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By Oliver P. Wallace and Elliot L. Amidon*

I. Introduction

IN terms of volume of lumber production, eastern white pine is New England's most important forest species. Over half the lumber produced in New England is white pine. Three quarters of this lumber is the output of Maine and New Hampshire sawmills. In 1956 Maine produced 262 million board feet of white pine lumber, two-thirds of the state's total lumber production; New Hampshire produced 176 million board feet of white pine lumber, 70 percent of its lumber production.

In 1957 the University of New Hampshire Agricultural Experiment Station, in cooperation with the Northeastern Forest Experiment Station, U. S. Forest Service, undertook an exploratory study of: (1) the flow of white pine lumber through the marketing channels to its final end uses, (2) the major factors influencing the marketing process, and (3) the quantity and quality of eastern white pine lumber produced in New Hampshire and Maine during 1956. Since a comprehensive regional study of a similar nature will soon be conducted,† the experience gained in the methods of securing and analyzing the information are additional benefits from the study that may prove to be as valuable as the factual data obtained.

Sawmills in Maine and New Hampshire were stratified by production size class and a random sample was drawn from each stratum. As originally conceived, this sample would have provided a basis for estimating the proportion of all white pine lumber in both states which was produced and sold by various categories. However, some of the reporting sawmills were not independent producing and marketing units. Rather, a firm owned, contracted, or financed one to several sawmill units whose marketing practices were determined by the parent organization. Information was usually not available for the production and sales of individual sawmill units, but a total was provided by an owner for the production and sales of all of his mills. Sawmill owners reported production and sales for all sawmills owned, contracted, or financed to such an extent that their marketing practices were determined by the parent organization. Thus the sample unit changed from the sawmill to the sawmill owner, the logical sampling unit for a marketing study. Information was not available on the total population of sawmill ownerships.

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† Northeastern Regional Research Project NEM-24, Marketing of Northeastern Lumber.

Ninety-nine sawmill owners were interviewed in Maine and New Hampshire (Table 1). Addresses of their major white pine lumber purchasers were obtained. These customers — wholesalers, retailers, and industries scattered throughout New England — were interviewed in order to estimate the quantity and quality of white pine lumber consumed by the manufacturing and construction industries. The consumption of white pine lumber for particular end products must be left for possible future investigation.

II. The Sample Statistics

The total 1956 production of white pine lumber in Maine and New Hampshire was 437 million board feet. The 99 sawmill owners interviewed produced 166 million board feet or 38 percent of the total production during 1956. The sample at the sawmill level in New Hampshire covered 94 million feet, or 53 percent of the state's total production; in Maine, the sample covered 72 million feet or 27 percent of Maine's white pine production. So although the data discussed in this bulletin are strictly applicable to the 99 sample owners only, this relatively large random sample contains aggregate relationships characteristic of the white pine lumber industry in Maine and New Hampshire.

Table 1. Structure of the Sawmill Owner Sample

Owner Production Class	Production Range	Owners Contacted	Sawmills Owned	Eastern White Pine Handled per Sample Owner	
				Production[1]	Purchases[2]
	M bd. ft.	Number	Number	M bd. ft.	M bd. ft.
I	1-99	10	10	48	0
II	100-499	17	17	281	21
III	500-999	20	21	748	75
IV	1000-2999	41	53	1,518	30
V	3000-9999	8	18	3,964	287
VI	10,000+	3	16	12,433	3,667

1 Includes lumber from contracted sawmills. Custom-sawn lumber production is not included.

2 Only square-edge lumber was purchased.

Of the total volume of 166 million board feet handled by the sawmill owners, over 90 percent was produced by their own or contracted sawmills. The remaining amount was lumber purchased from other sawmill owners. Those sawmill ownerships in the two largest classes, which accounted for almost half of the white pine lumber produced by the sample owners, also handled 90 percent of the volume purchased from other sawmill owners. Thus the largest mill ownerships undertook the function of assembling other producer's lumber — in effect acting as wholesalers as well as lumber producers. Only the more valuable square-edge lumber was assembled; round-edge lumber went directly to the manufacturing consumers.

The study showed that round-edge lumber is still a major product of

sawmills of all sizes in this region (Table 2). Twenty-eight percent of the total lumber production of the sawmill owners sampled was round-edge. This production did not come from a few owners who specialized in round-edge. Nearly all sawmill owners produced some square-edge lumber with two-thirds also producing some round-edge.

Contrary to what might be expected, the medium-size Class III and IV ownerships produced a higher percentage of round-edge lumber than any of the other size classes. Class I and II owners sawed mostly the more valuable square-edge lumber for local markets. The larger producers manufactured most of the lower value round-edge lumber for box and crating industries. The sample mills in New Hampshire produced a higher proportion of round-edge lumber than did those in Maine.

Table 2. Square- and Round-edge[1] Lumber Production by the Sawmill Owners Sampled, 1956

Owner Production Class	Owners Sampled	Owners Producing		Average Production per Owner Round-Edge Producers Only		
		Square-Edge	Round-Edge	Round and Square-Edge	Round-Edge	
	Number	Number	Number	M bd. ft.	M bd. ft.	Percent
I[2]	10	10	1	40	12	30
II	17	17	9	319	105	33
III	20	18	14	746	350	47
IV	41	41	31	1,479	734	50
V	8	8	4	3,483	1,403	40
VI	3	3	2	8,649	3,875	45
Total	99	97	61	—	—	—

1 "Round-edge lumber — a piece of lumber, with wane on one or both edges, usually 2 inches or less in thickness. Round-edge lumber is commonly sold in this condition in New England, but in other parts of the country it is generally square-edged before it leaves the mill." Society of Mechanical Engineers, Handbook for Small Sawmill Operators, p. 53, New York, 1956.

2 This table is read as follows: 10 sawmill owners in the 1-99 thousand board-feet-per-year production class were sampled; all 10 owners produced some square-edge lumber; 1 of the 10 produced 12 thousand board feet of round-edge lumber, or 30 percent of his combined round- and square-edge production.

According to A. C. Cline in 1925,* 63 percent of New Hampshire's lumber production was manufactured into boxes and shooks. Most of this box lumber was in round-edge form. Round-edge made up 43 per cent of the 1956 lumber production of sawmill owners sampled in New Hampshire. Assuming these samples are comparable, the proportions of round- and square-edge lumber produced have been reversed in the past three decades. According to the mill owners sampled, this trend toward more square-edge production can be expected to continue.

Pine lumber segregated to be sold as knotty-pine for paneling comprised only 7 percent of the total volume of square-edge handled by the 99 sawmill owners. The proportion so segregated did not vary with size class

* Cline, A. C., "The Marketing of Lumber in New Hampshire", Harvest Forest Bul. 10, 1925.

above the one-half-million-foot production level. Segregation of knotty pine lumber by sawmill owners in the two lowest production size classes was negligible. These owners sold lumber by the appropriate Common grades.

Some 3 percent of the No. 3 common and better quality square edge was manufactured into dimension lumber, i.e., yard lumber of any width that is from 2 to less than 5 inches thick. The proportion of dimension lumber produced did not vary appreciably with owner size class. In this form the white pine competed mainly with local hemlock for framing purposes. A few timbers, thicker than 5 inches in least dimension, were sawn for specialty purposes, but their total volume was negligible. By far the major product was 1-inch boards for general construction.

Evidently 50 to 75 percent of the square-edge eastern white pine lumber produced is now being planed before it is first sold, and an even higher proportion of planed lumber (one or more sides) reaches the consumer. Much of the rough lumber produced and sold by owners of smaller sawmills is planed by wholesalers and retailers before it reaches the ultimate buyer. Owners of larger sawmills, those averaging over 3 million board feet per year, planed over 90 percent of their square-edge lumber output, double the proportion planed by smaller producers. (See Table 3.)

Table 3. Relationship of Sawmill Owner Size Class to Proportion of Square-Edge Lumber Graded and Planed

Owner Production Class	Basis		Proportion Graded[1]	Proportion Planed
	Owners Sampled	Square-Edge Handled		
	Number	M bd. ft.	Percent	Percent
I	10	463	0	42
II	17	4,177	10	43
III	20	10,193	42	29
IV	41	40,741	57	41
V	83	28,393	85	80
VI	3	40,548	100	99

1 Graded according to "Standard Grading Rules for Northern White Pine and Norway Pine", as adopted and published by the Northeastern Lumber Manufacturers Association, Inc. N.Y.C., New York. Knotty pine paneling volumes are included.

Nearly three-quarters of all the square-edge lumber was graded according to standard grading rules. Grade recovery percentages were based on the experience of sawmill owners handling a total of 75 million feet of square-edge lumber. The sample results, in percent of total square-edge volume, were 4 percent D and better, 13 percent Nos. 1 and 2 Common, and 83 percent No. 3 Common and poorer. Although No. 3 Common and poorer was not separated into Nos. 3, 4, and 5 Common on the interview schedules, some sawmill owners supplied these data. On the basis of 15 million board feet, No. 3 Common is estimated to be 38 percent and Nos. 4 and 5 Common 45 percent of the total square-edge production.

Small producers said they preferred to sell their lumber mill run to larger producers or wholesalers rather than incur the extra expense of

grading their small output. The proportion of graded lumber increased rapidly as the average yearly volume production rose. The exact level is not known, but evidently an annual production of at least ½ million board feet must be reached before standard grading is practicable.

The small recovery of the upper grades — 17 percent No. 2 Common and better — illustrates the well-recognized problem of selling the remaining low grades. Fortunately, promotion of knotty pine paneling has been quite successful and has, in effect, increased the average price received for lumber which would otherwise be sold as No. 3 and No. 4 Common.

Changes made in lumber-manufacturing practices at the sawmill level during the last 5 years indicate efforts are being made to sell a better product (Table 4). Over half of the sawmill owners made some changes in their operation which increased production and marketing efficiency.

Table 4. Changes in Manufacturing by Sawmill Owners Sampled, 1952-1957

Changes in Manufacturing[1]	Owners
	Number
Saw more round-edge	4
Saw more square-edge	19
More planing	10
Better sawing	15
More grade sawing	8
Other (installed planer, edger, etc.)	22
Made one or more of the above changes	61
Made none of the above changes	38

1 More than one change per individual sawmill possible. The last two items are included to eliminate double-counting.

III. Marketing

1. The Market Structure

The previous section presented production data by size classes of sawmill ownerships. While such a classification is useful in describing lumber output from the sawlog raw material, it evidently is not meaningful for studying factors affecting the flow of lumber from sawmill to consumer. An examination of the first sales by the 99 sawmill owners sampled shows roughly 60 percent of the sale volumes going directly to consumers and 40 percent to middlemen for all sawmill owner size classes (Table 5). Apparently there are no important market restrictions preventing small or large sawmill ownerships from selling either directly to consumers or to the middlemen, i.e., an owner's annual production does not determine his position in the marketing chain. Choice of sales outlets is a reflection of a firm's marketing classification as shown in Table 6. It should be noted, however, that all classes of owners sold some volume to each type of sales outlet. The smaller sawmill ownerships usually sell an informally graded product to local users, which minimizes the intermediate assembling and sorting functions.

Table 5. Relationship of Sawmill Owner Size Class to Type of Sales Outlet

Owner Production Class	Basis		Percent of Volume:								
			Used,[1] Not Sold	Sold to Consumers			Sold to Middlemen			Unknown	Total
	Owners Sampled	Volume Handled		Manu-facturers	Others	Total	Retailers	Others	Total		
	Number	M bd. ft.									
I & II	27	5,600	1	25	36	61	4	33	37	1	100
III & IV	61	78,615	2	36	16	52	8	34	42	4	100
V & VI	11	82,304	12	5	39	44	14	30	44	(2)	100

1 Lumber volume handled is manufactured into non-lumber products by the same sawmill ownership, i.e., no lumber sales involved.
2 Less than 1 percent.

Of particular significance was the finding that 35 of the 130 firms contacted sold two-thirds or more of their lumber to consumers. These firms, who thus were essentially retailers, owned or contracted 49 sawmills. In these cases, the retailer controlled the entire conversion process, logs to lumber. Similarly, 12 manufacturers, owners who converted lumber into some other form such as crating, owned or contracted an additional 26 mills. This pattern is indicated in Table 6.

Table 6. White Pine Lumber Sales by Lumber Producers, Middlemen, and Manufacturers Sampled, New England, 1956

Marketing Classification	Owners	Sales	Proportion of Sales Volume to: Wholesalers	Retailers	Consumers: Manufacturers	Consumers: Construction
	Number	M bd. ft.	Percent	Percent	Percent	Percent
Lumber producers[1]	68	78,426	42	7	42	5[3]
Wholesaler	15	110,856	17	52	27	4
Retailer	35	61,749	16	1	2	81
Manufacturer	12	71,108	14	1	83[2]	2
Total	130	322,139	—	—	—	—

1 Lumber producers: Two-thirds or more of his sales volume is produced by his contracted and/or owned saw-mills. Generally sells to lumber manufacturers and/or distributors but retails (sells directly to consumers) one-third or less of his sales volume.

2 Seventy percent used in own plants; 13 sold to other manufacturers.

3 Does not add to 100 percent, 4 percent unknown not included.

Lumber, like most manufactured products, is traditionally purchased by wholesalers from primary manufacturers (lumber producers) and then distributed through retailers to the ultimate consumers. Each marketing agent performs the necessary services of assembling, sorting, and standardizing the product. Deviations from this normal marketing pattern were found in sales practices of both owners and distributors.

The major manufacturing consumer of white pine lumber is the box industry, which used over 90 percent of the 42 million board feet of round-edge lumber produced by the sample sawmill owners. Part of their raw material requirements are met by their own sawmills; the remainder is almost entirely supplied by purchases directly from sawmill owners. Many manufacturers of industrial goods throughout New England and New York bought square-edge white pine from wholesalers.

2. Factors Affecting Sales

One-third of the sawmill owners sampled indicated that within limits of 2 to 5 dollars per thousand board feet, a buyer's credit standing was more important than the price offered. Lumber producers emphasized the importance of the buyer's business reputation. Only 16 owners said that the

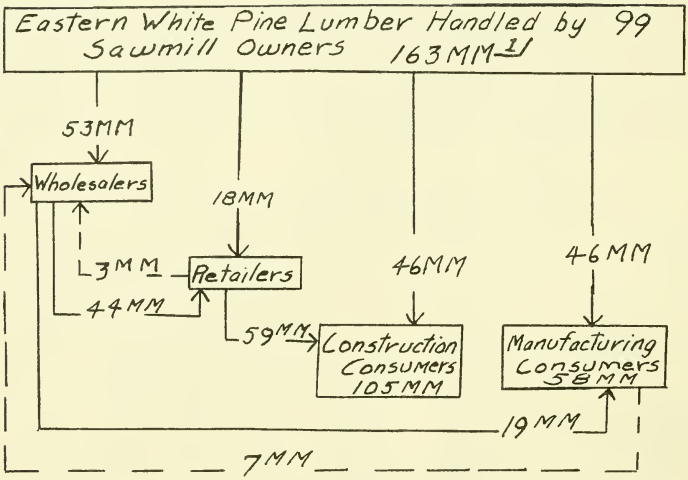

Figure 1. Estimated distribution of white pine lumber from 99 sawmill owners to construction and manufacturing consumers, 1956. Figures are in millions of board feet which is abbreviated by the symbol MM.

[1] No information obtained on 3MM.

best price offered was the main basis of their sales. Another group of 16 owners in the lower three production classes stated that immediate cash payment was of highest importance. Even though 25 of the sawmill owners operated as retailers, six indicated that the buyer's reputation and credit standing were as important as the sales price.

Why only 17 percent of the sawmill owners should use price as the main basis of their sales can be partially explained. A recent study showed that 60 percent of the sawmill owners had been in business over 10 years.* These owners had time to sort out the buyers with favorable price and credit terms and establish a long-run sales policy. Sawmill owners contacted in Maine and New Hampshire had an opportunity to sell to more than one buyer — and did so, as shown by the sample statistics given in Table 7. Nearly three-quarters of the lumber producers visited sold to more than one buyer; most sold to two to five different buyers.

The 1956 lumber market conditions were favorable for sawmill owners. Over 100 different wholesalers and manufacturers bought from the sawmill owners sampled. In addition, retail lumber yards in nearly every town in New England offered extensive sales opportunities. Despite the good market for white pine lumber, little effort was made by sellers to find additional markets for their products. Previously established marketing contacts were continued. Another contributing factor was that lumber producers usually

* L. C. Swain and O. P. Wallace, "Buying Practices of Wood-Using Industries in New Hampshire", N. H. Agr. Exp. Sta. Bul. 433.

Table 7. Number of Customers of Lumber Producers Sampled, 1956

Owner Production Class	Sales to:		
	One buyer	2 to 5 buyers	6 and more buyers
I	3	1	—
II	5	6	1
III	4	8	1
IV	6	21	6
V	—	1	2
Total	18	37	10

spent most of their time procuring raw materials and supervising sawmill operations.

Sixty-three percent of the sawmill owners spent less than 5 hours per month promoting their products. Often the sawmill owner himself did all the selling. Only a third of the sawmill owners had an additional salesman, and most of these men did not spend full time selling lumber. Almost two-thirds of the owners had made no marketing changes since 1952. The other third indicated a slight trend of increased sales to local markets and retail yards.

There is an extensive network of hard-top roads throughout the white pine region in Maine and New Hampshire. Consequently, all sawmill owners stated that the transportation of their products to market presented no difficulties. Maine and New Hampshire sawmill owners sold much of their lumber within the New England states, but they sold some north into Canada, west to the Ohio, and south to Maryland. They reported shipping 60 percent of their round-edge lumber and 46 percent of their square-edge lumber out of state (total 49 percent).

3. Future Market Prospects for Eastern White Pine Lumber

A. Quality Prospects

Market opportunities for each particular grade of white pine lumber require further study. At all stages in the marketing chain, from producers to retailers, owners were seldom able to estimate the volume of each separate grade going to particular purchasers. However, some general conclusions can be made concerning the quality of white pine lumber — which could influence its future use.

No. 4 Common and Poorer — Low grades of square-edge white pine compete with comparable grades of other softwood species, low-grade plywood, or similar substitutes for the same use. The total cost of labor and materials determines whether lumber, plywood, or other products will be used for house sheathing, and thus for the low grades of white pine price is of first importance. The resulting competition has made No. 4 Common lumber a major selling problem, especially since almost one-half of the volume produced by the sample owners was this grade. Manufacturers con-

sumed large quantities of this grade, chiefly for crating, but also for wire rope reels, where white pine, reinforced with other species, is preferred for its light weight.

Finding additional markets for this grade would require more selling effort and the development of products favoring use of low quality raw material. Sales in the immediate future will depend mainly on a continued demand for crating and rough construction lumber.

No. 3 Common and Better — The grades No. 3 Common and better are preferred for white pine's intrinsic qualities: soft texture, light weight, resistance to splitting, and natural durability. The highest quality knotty pine paneling, largely No. 3 Common quality, is preferred for its tight, red knots. Rustic pine furniture makers use No. 3 Common almost exclusively.

User preferences for No. 2 Common and better lumber are not clear because the complicating factors of lengths and widths within grades were not studied. Grade recovery percentages do not reflect the relatively narrower widths and shorter lengths of the upper grades. For many millwork manufacturers the high cost of assembling the best grades in long lengths from local sawmills has forced the substitution of western species, particularly ponderosa pine. A previous study showed the average white pine log in New Hampshire to be 9 inches top diameter inside bark and just over 10 feet long.* This is an indication that the current white pine resource will not meet demands for long lengths and wide boards. However, small tight-knotted trees are a source of both knotty pine paneling and No. 1 and 2 Common lumber. Lumber dealers indicated that white pine lumber of these grades can compete with softwood species from other regions if it can be obtained in the longer lengths and wider widths.

B. General Market Prospects

Lumber producers, wholesalers, and retailers were asked their opinion of the future market for white pine lumber. Most noted only slight marketing changes in the past 5 years and expected no major changes in the near future. Specifically, most owners expected *no* change in: (1) type of products for sale, (2) sales volume, (3) distance to market, (4) the degree of competition from comparable western species, (5) knotty pine production, and (6) relative prices (discounting the effect of inflation). However, the same owners expected a slight increase in: (1) sales to retailers and contractors, (2) competition from low-grade plywood and hardboard, and (3) the spread of standard grading by mill owners sawing white pine.

The present market prospects for white pine lumber may be expected to remain the same unless: (1) New products or uses are found for white pine lumber, particularly for the lower grades. An outstanding example of white pine product promotion has been knotty pine for wall paneling. Building up boards by end- and edge-gluing offers one means of increasing the utilization of low grade white pine. (2) White pine is managed to produce the upper grades in sufficient width, length, and volume to compete with western softwood species. Intensive silvicultural practices, including pruning, are essential to produce the highest grades in less than 100-year rotations. Such practices must be widespread and sustained to reduce assembly costs for those industries requiring quality lumber. Until logs

* Swain and Wallace, *ibid.*

of higher quality reach the market, the main emphasis must be placed on better manufacture and vigorous promotion of current products to maintain the competitive position of eastern white pine in the lumber market.

IV. Summary and Conclusions

White pine lumber is a major product from Maine and New Hampshire forests. More than a thousand sawmills are used to produce this lumber. Its value at retail lumber yards is estimated at 52 million dollars. Almost half of this volume, however, falls into the lowest two standard grades, No. 4 and 5 Common lumber. Selling this product presents a major problem to lumber dealers. The bulk of it goes into boxes and crating and rough construction. The upper grades are in constant demand. Their sale is hindered by a lack of volume, short lengths, and sometimes by poor manufacturing. These upper grades are used almost entirely in home construction and repairs.

The demand for the upper grades results in increasingly competitive bidding for the better quality stumpage* and contributes to the general rising price† for white pine stumpage. An immediate result is higher raw materials cost to producers and a need for more efficient production combined with better marketing practices.

Sawmill owners indicated that a lumber buyers credit standing or business reputation is more important than price. Sales were not limited to only one buyer but producers operating volumes under one million feet spent very little time selling. Their time was occupied in procuring raw materials and operating their sawmill.

The competitive position of sawmill owners with respect to purchasing the raw material and selling it as a manufactured product is indicated by their classification as a marketing agency. Of the eleven sawmill owners handling over 3 million board feet annually, eight performed at least the wholesaling and some of the retailing functions. Altogether, about one-third of the sawmill owners sampled were middlemen, and as such they may be in a better competitive position for procuring their white pine raw material (stumpage) and for selling their products.

Only 30 percent of the volume included in this study was sold to wholesalers. Eleven percent was sold by sawmill owners directly to retailers and the main bulk, 59 percent, was sold directly to consumers — to manufacturers and for construction.

New Hampshire is the major source of round-edge lumber. It is sold to box plants and other industrial users throughout New England and New York. Although the volume has declined in the last 20 years, there is a continuing market for it. The price of round-edge lumber "on-the-sticks" was quoted in the Boston Commercial Bulletin as being about 27 dollars less than that for square-edge white pine. Ninety-six percent of the round-

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* Swain and Wallace, 1956. "Marketing Forest Products in New Hampshire", N. H. Agr. Exp. Sta. Bul. 420.

Baker and Beyer, 1957. "Marketing Forest Products in Maine", Maine Agr. Exp. Sta. Bul. 554.

† Wallace, O. P., 1957. "Changes in Stumpage and Lumber Prices in New Hampshire, 1937-1956", Forestry Dept. Mimeo., University of New Hampshire.

edge lumber in the sample went directly to manufacturers. The remainder was sold to wholesalers. Because more lumber volume is obtained from logs sawn to round-edge than from logs sawn to square-edge, round-edge producers have been able to compete favorably for stumpage. Also, round-edge lumber producers have been able to use lower quality trees and thus operate in lower quality stands than can the producer of square-edge lumber.

White pine square-edge lumber as it is offered for sale to consumers is a well manufactured, graded product. The total volume of No. 3 Common and better grades does not seem adequate to meet demand. Particularly the longer lengths are scarce as compared with competing western softwood lumber. Improved forestry practices that will improve the lumber grade yield of white pine trees, combined with an efficient marketing system and vigorous promotion, will mean that American consumers can count on this fine wood for many uses indefinitely.