

Keeping the "Poplars" Straight

Many woods, good for many different things

by Jon W. Arno

To be told at the lumberyard that the board you are about to buy is poplar may be only slightly more helpful than to be assured that it is wood. The name poplar and the backwoods corruption of this term, popple, are applied to many different kinds of lumber in various regions of the country. Embroiled in the confusion are some dozen or more species belonging to four genera in two totally separate botanical families: the magnolia family, *Magnoliaceae*, and the willow family, *Salicaceae*, as shown in the chart on p. 64. Your lumber dealer probably doesn't know which species he has—to some extent he's at the mercy of the mill from which he buys his wood. The best clue to the wood's identity may be the part of the country it came from.

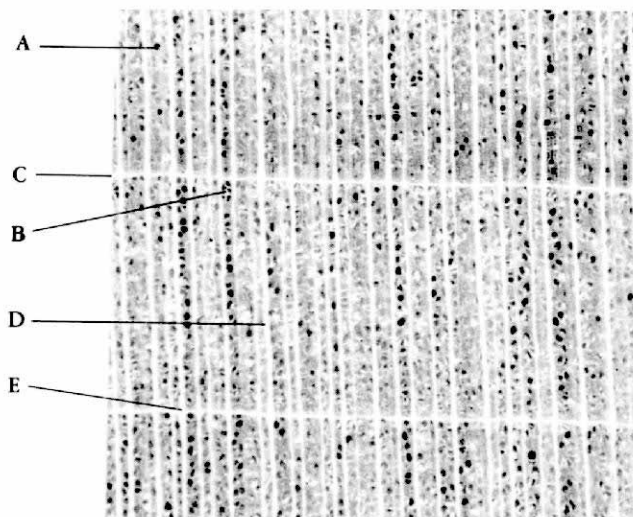
My first exposure to poplar came several years ago when I purchased a few board feet from a mail-order house. It was absolutely beautiful stock, arriving in nice wide boards with almost pure white sapwood and an olive-green heartwood streaked with chocolate brown. Some time later I ran across poplar advertised at an unbelievably low price from another mail-order house and I bought in quantity. Alas, it was a completely different wood. Both the sapwood and heartwood were creamy white in color, with a lot of tension wood, and the boards were no wider than 8 in. It even smelled different, reminding me of stale aspirin.

Both woods ultimately proved useful for totally different purposes and I'd gladly buy both again, but this experience launched me on a determined quest to learn what I could about the poplars, so I would at least know what had arrived when I got my future mail-orders.

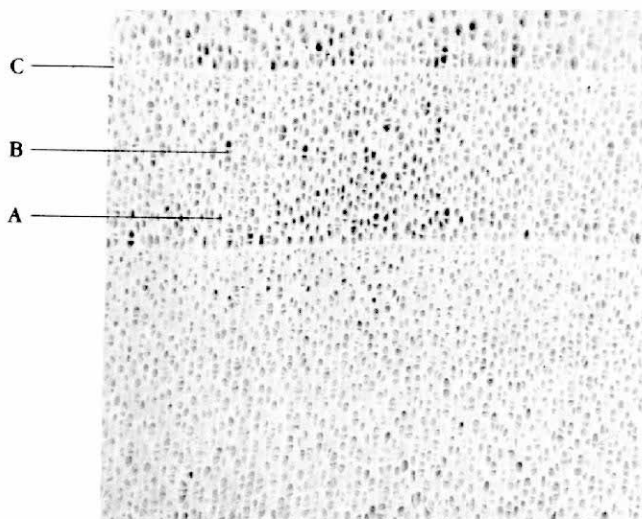
The magnolia family—My first purchase turned out to have been **yellow-poplar** or tuliptree, *Liriodendron tulipifera*, a member of the magnolia family native to the lower midwest, mid-Atlantic and southern states. Poplar shipped from mills in this region or referred to as tulip-poplar probably is this species. The tuliptree is a fast grower, and under the right conditions it produces a tall, dear trunk, so that boards up to 12 in. wide are fairly common. The tuliptree and sycamore vie for distinction as the largest of the deciduous trees east of the Mississippi. Tuliptree's huge size was once put to use by some Indian tribes for making dugout canoes. Although truly giant specimens are now rare, young stands are more common than ever. One reason that tuliptree is so plentiful is that it occupies the same ecological niche as the chestnut, and it has taken over many sites where chestnut once predominated.

Although the price of yellow-poplar seems to be increasing faster than other woods, it is a cabinet wood in its own right and still a good buy. According to the U.S. Department of Agriculture's *Wood Handbook*, the correct commercial name is yellow-poplar, but unfortunately it is neither yellow in color nor, as we shall see, a true poplar.

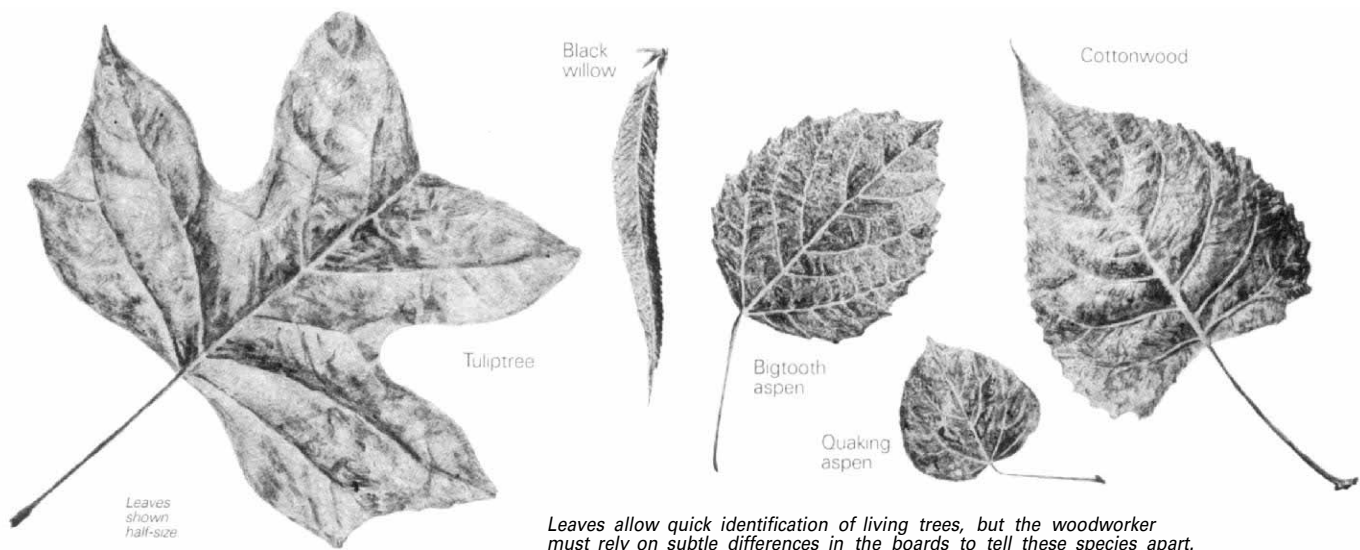
Yellow-poplar is a soft, diffuse-porous, fine-textured



Yellow-poplar (Liriodendron tulipifera): Moderately soft and moderately light (average specific gravity 0.42). Heartwood commonly green or greenish brown, occasionally shaded with purple, blue, black or yellow, or with streaks of various colors. Sapwood flat creamy or grayish white ('whitewood'). Diffuse-porous, pores small, solitary (A) and in multiples (B). Growth ring distinct due to whitish or pale-yellow line of terminal parenchyma. (C), clearly visible to the naked eye. Rays (D) also visible to the naked eye (about as distinct as terminal parenchyma), often swollen (noded) at the growth-ring boundary (E).



Cottonwood, typical of Populus species: Relatively soft and light to moderately light (average specific gravity P. balsamifera 0.34, P. deltoides 0.40). Heartwood light brown to light grayish brown. Green wood often has a sour, unpleasant odor. Wood generally diffuse-porous, sometimes semi-diffuse-porous. Pores numerous, densely but uniformly distributed, solitary (A) or in radial multiples (B). Largest pores barely visible to unaided eye. Terminal parenchyma form a fine, light line along the growth-ring boundary (C). Rays very fine, indistinct even with hand lens.



wood. It's easy to work and stable, and it takes a good finish. It has a very subdued figure, much like birch except for its noticeably green color (sometimes streaked with brown, black or purple), which in time may turn deep brown.

Tuliptree was a new species to the European colonists. Wiped out in Europe by the Ice Age, it is native now only to the United States, with one very similar species found in southern China. In Colonial times the massive logs were often sawn so as to segregate the dark heartwood from the sapwood. The sapwood was referred to as whitewood, and was used in furniture as a secondary wood for drawer sides and interior parts. This same technique can still be used by the frugal cabinetmaker to create a piece of furniture that is solid yellow-poplar, yet appears to be made of two different woods.

Another member of the magnolia family, *Magnolia acuminata*, or cucumbertree, is sometimes mistakenly marketed with tuliptree as yellow-poplar. They are botanically close relatives and their wood is almost identical. A sharp-eyed timber grader looks for a lighter-colored sapwood in cucumbertree. The woodworker can distinguish both from the true poplars by their greenish heartwood. Under a 10x hand lens, as shown on the facing page, look for a fine whitish line separating the annual rings in the end grain. This line is formed by a row of small cells called parenchyma. When these cells appear as a line separating the annual rings, they are called terminal parenchyma. The line is clearly defined in both tuliptree and cucumbertree, while in the true poplars it is indistinct.

The willows and true poplars—These belong to the *Salicaceae* family, a broad grouping that includes many species, some of which are mistakenly sold as poplar. When freshly cut or slightly damp, most species in this family have a characteristic odor, an acidic, vinegary smell similar to damp aspirin. In fact, the willows are a natural source for the salicylic acid used in aspirin. When the wood is thoroughly dry, the odor disappears, but it may return under humid conditions.

The willows and their cousins the true poplars are far more similar to each other than any of them are to yellow-poplar, and are difficult to tell apart in photomicrographs. Yet each wood has subtle visual clues to its identity, and there are significant differences in their workability.

One branch of the family, the genus *Populus*, contains the aspens, the poplars and the cottonwoods, and virtually all of

them have so many local and regional names that each tree ends up having more aliases than a con-man.

My second purchase of "poplar" was actually *aspen*, and should have been sold as such—the wood from the two aspens, quaking aspen and bigtooth aspen, is potentially troublesome because it's loaded with tension wood. This is not always easy to spot in the unfinished board, but the minute it is stained the surface becomes fuzzy or blotchy in appearance, and usually ends up looking like a very amateurish staining job. All of the true poplars have this problem to some degree, but the aspens are the worst. If the surface chips in planing or becomes fuzzy while sanding, you can expect it to stain unevenly, even after you think you've sanded all the fuzziness out.

The aspens have the finest texture of all the woods in the genus *Populus*. The wood is a very light cream color, almost white, with little contrast between sapwood and heartwood. The heartwood may have a slight gray cast and show streaks of a rusty or reddish-brown color around knots or where the wood has been damaged, but no greenish cast. It is soft and rather bland in figure, and for pieces that will be either painted or left unfinished, it is a reasonable choice as the primary wood. You can put on a clear finish, but plan to do a lot of sanding between coats.

Aspen shrinks fairly uniformly in drying, and is quite stable compared to other woods and even other members of the willow family. This makes it a good secondary wood for drawer sides and panels where any appreciable swelling can pose a problem. With an average specific gravity (SG) of 0.35 (oven dry), aspen is softer than yellow-poplar, 0.42 SG, and it compares to white pine, 0.34 SG, in being easy to work, but it is far superior in resistance to splitting when being nailed. It is a wood that will not splinter, making it a prime choice for children's toys—and sauna seats, too.

Also in the genus *Populus* of the willow family are the **cottonwoods**. Several trees have such similar wood that they can all be considered together. Unlike the aspens, the cottonwoods have a tendency to be semi-ring-porous. To be sure, they are not as large-pored as the oaks and the ashes, but they have enough variation in the size of the earlywood and latewood pores to produce a distinct figure when stained. The semi-ring-porous nature of cottonwood is easy to spot on the unfinished surface of a board by holding the board up to a bright light in the same way you would examine a freshly

Family	Genus	Species	Common name	Lumber	Lumber characteristics	
Magnolia (<i>Magnoliaceae</i> spp.)	<i>Liriodendron</i>	<i>tulipifera</i>	Tuliptree	Yellow-poplar	Close-grain/diffuse-porous, white sapwood, greenish heartwood. Soft, but slightly harder than other "poplars."	
	<i>Magnolia</i>	<i>acuminata</i>	Cucumbertree			
Willow (<i>Salicaceae</i> spp.)	<i>Salix</i>	<i>nigra</i> (and others)	Black willow (other willows)	Willow	Semi-ring-porous/open-grain, very similar to the cottonwoods. Black willow has dark-colored heartwood.	
		<i>Populus</i>	<i>balsamifera</i>	Balsam poplar (balm-of-Gilead)	Cottonwood	Semi-ring-porous, very soft, cream-colored sapwood, light grayish heartwood. Can make an attractive primary wood if tension wood is avoided. Nice figure when stained.
			<i>deltoides</i>	Eastern cottonwood ("eastern poplar")		
			<i>heterophylla</i>	Swamp cottonwood		
			<i>trichocarpa</i>	Black cottonwood		
		<i>Populus</i>	<i>grandidentata</i>	Bigtooth aspen ("popple")	Aspen	Close-grain/diffuse-porous, white color with rust-brown streaks around knots and blemishes. Tension wood very common. Soft, easy to work. Stable, makes good secondary wood.
<i>tremuloides</i>	Quaking aspen ("popple")					

varnished surface for dust spots. As a result of its coarser texture, the wood is not as lustrous as that of the aspens. Cottonwood is also not as stark white in color as aspen, and generally produces a cream-colored sapwood and slightly gray heartwood, which often has a very slight greenish cast.

While the cottonwoods are similar, they are not identical. Some balsam poplar I recently bought from a mill in the Upper Peninsula of Michigan was darker in color and more open-grained than cottonwoods I had purchased from other sources. So far it's my favorite "poplar," and I'd like more of it. I wouldn't buy it green, though—it's hard to dry.

One final group of species should be thrown into the confusion: the **willows**, of which there are many. While non-members of the genus *Populus*, the willows are more closely related to the aspens and the cottonwoods than is the tulip-tree. At least they belong to the same family. Technically they should never be marketed as poplar, but occasionally they are. From the user's standpoint, little harm is done, since the woods of willow and cottonwood are very similar. Normally, willow will be darker in color. This is because black willow, *Salix nigra*, is the most important of the willows in commerce: it's the largest and most plentiful. If you've been shipped black willow instead of cottonwood, don't complain. Black willow, while soft like all of the woods described here, makes a very nice primary wood. Its dark, brown-gray color is sometimes dark enough to not require staining, and its semi-ring-porous grain gives it a soft-spoken figure.

Price and availability—Virtually all of the so-called poplars are moderate to low in price, ranging from less than \$.50 a board foot to more than \$1.50. As with any lumber, the price depends on the grade, the amount of processing that has gone into it, and the quantity you purchase.

Yellow-poplar (*Liriodendron tulipifera*, i.e., tulip-poplar) is rising in price. It's still sold by several mail-order sources at \$1.00 to \$1.50 a board foot, but if you don't live in its native range, shipping costs will likely make it no cheaper than the common local hardwoods in your area. One of the advantages of yellow-poplar is that you can get wide boards with especially attractive heartwood color. For such stuff a

price of \$2.00 or more a board foot is not unreasonable.

Aspen and, in some areas, cottonwood are the most plentiful and least expensive of the true poplars. The aspens are "camp-followers of disaster" in that their favorite habitat is prepared for them when a forest is cut over or burned. In this sense they have benefited mightily from the arrival of European man and are now more common in pure stands than they probably have ever been. Although the aspens are relatively short-lived and eventually overtaken by the conifers and hardwoods which form the climax forest, they are fast-growing and a valuable resource for today's cabinetmaker.

Quaking aspen is native to most of Canada from coast to coast, and to the northern United States, while bigtooth aspen is an eastern tree, but their ranges overlap in the Great Lakes region and the St. Lawrence basin. Woodworkers who live in a region where aspen is common can save money by using it in place of the typical No. 2 ponderosa pine. Bought "run-of-mill," ungraded and green, directly from a local sawmill in reasonably large quantities—say, 100 to 500 board feet—aspen can be had for \$.40 a board foot or less. In fact, on orders for more than a couple of thousand board feet, half that price would be a good place to start bargaining.

If kiln-dried and surfaced, aspen and cottonwood in the better grades—No. 1 and better—should sell by mail-order for between \$1.00 and \$1.50 per board foot. If you shop around, buy in fairly large quantities and haul it yourself, you'll be able to do better.

The genus *Populus* includes some of the fastest-growing cold-tolerant trees in the world, and hybridizing them for still faster growth has become a high-priority project among tree geneticists. There is real promise that from this work may come the "super tree" of the future.

It's important not to let one experience with a wood called poplar create a fixed opinion about what poplar is and what it's good for. The truth is, it's good for many things, because it's many woods. Discovering them and learning the unique qualities of each is not only challenging, it is enjoyable. □

Jon W. Arno, of Brookfield, Wis., is an amateur woodworker. He wrote about elm in FWW #25, pp. 86-89.