



Walk into the burl warehouse of the M. Bohlke Veneer Corp. in Fairfield, Ohio, and you might be struck with an almost religious reverence for the place. Unlike the other buildings that house this veneer manufacturing operation, this storage building is dead quiet, cool and damp. Burls of amboyna, Carpathian elm, maple, redwood and walnut—some of them as big as 8 ft. in diameter—lie in bunches on the floor like giant mushrooms sprouting from the moist concrete. Owner Manfred Bohlke's private collection of totem poles, reaching toward the 25-ft. ceilings, stand guard over the harvested burls and add to the cathedral-like effect of this space.

Bohlke joined the ranks of this business 25 years ago when he purchased a small operation called the Fairfield Veneer Mill. Back then, he had a slicer, a drier and only a few employees. Nowadays, he has 13 slicers, nine driers and 350 employees who produce some two million square feet of veneer per day.

The Bohlke Corp. is one of 100 or so manufacturers in the United States and Canada that slices the veneer used for doors, furniture, plywood panels and high-end architectural millwork. The annual production of all the manufacturers in North America works out to many billions of square feet of veneer. Figuring an average tree yields about 7,000 sq. ft. (depending on how thick you slice it), that means somewhere close to a million trees are felled and made into premium-quality veneer every year.

#### **It's all in how you slice it**

Bohlke's burls set the company apart from some of the other high-end veneer plants that I visited. Because of their odd shapes, burls are best cut on a rotary lathe. Bohlke has four of them. The knife remains fixed, and the burl rotates in a complete arc. The company also has eight plain slicers and one half-round slicer—essential equipment for premium-quality veneer production. Plain slicers (see the top photo on the facing page), also



## **Manufacturing Veneer** *Where those amazing flitches come from*

by William Duckworth

called flat-cut slicers, accomplish most of the veneer-cutting work at all of the manufacturing plants throughout North America. Plain-sliced, book-matched veneer is what you will find on the best plywood panels and the most expensive manufactured furniture.

With both plain slicers and half-round slicers, the flitch is moved against a fixed knife. Plain slicers move the flitch straight up and down at a slight angle left to right, similar to the way you would work a knife against a ripe tomato to get a clean cut. Half-round slicers (see the bottom photo) rotate the flitch in an arc almost parallel to the center of the log, so you get veneer very similar to plain-sliced but with less-pronounced cathedral patterns showing on the face.

According to John Ackerman, general manager of the Genwove U.S. Ltd. plant in Indian Trail, N.C., the customer decides how thick the veneer will be cut. And customer demands vary widely. Veneer manufacturers sell primarily to panel and door manufacturers, furniture manufacturers and large architectural millwork facilities worldwide. At Genwove, they slice a lot of softwoods: Douglas fir, hemlock, eastern and western knotty pine, and southern yellow pine. The standard thickness for those species is  $\frac{1}{26}$  in. When the plant cuts hardwoods, settings vary from  $\frac{1}{36}$  in. to  $\frac{1}{50}$  in. The slicers at Genwove can be set as thick as  $\frac{1}{8}$  in. or as thin as  $\frac{1}{85}$  in.

At a brand new 320,000-sq.-ft. facility in Darlington, Pa., the Interforest Corp. has set up a production plant that cuts only domestic hardwoods: ash, birch, cherry, maple, red and white oak, and walnut. With seven state-of-the-art slicers, this facility can cut veneer from 2.5mm to .2mm thick. That translates to a range from approximately  $\frac{3}{32}$  in. to  $\frac{8}{4,000}$  in. With a plain slicer



***Plain slicers are the most common for premium-grade panel and furniture veneer. These machines move the wood up and down and in a sideways motion against a fixed knife.***

chopping veneer at an average of 70 strokes per minute, those kinds of tolerances require an extremely sharp knife.

### **Knives are sharp and very big**

At all three plants I visited, one routine is constant: Each knife is sharpened after every eight-hour shift. Sizes vary, but the largest knife I saw was  $\frac{5}{8}$  in. thick, about 10 in. wide and 18 ft. long (see the top left photo on p. 91). No carbide here; most of these knives are made in Germany or Japan of steel that can be honed to a razor-sharp edge.

At Genwove, knives are sharpened with only one bevel, using a grinder that rides on a track. The edge is honed with a stone by hand. At Bohlke, a Japanese-made computerized sharpening system grinds the knives with four different bevels on one side and two bevels on the other. Four of the bevels are ground at a



***Half-round slicers minimize waste by cutting the flitch in an arc. Flitches are clamped to the beds of these machines by means of grooves milled into the flat back of the flitch.***



**Preparing a burl for the lathe**—Stephen Fowler, an employee of the M. Bohlke Veneer Corp., checks for debris before making the end cuts on a redwood burl headed for a rotary lathe.

micro-level. The precise angles at which the bevels are ground vary with the species the knife will be cutting.

When a single knife can cost as much as \$4,000, veneer manufacturers all share the same enemy: debris hidden within the flitch (see the photo at right). A good log buyer out in the field is trained to look for signs of some of the more common rubble—bullets, fence wire, nails, porcelain insulators and horseshoes—but they can't catch everything. *Horseshoes?* Yes. During the latter part of the last century, cowboys had a habit of hanging used horseshoes over the limbs of trees, where they would eventually be covered over and buried inside of the growing tree.

### **Log buyers: an unseen source of supply**

Greg Kelley, a plant engineer at Bohlke for 17 years, told me he's never met a log buyer. Buyers work in the field, as full-time employees of the company or as free agents, foraging sawmills and cruising timber stands throughout the Midwest, Northeast and the South for veneer-quality logs. It's an art as well as a science, according to Brent McClendon of the Hardwood Plywood and Veneer Association. Deciding which logs qualify for veneer mills is a complex talent based on years of experience.

Buyers want logs that are especially straight and clear. When they purchase already felled trees from a sawmill, end cuts will usually reveal the quality and color of the grain. Buying standing timber is more risky. They look at the slope and grade of the land and the condition of the soil. The color and texture of the bark will some-



**The enemy is metal.** A worker points to a nail found in a walnut burl. The lathe operator periodically stopped the machine and chopped around the nail with an ax to remove it bit by bit and prevent damage to the knife.

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**An 18-ft. razor**—Keeping the knives sharp is a top priority for veneer makers. It takes about a half hour for automated grinders to sharpen a knife.

times reveal problems lurking underneath the surface. But until a log is sawn in half—after it's been bought and shipped to the mill—they may not know it contains mineral streaks or insect damage.

### Little waste and lots of productivity

All of these factories are a marvel of efficiency when it comes to using their own waste. Bark, cutoffs, sawdust, even scraps of veneer that fall to the floor are collected and fed into burners. The burners heat vats of water used to soak the logs before slicing and the press driers that remove the moisture afterward. Flitches come out of their concrete or stainless-steel cooking baths at about 55% moisture content, steaming hot. After the flitches are sliced, the press driers heat both sides of each leaf at 300° to 350°F to keep the veneer from curling. The water from the vats is filtered and reused. The backing boards, meaning the slabs left over after a flitch is sliced, are often milled and sold as flooring, or they're simply cut up as firewood. Computerized bar-coded labels track each flitch through the production process. At the end of the clipper line, where flitches are trimmed to final size, electronic eyes read and calculate the total square footage to be shipped or put into storage.

### Some veneer is very dear

As they do in any business, prices for veneer fluctuate depending on supply and demand. But some really exceptional trees can command prices that are hard to believe. Manfred Bohlke has a special showroom chock full of those kinds of flitches (see the photos at right), including an American walnut tree nicknamed “The Beast.” This tree was felled close to 30 years ago, and Bohlke is the fifth or sixth owner. The unusually wide and clear veneer, cut at a full 1/2 in. thick, is for sale at \$3 per square foot. The only catch is that you have to buy the entire flitch. It is 17 ft. long and contains 36,000 sq. ft. of veneer.

I saw a Macassar ebony flitch totaling 10,000 sq. ft. that sells for \$7 per square foot. I also saw a Brazilian rosewood flitch that looked like half of a very large old-growth tree. Felled in 1975, long before the export ban on this species, the rosewood veneer had to be close to 4 ft. wide. You can cart this rare flitch home to your garage shop for a mere \$175,000. □

William Duckworth is an associate editor of Fine Woodworking.



**Rare, expensive veneers**—The Macassar ebony (top left), German white oak (top right) and Brazilian rosewood (bottom) at the Bohlke showroom represent some of the most expensive veneers on the market. The rosewood is so valuable that every leaf was photographed for an album to show to prospective buyers.