

Steaming walnut during drying increases yield but kills the vibrant natural colors prized in walnut dried without steam...

Put the Life Back in Steamed Walnut



Walnut (*Juglans nigra* in the family *Juglandaceae*) is perhaps our most popular domestic exotic hardwood. The heartwood of walnut is rich brown with overtones of red, purple and cordovan. In my view there are no other domestic hardwoods, and very few exotic species, that offer the woodworker such a wide range of colors, both bold and subtle.

But, in order to maximize yield from walnut logs most commercial mills steam walnut lumber during the kiln drying process. There are basically two methods of steaming: pressure steaming and steaming at atmospheric pressure. The details are not all that important for our purposes. In both methods un-stickered freshly milled lumber is subjected to "wet" steam (steam at 100% relative humidity) in a tightly sealed chamber. Depending on the process, temperatures will range from 190° to 230°, and steam will be injected into the chamber from a few hours to a few days. What actually takes place within the walnut is subject to debate. Some point to "bleeding" of the *extractives* in the heartwood into the sapwood while others hold that the color change is the result of a chemical transformation involving sugars and starches in the wood. Whatever the cause, the result of the steam is the elimination of the cream color sapwood found in air-dried or un-steamed walnut thus increasing the volume of *marketable* lumber from each log (walnut grading rules treat sapwood as a "defect").

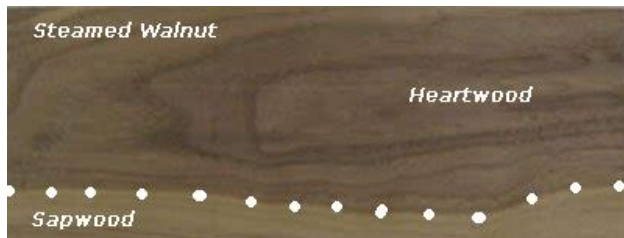
However, the increase in marketable yield produced by extracting color from the heartwood and blending it into the sapwood is not without cost. Steaming kills much of the desirable natural color of the walnut heartwood, eliminating the subtle color variations and turning everything, both heartwood and sapwood, to a dull monochromatic gray/brown. The striking color difference between un-steamed and steamed walnut is illustrated in the following photos. Please note that both samples were photographed at the same setting with the same lighting and the same camera. No finish of any kind has been applied to either sample. Both samples were run through the same helical head planer and then sanded through 180P. What you see in these images is the direct result of steaming with only the labels added for clarity.



It is difficult to imagine that anyone looking at these photos would find the steamed walnut image on the bottom more desirable than the un-steamed image on the top. It is as though we are examining two completely different species of wood. In the

process of steaming, we have taken one of the most vibrant, richly colored, and unique species of lumber in the whole of creation and managed, for the sake of increased yield, to

convert it into a bland, flat, nearly monochromatic material that must be artificially colored in order to even approach its former brilliance.



Somehow the whole idea of paying top

dollar for a premium hardwood and then having to apply color to make it look the way it came naturally from the tree seems fundamentally wrong. Nonetheless, in the rest of this article we will do just that. We will develop a method of restoring the color of steamed walnut to its former un-steamed glory. Best of all, the schedule proposed will restore the color of the walnut without the application of a single grain of opaque pigment. By avoiding the application of pigment stains and relying instead on water-soluble dyes and the natural dye found in garnet shellac we will retain the beautiful grain pattern of the walnut without hiding any of its character beneath an opaque film. The process is simple; it can be accomplished without special tools in any hobbyist shop. You will not need spray equipment and no dangerous chemicals are involved. Before we get into the specifics, however, let's first examine the process employed using a *story-board*. I highly recommend the story-board technique whenever considering a new finish schedule. Its proper use will avoid the frustration and disappointment that comes with jumping into an untried finish without first exploring the process.

The story-board I used was 48" long and 4" wide. Since I knew that there would be just three steps in this finish schedule, I divided the board into four sections, each 12" long. I then created the divisions between sections by making shallow saw cuts in the board at 12" intervals. The first section is left unfinished to illustrate the starting point of the steamed walnut. Each subsequent finishing step was then applied to the next section of the board in sequence and to the sections to its right. (i.e., step one to sections 2, 3 and 4. Step two to

sections 3 and 4, etc. until the entire finish has been applied). To obtain the following photos of each step in the process I simply cropped the photo into sections showing each separate step in the finish schedule.



Starting Point. When walnut is steamed the rich natural color of the heartwood is lost. Gone are the subtle reds, purples and warm cordovan colors that distinguish properly air-dried walnut as well as walnut dried in a solar kiln or vacuum kiln. The

once cream color sapwood that we would normally cut away from non-steamed walnut (or use in a place where it would not be seen) is now an insipid brownish gray that will only become more obvious and out of place when a clear finish is applied.



Step One. We begin the process of restoring the warm, rich color of non-steamed walnut by applying a diluted mixture of three of our water-soluble dyes, Standard Brown Walnut, Rosewood and

Navy Blue. We mix 3-parts Standard Brown Walnut, 1-part Rosewood and 1-part Navy Blue. This mixture was then diluted with 30-parts distilled water. (See "Mixing Your Water-Soluble Dye" below for the process of mixing *dye concentrates* and from the dye concentrates producing the *working mixture*.)



Step Two. When the dye has fully dried (about one hour under normal conditions) we apply a coat of garnet shellac mixed fresh from flakes in a two-pound cut. The natural red/brown dye in the shellac

accentuates the color of the dye while at the same time adding depth to the grain structure of the walnut. The shellac also serves as a *barrier coat* to prevent the oil-based varnish in the next step from excessively darkening the dyed walnut. This would not be a problem when finishing non-steamed walnut, but oil-based finish penetration can be unpredictable when combined with the dye on the steamed walnut.



Step Three. We next apply a topcoat of varnish. In the renewal of our steam walnut I selected Pratt & Lambert #38; an alkyd resin varnish made from soya (soybean) oil. Soy/alkyd varnish goes on lighter in color

and will not darken over time nearly as much as varnish made from either linseed oil or tung oil. Neither will it "yellow" over time as will *polyoneverythane*. Our objective is a protective finish that will not materially alter the color we have achieved by using dye and shellac to restore the warmth of our walnut.

Now, let's see how our schedule compares to a simple clear coat finish of varnish applied to un-steamed walnut sample. Again, we selected Pratt & Lambert #38 and applied it to a walnut board that has not been steamed. The un-steamed walnut finished with P&L #38 is on the left. On the right is last section of our story board in our finish schedule. The transformation was easy to achieve and was done without the application of pigment stain. Note that the band of sapwood along the bottom edge of the steamed sample (photo on right) has been seamlessly blended into the heartwood above.



Un-steamed Walnut

Pratt & Lambert #38 Satin Sheen



Steamed Walnut

Three Step Finish Schedule Above

Mixing Your Water-Soluble Dye

In the first step of our finish schedule we applied a mixture of three water-soluble dyes. Each of these dyes was first prepared as a **dye concentrate** (one-ounce of dye powder dissolved in 16-ounces of distilled water). From the *dye concentrate* we then prepared our **working mixture**. The instructions were:

- *Three-Parts* Standard Brown Walnut
- *One-Part* Rosewood
- *One-Part* Navy Blue

The *parts* referred to above relate to uniform measures of our *dye concentrate*. "Parts" can be any measure you choose from ounces to buckets (I use ounces); the important thing is to measure accurately and keep a record in your *finishers notebook* so you can duplicate your mixture when you move from the small samples used in this article to the larger volume needed to finish your project. The resulting mixture was then diluted by adding 30-parts distilled water thus producing our highly diluted *working mixture* which we then applied to the steamed walnut in order to restore the vibrant natural colors lost through steaming. We believe that this technique of *dye concentrates* and *working mixture* will make it much easier for you to take advantage of the versatility of water-soluble dyes.

Are you confused by the weak dye solution? Keep in mind, the purpose of this exercise is to *restore* the natural color of the walnut. My objective was not to add color to a light color bland species (pine?) to make it *appear* to be walnut.

It is also important to note that the mixture presented in this article worked well on the steamed walnut we were finishing. It may or may not work the same way on your steamed walnut. It is always important to make your own story-board and carefully mix your own *working mixture*.

Finally, since the point of this article is narrowly focused on reversing the color loss in walnut resulting from steaming, we will not get into the specifics of mixing and using *dye concentrates* to create *working mixtures*. For additional information on these topics, we encourage you to read our article on "[Working with Water-Soluble Dyes](#)".

One final point

If it isn't already obvious that I am committed to the superiority of dyes for coloring wood permit me to inject one other critical advantage as pertains to color shifts over time. Most domestic hardwoods darken over time. It is simply the nature of wood. Walnut, however, gets lighter. Had we used pigment stains in this process we would, in essence, have applied a thin coat of paint. That "paint" would have obscured the natural and changing color of the walnut beneath. The result would have been a "blotchy" appearance over time as the walnut naturally lightened. By using dye, we have applied a pigment free colorant that actually changes the color of the walnut. Therefore, as the natural color of the walnut lightens over time the dye color that we added will phase perfectly with the walnut. The grain, figure and added color will adjust perfectly over time.