

FINISHING CLASS...WITH JEFF JEWITT 5/5/03

By Dick Thomas

Dick Thomas attended the one-week course "Hands-Finishing with Jeff Jewitt" at the Marc Adams School of Woodworking, 5504 East, 500 North Franklin, Indiana 46131-7993. The course was held May 5-9, 2003. What follows are Dick's notes from the class. I've read through them, and I believe that you'll find a lot of valuable information here. If you have questions for Dick concerning these notes, you may contact him directly at jthomas9@carolina.rr.com. If you'd like more information on finishing from Jeff Jewitt, but can't attend a class, Dick recommends Jeff's new book "Great Wood Finishes" available from Taunton Press or from local book merchants. Wayne L. Manahan, President, CWA

SHELLAC

Shellac is NOT a really tough finish. But rubbing the area with denatured alcohol to dissolve the finish and then recoating with new shellac can easily repair it. Lacquer is much the same. Varnish is a tougher finish, and polyurethane is the toughest of all. Spar varnish is best for outdoor use, with its resistance to UV deterioration. The term 'spar varnish' refers to its initial use on sailing ships due to its ability to "stretch" with the flexing of the masts and spars of these vessels. Therefore, it is not as "hard" a finish as regular varnish.

To make shellac you mix the excretion of the lac bug with denatured alcohol. This stuff is refined and comes in flakes. The most common mixture that I have read about is a "2 pound cut", which, technically is 22% flakes to 78% denatured alcohol by weight. This would be a mix of 2 pounds of flakes with 1 gallon of alcohol. Or if you don't need a gallon of it, follow this chart:

DRY FLAKES (pounds)	LIQUID
2	1 gal.
1	2 qts.
1/2 (8 Oz)	1 qt.
1/4 (4 oz)	1 pt
1/8 (2 oz)	1/2 pt

A good way of estimating the mix is to fill the jar 1/2 full of flakes and then

fill the jar with alcohol. Shake the jar for 3 or 4 minutes every 15 minutes until the flakes are dissolved. After it is mixed up it is good for 6 months. A good jar to use is a Hellmann's Mayonnaise jar with its plastic lid. Put Teflon tape around the threads of the jar.

WOOD PREPARATION

1. Hand plane such as a Stanley #5 jack plane about 14 or 16 inches long. Can still sometimes be found at flea markets, but people now call them antiques and they want more than \$20 for them, and they need to be rebuilt. (The Lie-Nielson jack plane is a dream to use.)
2. Scraper, either hand type or cabinet scraper, which has a rigid blade.
- 3 Abrasives.

Plane blade sharpening:

Hold blade at a 25-degree angle to sharpening wheel until you have a slight burr on back (flat) side. Hone off the burr and polish on leather wheel. Or use the Tormek machine.

Scraper sharpening:

Use a single cut mill smoothing (ribs going in one direction only) file.

Rub side of file at 90 degrees to scraper in one direction only along edge of scraper to put burrs on edge. Do both edges of scraper to get 4 burrs on edges of scraper.

Hone the burrs flat with a stone & oil; then lay scraper on edge of bench and force the edges down with a burnisher.

Put scraper in a vise and use burnisher to turn down the burr in about 3 pushes to about a 15 degree burr. Start with 90 degrees, then 5 - 7 degrees, then 15 degrees. Do this on all 4 edges.

Scraper use:

Push Stroke...Thumbs low in center of back, 3 fingers on each end, bow blade, and push away from you.

Pull Stroke.... Hold same way, but pull toward you.

Use a French Curve Scraper to smooth out saw marks after making a cove cut with a table saw.

Abrasives:

Grit is number of openings per 1 linear inch of a mesh. (80 grit = 80 holes)

GARNET is very sharp, but it wears out quickly. For that reason it doesn't work well in power sanders.

ALUMINUM OXIDE is used in most woodworking. 220 or 240 grit abrasive is about as fine as you want to use because it makes scratches that are hard to see. Any higher grit is basically polishing the wood, which prevents some stains from penetrating properly. Use random orbit sander to do preliminary finish sanding, then finish with hand sanding with the grain to remove cross grain scratches from random orbit sander.

SILICONE CARBIDE:

This is 'wet-dry' paper, and the paper is usually dark gray or black. Do not use it on bare wood because it leaves black stuff in the wood.

A sanding block should have a softening pad like cork or felt between the wood and the paper. Klingspor sells "Flexible contour sanding blocks" to sand shaped areas like coves. They also sell "Tadpole Sanders" to get into small places.

Using a belt sander to flatten a panel, you should start sanding at a 45-degree angle to the grain, then 45 degrees in the other direction.

Always start a belt sander with it sitting flat on the board so that you do not gouge the board when you set it onto the board.

Sand the back side of the panel first so the panel will sit flat on the workbench while you sand the good (show) side.

Before sanding, use a scraper first to scrape off any glue, or it will chew up the sanding belt.

FRENCH POLISHING

To begin you must fill the pores in the wood by using a mixture of 4F Pumice Stone (4F is finer than 2F) and boiled linseed oil to rub into the surface of the wood. Pumice is more aggressive than Rottenstone. If you are using hard maple or cherry don't use either of the powdered stones. Use oil only. Pumice will be somewhat coarse and abrasive, so it can rub right thru a stain. Rottenstone is not as aggressive as pumice, but it is darker and this needs to be considered regarding the final finish.

1. Apply a thin film of oil on the board and rub it in as a nice even thin coat.
2. Sprinkle pumice on surface.
3. Take the oil cloth and add more oil to it, and rub into the board in a circular motion. The pumice is abrasive, and will wear thru the rag, as well as wear away the surface. Keep the amount of oil down.

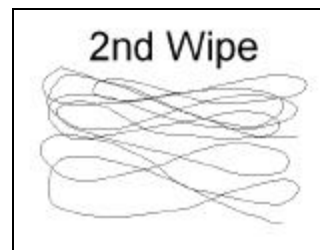
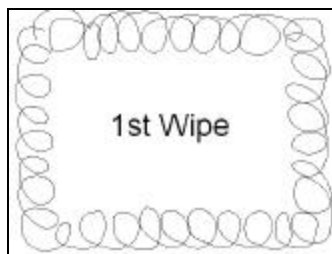
Wipe the excess oil off with a clean cloth. Wipe **ACROSS** the grain so you remove excess oil and pumice, but do not remove pumice & oil from the pores. When cloth “slides” across the surface you are through.

5. Let dry 24-48 hours.

6. “**BODYING**”. Make a 2-layer cloth of a 12-14” square of muslin (no lint or loose threads) with a golf ball size wad of absorbent cloth like a tee shirt inside it. Soak about 1 ounce of denatured alcohol into the ball and then put an ounce of shellac on it and wrap it in the muslin. Wrap tightly to assure that you can not ‘wring out’ any shellac, and then make sure there are no wrinkles ion the bottom of the muslin. Put 3 drops of baby oil on the outside of the muslin. Wipe in straight swipes with the grain, **VERY** lightly. Recharge the ball with shellac and re-wrap it when it doesn’t leave much shellac.

7. When pad starts dragging and feels sort of tacky put 1 or 2 drops of baby oil on outside of pad.

8. Rub **LIGHTLY** in circles around the perimeter and then fill in with figure 8’s.



9. When the pad feels like it is drying out put more shellac on the ball, re-wrap it in the muslin, add 1 or 2 drops of baby oil, and go back to it.

10. Quit when you start to leave (or just before) oil trails that don’t readily evaporate. Let it set for an hour or so before you come back to it, or let it sit 24 hours.

11. **POLISHING** or ‘**CUTTING BACK**’. Use 600 grit wet/dry paper with mineral spirits. (NOT alcohol. Mineral spirits will not harm any finish except wax)

12. Sand **VERY LIGHTLY** in circular motion all over for a short time - just enough to sand it all.

13. Wipe off with a clean cloth.

14. Charge soft wad again with shellac and baby oil and start French Polishing again.

15. Look for “vapor trails” following the muslin pad, and keep an eye on them for drying. Once the whole surface looks OK start to now apply more

pressure on the pad using both hands. Increase pressure only after pad gets harder to move - don't use too much pressure when pad is wet, because that will squeeze out shellac into pools.

16. CLEARING - To clear residual oil from the final finish put alcohol on a soft wad of cloth and move it RAPIDLY across the board. Pad must be only DAMP so you don't take any shellac off - only oil. Then buff it with a pretty much dry cloth.

17. If you find marks or unfinished spots sand them LIGHTLY with the GRAY synthetic steel wool (which is about like 0000 steel wool, but leaves no metal fibers), and go back to the shellac ball again.

RUBBING OUT A FINISH

Don't rub out a good satin finish. Rub out to correct flaws, or change from gloss to satin, etc. Must be sanded to get rid of defects...not steel wool, which is flexible and will ride over pimples or holes.

If you are working on a heavier finish and want to rub it out to get rid of holes and pimples use a 600 grit wet/dry paper with mineral spirits, soapy water, or paraffin oil. Then go to 800 then 1000 grit, lightly with the grain. Evaporative finisher like shellac or lacquer melt into themselves, and can be sanded and patched invisibly. If you are using varnish you can't do that because varnish builds up on itself, and the patch will show the spot. So put the last coat on heavy so you can sand it off and re-do the whole thing.

To sand it down use 600 or 1000 grit paper very lightly.

Use 0000 steel wool with mineral spirits or naphtha on it, and rub it in the dark brown wax can, and then rub the surface WITH the grain.

Once the haze starts to appear use a clean cloth to rub it out

If you want to remove the wax to add more finish or something, remove it with mineral spirits or naphtha.

To give a final satin finish use a pad of 0000 steel wool on a block with the rubbing liquid. Make sure strokes are very straight with the grain. You can do this with varnish.

To go up to a gloss finish use soapy water and a compound, and a polish paste with a random orbit sander.

To remove white water rings off a finish use 0000 steel wool and dark brown wax.

A black mark on wood indicates damage to the wood - not the finish. Chemicals in water go thru the finish and turn the wood black. Wood Bleach from Sherwin Williams (Oxalic Acid) can clear that up. 1 T in ½ pint of hot water and rub it off after you have removed the finish. May take a couple of tries.

Clorox will remove most food or juice stains, and maybe magic marker. Always try mineral spirits first...it won't hurt the finish.

COLORING

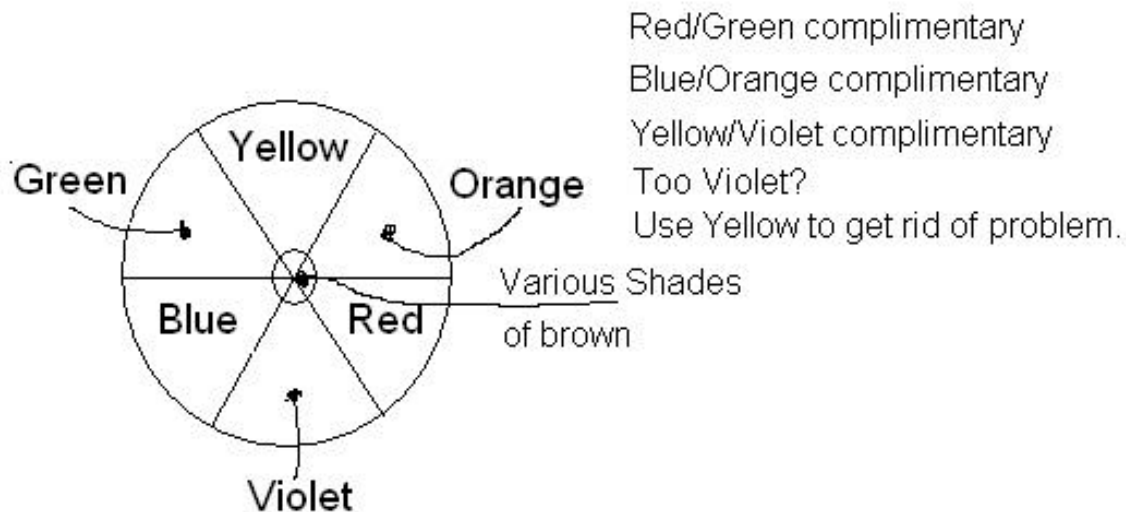
Pigment stains emphasize grain. Dye stains do not emphasize grain.

If a water based dye stain is too dark, wipe it down with water. If a pigment stain is too dark wipe it down with lacquer thinner.

Definitions: HUE is color. VALUE is darkness or lightness. CHROMA is vividness.

Red, Blue, and Yellow are primary colors. They are NOT made from mixing other colors together. Secondary colors (Orange, Violet, Green, Brown) ARE made from mixing other colors together.

COMPLIMENTARY colors are Red and Green, Blue and Orange, Yellow and Violet. If your color is too violet, use yellow to get rid of it.



COLORING WOOD

STAIN: A coloring that, when applied to a piece of wood, does not hide the graining.

a) Pigment based b) Dye based c) Chemical

Pigments are mostly “earth tones”, and are actually dirt. (Burnt umber, ochre, sienna, slate, etc) They are inert powdered color. Pigments need binders such as boiled linseed oil (flax oil) which is a drying oil that will dry on exposure to air, or tung oil, which comes from the nut of the chinawood - or tung - tree. Tung oil is lighter in color and will yellow less over time than boiled linseed oil.

NOTE: Pigment stains exaggerate accent parts of wood including scratches. Wipe the wood with naphtha or mineral spirits BEFORE you stain to find these scratches.

Pigment stains are inert, have a colorant, and a binder.

Dyes are mostly synthetic, but you can still get them from natural sources like walnut shells. Typically, dyes are dry powders, and are classified by the type of solvent they are dissolved in, such as water, alcohol, or oil.

Dyes are blended: Rosewood is red, turquoise, and yellow. (Red, yellow, and blue are primary colors, and make brown.)

A particle of dye powder is thousands of times smaller than a particle of pigment. Dye stains penetrate better and faster than pigment stains.

Water-soluble dyes penetrate wood quickly, and do NOT have as long an open time as pigment stains, even though they are in water. However, they WILL raise the grain. Recommend you wet the wood first and re-sand just prior to coloring. Wipe on and wipe off quickly.

- Dyes are not as light fast as pigment stains.
- Do not use them outdoors or near windows.
- Dye stains do not penetrate open grains as much as pigment stains. You can put a dye stain on first for a background shade, and then put a pigment stain over it. You can also use a gel stain over it.
- If you want a specific color on a piece of wood use a dye. If you are using different woods in a piece of furniture use a dye. Pigment stain will vary with the wood grain porosity, but dye stains give a consistent color regardless of grain.
- Water-soluble dye stain can also be mixed with methanol, ethanol, and propenol - all of which are denatured alcohol - for speeding up the drying time and reducing grain raising. Denatured alcohol is POISON.

TransTint is a concentrate that can be mixed with water, alcohol, and some oils. Use distilled water if you are using plain water on light colored woods to raise grain prior to sanding, or if using a light colored dye. Tap water will leave black spots because of the chemicals in it. Otherwise, you can use tap water with most dyes.

You can put varnish, lacquer, or oil over water based dye without changing color.

Chemical stains would be like lye, and can be more dangerous than it is worth to me.

To mix dyes use 1 ounce of dye concentrate to 1 quart of water.

After spraying with a water based dye clean the gun in a 3 step process: #1 - water #2 alcohol #3 lacquer thinner if you are going to spray lacquer or varnish next.

After spraying with lacquer or varnish, reverse the procedure if you will spray with water based product.

GLAZE is a pigmented coloring between 2 layers of clear finish. The purpose of glazing is to add more color, interest, graining, or antiquing.

Use shellac to seal the color of the wood, sand with 400 grit, remove the dust.

Make your glaze color - probably oil based, but maybe water based which is not as nasty looking to me as the oil based ones.

Apply glaze to board and wipe off.

If you don't like the glaze you can easily wipe it all off with mineral spirits, (or maybe naphtha if it has dried too long) because it is being applied to a sealed surface and doesn't sink in. (Of course you can't do this if you have put on the final coat.)

To mix TRANSTINT with water, use a ratio of 1 oz. to 1 qt. (Water is easier to control than mineral spirits or lacquer thinner.) Maybe go a little lighter than 1 oz to 1 qt, because you can darken wood easier than you can lighten it. But you CAN lighten it by adding water...it is just not as easy. If you get grain raising, then rub more stain water over the area and immediately use a red or gray scotchbrite pad to sand it down while it is still

wet.

SOLVENTS

Buy a chemical (organic vapors) respirator.

Denatured Alcohol (methanol) is used with shellac. It dissolves alcohol dye powders. It doesn't raise the grain like water does. It is poison.

Ketones (MEK) is acetone.... USE GLOVES. Not much used in woodworking except in Famowood, which is their solvent.

DISTILLATES of PETROLEUM

- Mineral spirits or paint thinner.
- K-1 kerosene does the same thing but is much slower evaporating, and can be used to slow down the open time of glaze or varnish. About 1 tablespoon to a quart as a retarder.
- Naphtha is the most volatile solvent you can buy legally. Flash point is below 100 degrees F. Good to wipe on sanded wood to show up scratches in the wood. Does not raise the grain and evaporates quickly. Good for cleaning oil based grime around drawer pulls.
- Lacquer thinner is a blend of things that allow it to evaporate, and it will mix with other solvents except water. Lacquer thinner has ketones in it. It can be re-used as a brush cleaner even when it is contaminated with paint or varnish. The pigments and oils settle to the bottom of the can. Pour carefully off the top.

To check old finishes for repairing them, put a drop of denatured alcohol on the finish to see if it gets sticky, which says that it is shellac. Or put a drop of lacquer thinner on it to see if it dissolves the lacquer. Neither of these will hurt varnish or urethane.

CHOOSING A FINISH

1. Durability. What will it be exposed to? Jewelry case has easy life...use lacquer. Dining table has constant use... use varnish.
2. Application. How fast does it dry? Lacquer or shellac dry quicker so you are not as concerned about dust before it dries.

3. Hard use - urethane is the toughest and hardest.
4. For spray finish lacquer and shellac are better than varnish. Varnish overspray stays sticky longer. The other 2 dry as they are being sprayed. If you do use varnish, use naphtha to shorten drying time.
5. Water based acrylic is water clear - not yellow. It is a lacquer. Since it is water based it **MUST** have a lacquer or shellac sealer coat to prevent it from soaking continuously into the wood.
6. Simplest finish is wipe on/wipe off oil finish. Not terribly durable - not hard. But to repair it you just wet sand it with more oil, and you have repaired it
7. Shellac can be sprayed, brushed, or wiped. To repair it you just dissolve it with denatured alcohol and re-apply.
8. Sealer coat (or “seal coat”) is used to provide an easily sanded coat on the wood to which the finish will stick well.

To make a touch up finish use TRANSTINT and shellac. Shellac will stick to any other finishes

Cleaning different finishes, start with mineral spirits. It will clean off oil soluble grime without hurting the finish. Other stuff should come off with a mixture of 1 cap full of Dawn or other liquid soap in a pint of water. Use with a damp rag, and then may need to wax it.

FINISHES

Finishes are made of resin, thinner (or solvent), and additives. The resin is the most important.

EVAPORATIVE RESINS:

Shellac flakes are dissolved by denatured alcohol. The alcohol evaporates, leaving the resin finish.

Nitrocellulose lacquer flakes are dissolved in lacquer thinner. Lacquer thinner evaporates to leave the lacquer resin.

Evaporative finishes will normally re-dissolve by re-introducing the solvent. Using denatured alcohol, then sanding and French polishing can restore shellac that has cracked. Lacquer finishes can be restored by using lacquer thinner, sanding and re-spraying lacquer to feather it out.

(Enemies of shellac are heat, exposure to alkalines, and moisture.)

REACTIVE RESINS

Varnish is made from varnish resins and mineral spirits. Oxygen reacts with the varnish to cause it to dry. Once varnish dries, mineral spirits will NOT re-dissolve the varnish. Varnish needs to be sanded between coats ONLY if it has dried for more than 24 hours, or if instructed to do so by the manufacturer.

Alkyd, phenolic, and urethane are the 3 basic resins used in paint or varnish. Mixed with much oil it makes a soft pliable varnish solution. With less oil it is harder.

‘Long (lot) oil’ is a flexible and soft finish like Marine Spar Varnish.

‘Medium oil’ is normal varnish with a hard finish.

‘Short oil’ varnish is a very hard finish, and is rarely used.

A good varnish finish is one or two coats of oil/varnish mixture rubbed in, followed by several coats of brushed, rubbed, or sprayed varnish.

If spraying varnish, add naphtha to speed up drying.

PASTE WOOD FILLER

They are oil based or water based. Oil base is easy to apply, with a long open time. Put a seal coat on first, and then apply the paste wood filler across the grain to work it into the pores. When it hazes over, wipe it off across the grain so you don’t pull it out of the pores. Maybe use burlap to wipe it off. Sand it with the grain, using 320, 400, or 600 grit. Wipe off the dust.

CLEAR WATER BASED GRAIN FILLER (Becker Laboratories, Mountain City, TN 37683)

This stuff is CRYSTALAC Clear Waterborne Wood Grain Filler. Apply it and rub it off before it dries. It is not as nasty looking as the oil based stuff. It is colorless. Sand it out to the same grit you have sanded the wood to. It will not change the color of the wood at all. If you stain after this using TRANSTINT, put the TRANSTINT in alcohol. After it dries sand it down and finish it.

This stuff is better to me...the oil based stuff is dark and nasty looking.

BRUSHING SHELLAC. When brushing an evaporative finish use a natural

bristle brush. This would be China Bristle, which is made from longer hog bristles than are available in the U.S., because our hogs die at a much earlier age than Chinese hogs do.

Use a synthetic bristle brush when brushing a water-based shellac.

When you sand between coats of shellac the sanding dust will dissolve with the next coat of shellac (or lacquer). Sanding dust from varnish will NOT dissolve with the next coat of varnish, so you MUST use a tack cloth to clean it off with.

To rub on coats of varnish you can use a lint free rag, or a non-textured paper towel.

WATER BASED VARNISH

Can be 'padded on' using the same idea as French polishing, but just dip the pad in the varnish. You can re-use the pad by storing it in a sealed jar.

Drying time is very fast either padding or spraying. If spraying you can re-spray after 15 minutes or so. Sand if you raise the grain in spraying.

Oxford 9000 Super Clear Polyurethane

Target Coatings, P.O. Box 1582 Rutherford, N. J. 07070 1-800-752- 9922

www.targetcoatings.com In my opinion, it's very expensive at \$115.00 per quart!!!

TONING

A toner is a colored finish. It is to be sprayed on after the seal coat, and then has a final coat or 2 sprayed on over it. It is basically shellac or a lacquer with TransTint added to it. Don't use it in a varnish, but you can use it with lacquer or shellac, and then put varnish coats over that.