

Textbook Mistakes

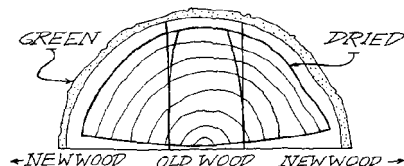
Somebody forgot that wood always moves

by Tage Frid

Looking through several textbooks about wood and woodworking, I have found that, especially for the beginning craftsman, there is quite a bit of misguidance or, in my opinion, mistakes that are very common. It seems as though someone wrote a book once who forgot that wood always moves, and all those who followed continued with the same errors.

Before going any further, I think we should set down a few facts about the material we work with: how it reacts after it is cut, dried and made into wood products, and what happens to it after many years of use. I expect anything I design and make to be used for many years after I am gone, so I feel it is very important that whoever designs and makes furniture doesn't make the mistakes that books advise. What they advise in some cases is more difficult, more work and sometimes creates a time bomb that guarantees the wood will eventually split.

I don't think I have to explain about the birds and the bees. We all know that the seed gets into the ground and the sapling gets started and each year puts a new year ring on. A tree grows from the inside out, which means that the closer you get to the center, the older the wood. I don't want to go into a big thesis about wood, just enough to show where the books are wrong. We know that the center of the tree is the oldest and the outside the youngest,

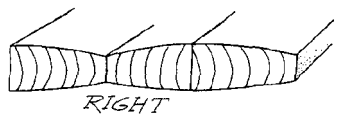
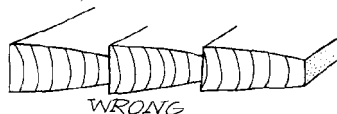


which means the pores or cells on the outside are more open than the center ones, so the outside will shrink more than the inside. This tells how the

wood moves after it is cut and dried.

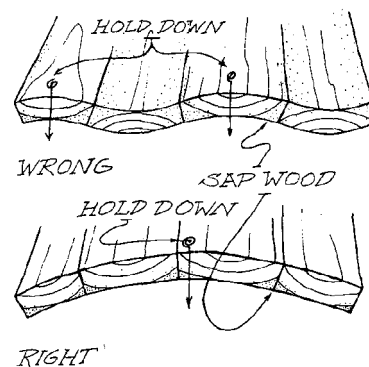
The reason that this is important is that after the wood is dried and made into a piece of furniture, the wood will continue to expand and shrink every year with the seasons. How much it moves depends on how dry our houses get in winter, and how damp in summer.

Just as the new, outside wood shrinks more when it dries, so it expands more when the humidity rises. This means that when joining boards together — say, for a tabletop, or whatever — the boards should be chosen and placed such that new wood should be joined to new wood, old wood to old wood.



Otherwise, no matter how well you plane and sand the boards after joining them, the different rates of expansion and contraction will guarantee an uneven joint as soon as the humidity changes.

Another thing most books tell you is to alternate the wood to compensate for the cupping caused by shrinkage. This would be fine if you wanted to design a washboard. But if you want to use your wood, for example, for a tabletop, it will take a lot of screws to hold it down, plus every second board will usually have a lot of sapwood, especially today with the shortage and high cost of wood, where every piece must be used. But, if we don't alternate the wood, it will work together and form an arch that will be very easy to hold down with a few screws. Also, we will have the center of the wood facing up, meaning



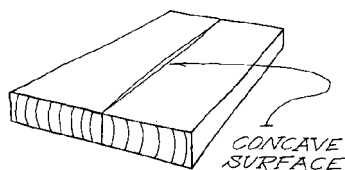
less sapwood, better color, harder and usually fewer knots.

Maybe the greatest mistake found in books concerns gluing boards together long grain to long grain. It is suggested you strengthen the joint by putting in dowels. It is also suggested that you leave a space of 1/8-inch at both ends of the dowel. I don't know how they expect to stop a dowel exactly 1/8-inch out on both ends. Even if this were pos-



sible, the joint would be filled with glue so we would have a piece of wood going across the grain. The dowel is, say, four inches long and will stay like that, but the board it's in will not continue to be four inches. As time goes on it will shrink, and even if there is no glue in the dowel joint (an impossibility), the result will be a split board. Whenever I see old tables with a split near a joint, I would bet there are dowel joints hidden in there.

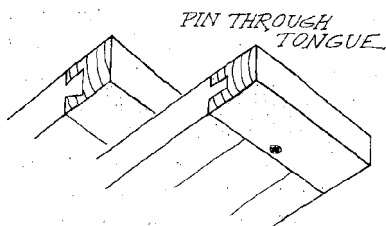
The right way to join boards long grain to long grain is without dowels. Run the edges over the jointer slowly, or even better, just use a hand jointer plane, and get a slight concave surface.



Then glue the boards together. This puts a slight pressure on the ends. When the wood dries and gives off moisture at the ends first, the pressure is released and the ends will not split. At the same time, we can use fewer clamps.

If wood is glued together using this method and we try to break it apart, generally it will break somewhere other than in the joints. If it did break in the joints, it would take wood from both pieces, which proves we have a joint that is as strong as the material itself. This means there is no reason for what the books suggest — putting a spline or tongue and groove in the joint to get more glue surface. Furniture factories like to use tongue and groove because it allows machines to line up boards. But for individual craftsmen it's a waste of time.

Another piece of bad information in the books is the suggestion to put a tongue on the ends of tabletops and to glue a piece on each end with the grain running in the opposite direction to keep the tabletop straight. It's correct to use the end piece, but don't glue it as they suggest. That will not give the wood the freedom to move, which it will. The end boards will stay constant in length, the center boards will contract and expand in width. There is no glue that is capable of holding them, so the result is that they are going to split. The tongue and groove should be glued (or better yet, pinned)

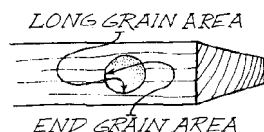


only in the center inch or so, which gives the wood the freedom to move. When cutting these end boards, joint

or plane a slight concavity on the inside edge so that the ends will continue to exert pressure after the center is forced in. The best (and most difficult) way is to use a sliding dovetail joint to hold the end boards in.

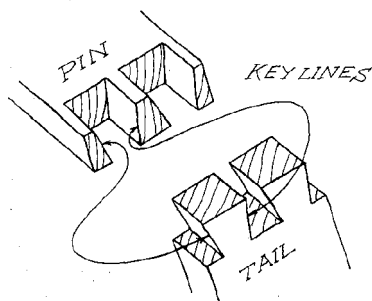
Most books highly recommend doweled joints, which are not very strong. I would never use a doweled joint myself, for example, in a chair. In mass production it is considerably easier to use dowels, especially because all the joints can be put together in a split second. So naturally the factories recommend doweled joints highly. But for individual craftsmen this is wrong.

As we all know, you cannot glue end grain to end grain or end grain to long grain, because there is no strength in end grain. We can depend only on gluing long grain to long grain. That is the reason the mortise and tenon are much stronger than dowel joints. With dowel joints there is only 1/8-inch or so where we have long grain to long grain. The rest of the joint is end grain.



A dowel joint is good only if joining two boards end grain to end grain, because then the whole dowel will be surrounded by long grain. (In another article I will write about a dovetail dowel when I have perfected the tool which will make the joint.)

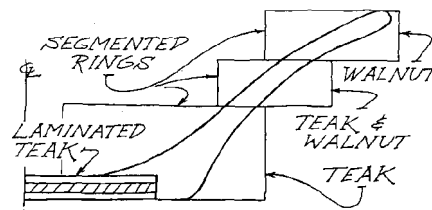
Another mistake mentioned in the books is that when making hand dovetails, it doesn't make any difference if you make the pin or the tail first. There is a difference. The easiest and most correct way is always to make the pin first, the tail last. How well the joint fits is determined by how



accurately we follow the "key line" that transfers the pin's shape to the tail (or the tail's shape to the pin). If the tail is made first, when we cut on the

"key line" drawn from the tail, we destroy that important line with the very first saw cut. But if the tail is made last, we have several strokes with the saw before we completely destroy the line we are "splitting."

In the last issue of *Fine Woodworking*, the article about checkered bowls shows a good example of not allowing wood to move. If the technique shown is used, it is sure that the bowl is going to split sooner or later. First the walnut will split, and later the teak, which moves much more slowly because of its natural oils. With long grain running in a complete circle in the checkered ring, that ring will keep the same diameter forever, but the walnut and teak are going to move and shrink, splitting the bowl. The same bowl could be made by segmenting the walnut and teak on the sides, and offsetting where the joints meet, as in a brick wall. For the bottom, I would resaw and cross-laminate the teak in a three-ply construction and inset it into the side.



Another thing I never do if I am going to glue pieces together is to use a sander. Sandpaper always removes the wood from the edges faster than the center, with the result that the joints will be tight in the center and open along the edges. I would use a sharp circular saw blade or, if I have to do any correcting, I would use a hand plane, which would make the surface perfectly flat and give a much better glued surface.

These are just a few things I have found by looking through some of the textbooks available. There are a lot of books about woodworking but very few are worth buying. So far I have not found any I can recommend. I think the best one available today is *The Encyclopedia of Furniture Making* by Ernest Joyce.

[Editor's note: *The Encyclopedia of Furniture Making* can be purchased for \$14.95 at local bookstores, or directly from Drake Publishers, Ltd., 801 Second Avenue, New York, NY 10017.]