

Put the Life Back in Steamed Walnut



Steaming walnut to increase yield kills the vibrant natural colors prized in un-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 immediately after milling the logs into lumber. 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 structure. Depending on the process, temperatures will range from 190° to 230° and steam will be inserted 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 coloring 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 neither sample was sanded after planing. What you see in these images is the direct result of steaming with only the labels added for clarity.

Un-steamed Walnut

Steamed Walnut

It is difficult to imagine that anyone looking at these photos would find the steamed walnut image on the right more desirable than the un-steamed image on the left. 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 we propose 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 masking any of its grain structure beneath an opaque film. The process is simple; it can be accomplished without special tools in any hobbyist garage or basement shop. You will not need spray equipment and no dangerous finishes are involved. Before we get into the specifics, however, let's first examine the process that we employ using a *story-board*. We 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.

In the following photo you see the story-board we created in the process of developing this finish schedule. The board was selected to illustrate the problem we are attempting to solve; creating the look of un-steamed walnut on a steamed walnut board that contains both heartwood and sapwood.

This story-board is 48" long and 4" wide. Since we knew that there would be just three steps in this finish schedule we divided the board into four sections, each 12" long. We created the divisions by making shallow cuts in the board at 12" intervals. The first section is left unfinished to give us a reference to the starting point. Each subsequent step is applied to all of the remaining sections of the board until the entire finish has been applied. To obtain the following photos of each step in the process we simply took photos of each step and then cropped each image to fit together at the saw cuts separating each step in the process.

The starting point. (Left end of the story-board) 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 and walnut that has escaped the steam chamber on the way to the 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. (The second panel from the left) 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*.)

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Step Two. (The third panel from the left) 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. (The right end of the story-board) We next apply a topcoat of varnish. In the reclamation of our steam walnut we have 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 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 and the last panel in our finish schedule (without the labels) is on the right. 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**. 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; 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 concentrate* and *working mixture* will make it much easier for you to take advantage of the versatility of water-soluble dyes.

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"**.