diamond lap, grind the long edge flat, then reposition the index wheel to the 30 division setting (0 plus 30 divisions = 30 division mark) and, without changing the depth setting, grind the other long edge flat. *Note: Always work to the same depth-setting stop on each side of the centerline as this will insure the same angle and length of each side.*

4 Set the index wheel to the 82 division mark (96 less 14 divisions = 82 division mark) and grind the short edge flat. Without changing the depth-setting stop, reposition the index wheel to the 14 division mark (0 plus 14 divisions = 14 division mark) and grind the other short edge flat. The opal centerpiece should now look like a kite, with the two long sides equal in length and the two short sides equal in length. Use your dial calipers to verify this.

5 Use the trim saw to cut 2 black jade strips approximately ¼" W x ¼" T x ¾" L and another 2 black jade strips approximately ¼" W x ¼" T x 1 ¼" L. Prepare these strips for bonding (as explained above).

6 Using superglue, bond 1 long and 1 short black jade strip to opposing sides of the kite-shaped opal centerpiece.

7 Using a #2 pencil, mark both edges of the opal centerpiece between the protruding black jade ends. Using the index-head setting and depth-setting stop used on the last surface ground in Step 4, grind the protruding black jade ends until flush with the opal centerpiece (the pencil marks on the edge of the centerpiece are just removed and no more). For the opposite side, reposition the index head setting for this side and readjust the depth-setting stop to grind the protruding black jade ends until flush with the opal centerpiece (the pencil marks on the edge of the centerpiece are just removed and no more).

8 Using superglue, bond the other long and short black jade strips onto the remaining opposing sides of the opal centerpiece.

9 Grind the black jade accent strips all around the piece so that each accent strip is tapered (dart shaped, strips are wider at the center axis). This requires changing each of the original index head settings as follows: the new long side settings are 31 and 65 (changed by adding 1 division and subtracting 1 division) and the short side settings are now 12 and 84 (changed by subtracting 2 divisions and adding 2 divisions). Note: The short side requires a larger change to achieve the same visual weight.

10 Using the trim saw, cut two malachite strips approximately ¼" W x ¾" T x ⅛" L. Prepare these strips for bonding as explained earlier.

11 Using superglue, bond one short malachite border strip to the intarsia assembly. Mark the other short black jade side with a #2 pencil and then grind the one protruding malachite end, adjacent to the other short side, until even with the black jade strip and just removing the pencil marks. Do not grind away the other protruding malachite end at this time.

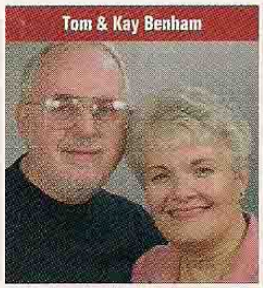
12 Using superglue, bond the other short malachite border strip to the black jade side just ground. Mark one long side of black jade with a #2 pencil, then grind away the protruding malachite end until the pencil marks are just removed. Do not grind the other protruding malachite ends at this time.

13 Using superglue, bond one long malachite strip to the side just ground. Mark the black jade surface between the two protruding malachite ends and then grind these ends until the pencil marks are just removed.

14 Using superglue, bond the remaining long malachite border strip to the surface just ground.

15 Using the same index settings from Step 9 (31, 65, 12 and 84), grind the protruding malachite strips level and then continue to grind until each malachite side is .100" wide. Verify width with your dial calipers.

In part II we will finish bonding and then bevel and polish the final intarsia piece.



Tom and Kay Benham have been actively pursuing their lapidary and goldsmithing hobbies for a number of years. Both are active and have served in various capacities for the Florida Society of Goldsmiths (FSG) and the Pinellas Geological Society. They are co-editors of FSG's Newsletter, and contributing editors to *Lapidary Journal*, compiling the *Jewelry Journal* column and frequently contributing to Step by Step. Tom and Kay enjoy teaching intarsia at William Holland School of Lapidary Arts in Georgia and metalsmithing in the Tampa Bay area.

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This project is intended to make use of synthetic opal or opal-like material so you can become more confident with intarsia before using precious opal.

For information on bonding, polishing, and the glues used in this project, please refer to Part I, June 2002.

To make a bezel setting and bail for your intarsia, see "Silver Pendant Setting" on page 54.

Skill level

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What you need

For tools and materials needed for this project, see Part I, June 2002.

16 Set the faceting machine head at 90° so that the dop stick is now vertical and perpendicular to the lap. Using the 100-grit lap, grind the back of the intarsia assembly flat and smooth. Do not polish this surface at this time as we want it to remain rough for bonding.

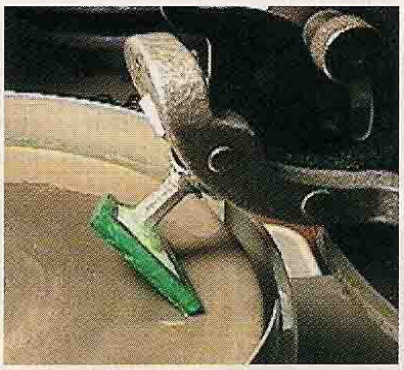
17 Using a #2 pencil, mark both sides of the malachite backing piece (1 ⅛" W x ⅛" T x 1 ⅝" L). Holding this piece by hand, grind both faces until flat and parallel. Use the dial calipers to verify that the front and back surfaces are parallel.

18 Using a two-part epoxy, bond the backing piece onto the back of the intarsia assembly. Place the bonded piece under a warm lamp for at least 10 minutes for a proper cure.

19 While hand-holding the intarsia assembly, polish the back surface using the polishing procedure.

20 Using a #2 pencil, mark the edges of the malachite border strips of the intarsia assembly. Remount the dop stick in the faceting machine with the faceting machine head set back at 0° — the dop stick is again horizontal and parallel to the lap. Using the index settings from Step 15 (31, 65, 12 and 84), grind the protruding edges of the backing plate until flush with the malachite border strips — just removing the pencil marks. Use the polishing procedure to bring these edges to a final polish.

21 Reset the faceting machine head at 45° and grind a slight bevel on each back edge — bevels should be approximately 1/16" wide. Using the polishing procedure, bring each bevel to a final polish.



22 Remove the intarsia assembly from the faceting machine. Using the transfer fixture, bond another dop stick to the back of the intarsia assembly. After the epoxy has set, use a small torch to warm the metal dop stick attached to the front face so that it may be twisted off. *Warning: warm the original dop stick only — just until the epoxy softens — do not overheat the intarsia.*

23 Mount the intarsia assembly in the faceting machine with the faceting machine head set at 90° — dop stick is vertical and perpendicular to the lap — then grind the front surface flat. Bring the front surface to a final polish.

24 Reset the faceting machine head at 45° and grind a bevel on each front edge — bevels should be approximately 1/16" wide. Bring each bevel to a final polish.

25 Carefully remove the dop stick from the back surface. If the back surface is damaged in the removal process, repolish it. Your opal intarsia is now complete and ready for mounting.

With this experience under you belt, you are now ready to try an opal intarsia using your precious opal. If you need additional help in preparing your opal, Paul B. Downing's *Opal Cutting Made Easy*, ISBN 0-9625311-4-6, is an excellent reference.

ADDITIONAL HINTS FOR CREATING OPAL INTARSIAS

When creating non-opal intarsia, we make the material fit our design. However, when using precious opal, it is more frugal to design the intarsia to fit the opal so as not to waste precious opal material.

An important technique when creating an opal intarsia is always to add your strips so they are above the surface of the precious opal centerpiece. This allows you to grind the assembly down to the surface of the opal so that you only have to polish the opal surface and not grind into it. There is nothing more heartbreaking than building an intarsia around a wonderfully colored opal centerpiece only to have the color disappear when leveling the face of the intarsia assembly.

Because the expensive precious opal rough is usually found in smaller pieces, we generally tend to work on a smaller and more delicate scale when creating precious opal intarsia. A little bit of opal color and flash go a long way in beautiful intarsia masterpieces.

Enjoy! ◆

Tom and Kay Benham have been actively pursuing their lapidary and goldsmithing hobbies for a number of years. Both are active and have served in various capacities for the Florida Society of Goldsmiths (FSG) and the Pinellas Geological Society. They are co-editors of FSG's Newsletter, and contributing editors to *Lapidary Journal*, compiling the *Jewelry Journal* column and frequently contributing to Step by Step. Tom and Kay enjoy teaching intarsia at William Holland School of Lapidary Arts in Georgia and metalsmithing in the Tampa Bay area.