

1953

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September 1953

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FOREST SERVICE
FOREST PRODUCTS LABORATORY
Madison 5, Wisconsin**
In Cooperation with the University of Wisconsin

PAPER BIRCH UTILIZATION IN THE LAKE STATES

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A brief study of the quality and amount of paper birch going into different uses in northern Minnesota, northern Wisconsin, and the Upper Peninsula of Michigan was made in September 1952. The numerous pulp and paper mills and small sawmills were sampled. All other known users of paper birch in this area, which were relatively few, were contacted, mostly by personal visit, but a few by letter. Questions related to available stands were beyond the scope of the study.

It was found that paper birch is put to about the same types of use in this region as in New England. In New England, however, most uses are on a much larger scale.

Paper birch is one of the less valuable Lake States woods, whether for saw logs, box bolts, or pulpwood. Aspen and mixed hardwoods sell for the same or somewhat less, as a rule. At the other extreme, No. 1 yellow birch saw logs sell for twice as much as the same quality of paper birch, and spruce pulpwood sells for nearly twice as much as paper birch pulpwood. Some of these price details are shown in table 1. Although the table was prepared with special reference to Wisconsin, prices in other parts of the northern Lake States would not be expected to differ greatly.

The future of paper birch utilization in the Lake States appears to hinge largely on two things: (1) development of accurate data on availability of sound birch 6 inches and larger; that is, the sort of birch that forms the great bulk of current use, and (2) possible new developments to enhance the utility of smaller paper birch that comprises so much of the stand today. Desirable as such new developments would be, they cannot, of course, be counted on.

The chief uses for paper birch in the northern Lake States were as follows:

¹Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

<u>Use</u>	<u>Cords</u>	<u>Percent</u>
Pulpwood ²	16,800	59.6
Veneer and veneer products ³	8,100	28.7
Sawed products: ³		
Turning squares	2,300	8.2
Crossties, lumber, miscellaneous (estimated)	<u>1,000</u>	<u>3.5</u>
	28,200	100.0

Pulp and Paper Products

Sixty percent of the reported paper birch was used for pulp products, including fine papers, newsprint, and container board. Paper birch probably did not account for more than 10 percent of the total pulpwood at any one mill, and most of them used none of it.

Pulpwood was the only substantial use that was found for small-sized birch. According to specifications, sticks as small as 4 inches in diameter inside bark, at the small end were acceptable, although half of the sticks were usually required to be 6 inches or larger. Actually some sticks smaller than 4 inches were accepted if otherwise good. The quality was sound, and causes for rejection included dead, wormy, charred, decayed, or black-knotted wood, hollow butts, undersize, pronounced crook, and poor manufacture. Paper birch gives a relatively high pulp yield, and was typically used in combination with other woods to make up the short fiber content of paper. In storage it lasts as well as aspen or balsam, but not so well as hemlock or spruce. It must usually be pulped within a year to avoid deterioration. Producers usually prefer to deal with other pulpwoods that are easier to handle and to peel.

Veneer and Veneer Products

Six companies used a total of 8,100 cords of paper birch, or 29 percent of the total, in making veneer and veneer products. The birch was bought in 50-inch and 100-inch bolts, although the latter were often cut into two to four shorter lengths before turning. Some users accepted 6-inch diameters, but an 8-inch minimum was more common.

²1950.

³1951.

Birch for turning ran larger than that for pulpwood, but not so sound. Many of the largest turning bolts had unsound centers. These were accepted provided they were sound enough for the lathe chucks to grip firmly and provided there was a good volume of clear wood outside the centers. The veneer cores that contained most of the unsoundness varied from about 3-1/2 inches up, depending on quality and on the length of the bolt being turned. While surface knots were not excluded, they were strictly limited as a rule.

Much of this birch was used by one company for safety matchboxes of 1/40-inch veneer. Paper birch veneer, together with other veneers, was used at three plants making school seating, round cheeseboxes, swab slats, and cabinet veneers. Paper birch only was used at two plants making die-cut products. One of these made nothing but toothpicks. The other made plant markers, tongue depressors, ice-cream sticks, picnic spoons, etc. Die-cut products were a relatively small use, but one for which paper birch is a preferred species.

Sawed Products

Sawed products comprised roughly one-eighth of the total use of paper birch.

Turning Squares

Two-thirds of the volume of sawed products consisted of turning squares. Few of these were larger than 2 by 2 inches, and practically all of them were used in the same plants where they were sawed. Bolts down to 6 inches were acceptable, if sound, smooth, and straight. Lengths were 50 and 100 inches.

No specifications were available, but the highlights of the specifications for New England birch turning squares are as follows:

Standard sizes are from 1/2 to 5 inches square, although the big volume is in 1- to 2-inch sizes. Lengths range from 18 inches to 48 inches in 6-inch multiples. From 25 percent to 40 percent of 42-inch and shorter lengths are allowed, depending on cross section.

The two grades are clear and 90 percent and better clear. Both grades exclude red heartwood in sizes under 2-5/8 inches. The clear grade is literally clear, while 90 percent and better clear requires 90 percent of the length of the poorest pieces to be clear. The great bulk of the squares shorter than 48 inches no doubt results from trimming out defects to make these grades.

The wood-turning industry will be discussed separately.

Crossties and Side Lumber

Paper birch was a minor species as far as crossties were concerned. In general, they were made here and there in small quantities by portable mills, and accurate production figures were not available. One of the principal railways in the northern Lake States estimated its use of paper birch crossties to be about 5,000 yearly. If this is fairly typical of other railways in the region, then all of them together use less paper birch than some individual paper mills. Crossties were sawed in standard sizes from 6 by 7 to 7 by 9 inches. This calls for a minimum diameter of about 9 inches in the tie cuts. Crosstie specifications vary somewhat between railways. In general, however, they exclude decay in any form, but allow defects that do not materially impair strength and durability. Some of the tie cuts were large enough to produce one or two boards in addition to a crosstie. This so-called "side lumber" was a byproduct of crosstie manufacture, and was almost the only paper birch lumber on the market. It represented possibly 20 percent of the marketable product of the tie mills. Although the quality may be quite good, it was only of crosstie length, that is, 8 to 8-1/2 feet, and much of it was narrow as well.

Other Uses

One company was making knotty paneling of paper birch and other northern hardwoods. Another was making short sections of picket fence about 1 foot high and suitable for protecting flower beds. Both of these were among the smaller uses.

Turned Products

As previously mentioned, turning squares were the chief outlet for paper birch in sawed form. Four plants making turned products were visited. The largest of these used all local hardwoods, including paper birch, for broom and mop handles of several styles and sizes. Reject handles were made into chair rounds as a salvage proposition. Two of the plants made dowels for midwest door and furniture manufacturers as their chief product. For this use paper birch was the favorite wood, but not the only wood because of procurement troubles. The fourth plant made a fairly wide variety of small- to medium-sized turnings for furniture and industrial uses using only birch.

The above products have been made with satisfaction in the Lake States for years. Forest Products Laboratory tests of turning properties of paper birch show a negligible difference between that grown in the Lake States and that grown in New England. For these reasons there seem to be no good grounds for seriously questioning the turning properties of the Lake States birch. In New England

paper birch has long been the preferred wood for spools, shuttles, and a host of small miscellaneous turnings. Much New England birch has been depleted by cutting and by insect attack in recent years. At first this might seem to encourage the idea of more wood turning in the Lake States. Increasing competition from plastics is hurting some of the New England woodturners, however, and may well make this use for birch less attractive in the future.

Typical die-cut products made from rotary veneer of paper birch are shown in figure 1, and products such as spools, shuttles, and other small miscellaneous turnings are shown in figure 2.

Table 1.--Recent prices for paper birch and other Lake States woods

Species	Sawlogs			Box and	Pulpwood, rough
				excelsior	
	No. 1	No. 2	Woods run	bolts	
	Dollars per M board feet			Dollars per cord	Dollars per cord
Aspen			30 - 40	14 - 15	12 - 14
Balsam					20.50 - 22.50
Birch, paper	55 - 70	30 - 40	40 - 50	14 - 15	14.00 - 14.50
Birch, yellow	110 - 160	45 - 55			
Hemlock			40 - 50		14.50 - 18.00
Maple, hard	65 - 85	40 - 50	45 - 55		
Mixed hard-woods				12	12.00 - 13.00
Pine, jack			28 - 35	15 - 17	17.00 - 19.00
Pine, white					
and Norway	65 - 85	35 - 40	50 - 60	18 - 20	
Spruce			45		25.00 - 26.50

¹Wisconsin Forest Products Price Review, Winter 1952-1953, compiled in Extension Forestry Office, University of Wisconsin.

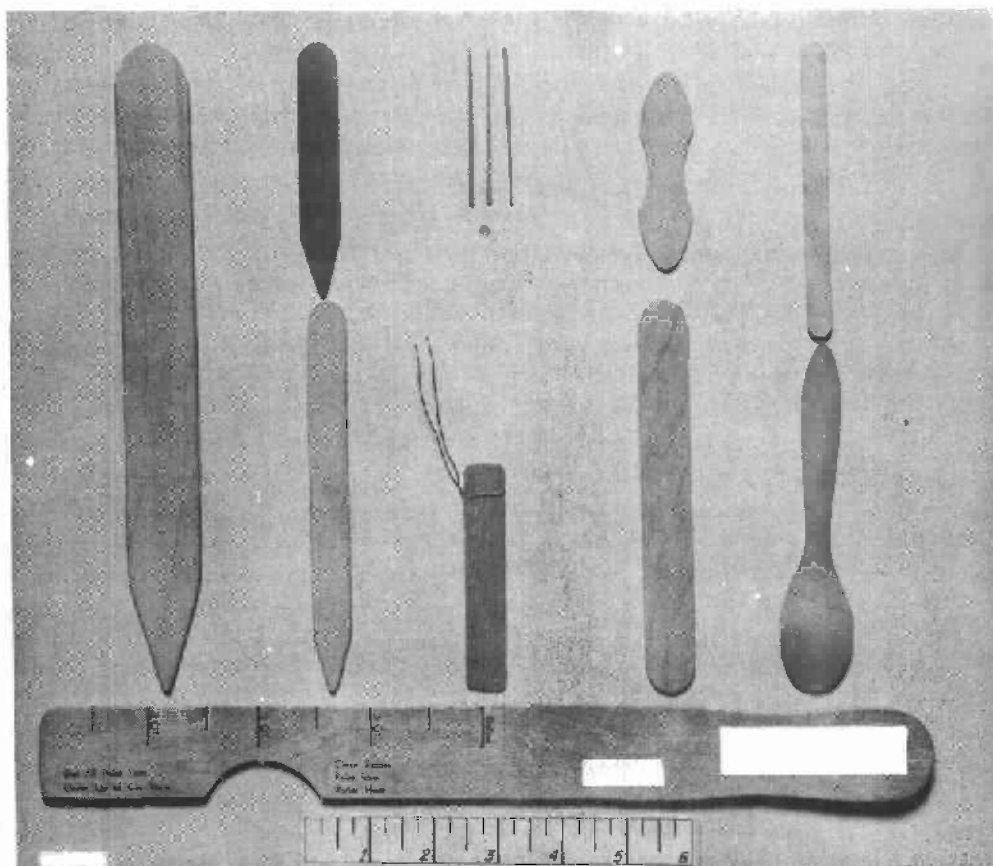


Figure 1. --Typical die-cut products made from rotary veneer of paper birch.

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Figure 2. --Some types of small turnings made from paper birch in New England.

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