

MARKETING TIMBER PRODUCTS IN SELECTED
AREAS OF THE NORTH CENTRAL REGION

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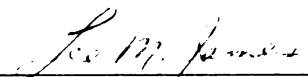
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ABSTRACT

MARKETING TIMBER PRODUCTS IN SELECTED AREAS OF THE NORTH CENTRAL REGION

by Michael R. C. Massie

This report is an analysis of the marketing of raw wood products in the North Central region. It is based on the field data collected during the years 1960 and 1961 for the North Central Regional Research Project NCM-27, "Timber Products Marketing in Selected Areas of the North Central Region."

The objectives of the study are (1) to evaluate how effectively present marketing practices reflect wood-use demands backward to wood processors and timber producers, and producers' supplies forward to primary manufacturers or concentrators, (2) to determine the costs and margins of moving forest products from the woods to primary manufacturers, and (3) to determine the changes in marketing practices which might raise marketing efficiencies.

Study areas were selected in nine cooperating states--Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio and Wisconsin--to cover an area of active timber production. Detailed interviews were held with representatives of firms at three levels of the marketing chain--producer, intermediate market agent, and primary manufacturer--that handled sawlogs, pulpwood, veneer logs, cooperage bolts, and posts, poles and piling. Altogether, 825 producers, 152 intermediate agents, and 581 primary manufacturers were interviewed.

Firms in the North Central region draw their wood supplies from relatively localized timbersheds. Where concentrations of pulp mills occur, however, wood is shipped in long distances by rail. Also, quality veneer logs are frequently shipped long distances to mills. In general, truck transportation is increasing. Pulpwood and quality veneer logs are frequently trucked distances greater than 100 miles. Other products are usually trucked only 15 to 40 miles.

The procurement system relied on most heavily by primary manufacturers is one of direct purchase from producers. Usually 50 to 80 percent of mill receipts, depending on study area and product, come from producers. Purchases are frequently made on a delivered no prior agreement basis. However, informal oral agreements are not uncommon. Producers are increasing in importance, whereas intermediate agents are decreasing. In some areas smaller wood-mills are increasing self-production of their inputs.

Relatively few producers are large specialists in timber production, but there are many small, part-time operators who produce seasonally and receive only a small income from timber production. Producers and landowners exert little market power in selling. Also, both show only minor interest in the promotion of forest management practices; especially on small private holdings.

Margins and profit ratios are somewhat low at the producer level, but they vary widely by species and product and by study area. Many producers lack capital and/or credit, technical training and under-

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standing, and the desire to invest in a seasonal, part-time, and unstable productive enterprise. Frequently hand labor is substituted for machine capital and highly efficient tools.

Changes in marketing practices which might raise marketing efficiencies could be developed in three broad areas with continued research. One area concerns the reconciliation of the producer to existing measures benefiting the landowner and the resource but presently opposed by him. The second would be to assist producers to achieve more efficient, profitable operations. The third would be ways and means of making adjustments in degrees of market power held by different agents and firms in the marketing system to attain a more equitable balance.

MARKETING TIMBER PRODUCTS
IN SELECTED AREAS OF THE
NORTH CENTRAL REGION

by

Michael R. C. Massie

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FOREWORD

This report is based on a portion of the field data collected during the years 1960 and 1961 by the North Central Regional Technical Committee as part of the Cooperative Regional Research Project, NCM-27, "Timber Products Marketing in Selected Areas of the North Central Region."

Nine state agricultural experiment stations--Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio, and Wisconsin--participated in the overall project. The Central States Forest Experiment Station and the Lake States Forest Experiment Station of the U. S. Forest Service cooperated.

The project was supported in part by regional funds provided under Title I, section 9b3, of the Bankhead-Jones Act, as amended August 14, 1946 and the Hatch Act, as amended August 11, 1955.

Objectives of the regional project are as follows: (1) to evaluate how effectively present marketing practices reflect wood-use demands backward to wood processors and timber producers, and producers' supplies forward to primary manufacturers or concentrators; (2) to determine the costs and margins of moving forest products from the woods to primary manufacturers or concentrators; and (3) to determine the changes in marketing practices which might raise marketing efficiencies and strengthen working relations among landowners, producers, processors and market agents.

Cooperating states followed a uniform approach. Localized study areas were selected in each state. Standardized interview schedules were developed for use at each market stage considered in the study

--producer, intermediate market agent, and primary manufacturer. Definitions and procedures including sampling were standardized. Agreement was reached to obtain coverage of the following wood-products industries: lumber, face veneer, container veneer, cooperage, woodpulp, and posts, poles and piling.

This report, which follows a series of individual timber-products reports, is an over-all analysis of timber-products marketing. It is a general treatment of the marketing functions observed in selected areas of Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, Michigan, Wisconsin and Minnesota.

The writer wishes to acknowledge his debt to the many individuals who contributed to the collection and analysis of data used in this report, particularly to Drs. Robert S. Manthy, J. Edwin Carothers, and William B. Lord and Mr. Charles R. Miller.

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INTRODUCTION

Within the North Central region more than 868,000 M cubic feet of standing timber was converted into forest products in 1958. This represents about nine percent of the total national output of forest products. Since 1954 both the regional and national output have declined slightly. Lake States production decreased some 10 percent, but Central States production increased seven percent.

In 1958 the local market value of timber products harvested equaled 14 percent of the value of all farm crops harvested in the United States. In the rural economy timber products are often very important to the small community. While the value of the raw product in the main is attributable to lands other than those classified as farm, timber products output is becoming increasingly more important to the farm family, as it has become firmly entrenched as an alternate form of "employment" or revenue during the seasonal or slack periods of farming in many areas of the North Central region.

In value added by manufacture, timber products industries have a significant place in the region. In 1958 the value added by manufacture for these industries amounted to some 811 million dollars. Paper mills contributed about one-half of this amount, and paperboard mills almost another one-third. The remaining percentage was contributed primarily by sawmills and planing mills, and by veneer and plywood products.

Study Areas

Study areas were delineated within each state participating

in the regional project. They were selected, not to provide a statistical sampling of the region as a whole, but to provide coverage in each state of an area of active timber production. Attention was given to scattering the study areas so that a diversity of market conditions would be sampled.

The study areas in which the major timber products industries were sampled adequately for inclusion in this report are shown in Figure 1. These areas include portions of Michigan, Minnesota, Wisconsin, Indiana, Iowa, Kansas, Missouri, Illinois, and Ohio. Within this complex, minor groupings of states can clarify parts of the analysis. The Lake States can be separated from the Central States both by geographic criteria and by major timber types. The Central States can be further subdivided into a western division (Kansas, Missouri and Iowa) and into an eastern division (Ohio, Indiana, and Illinois). Some products are not produced in all study areas (e.g., cooperage was not encountered in the Lake States study areas) and some products differ widely in importance by study area (e.g., pulpwood is relatively more important than sawlogs in the Lake States, and the reverse is true in the Central States).

Boundary lines of study areas were not considered to be rigid. Market agents outside the delineated areas were included in the sampling when their activities were found to be heavily influenced by marketing within a study area or if they, in turn, exerted a substantial influence on marketing activities within a study area.

Procedure

Detailed interviews were held in 1960 and 1961 with representatives



Figure 1.--Location of study areas in the North Central region in which timber products marketing was sampled.



of firms at three levels of the marketing chain--producer, intermediate market agent and primary manufacturer. Interview schedules were standardized for each market level, and identical schedules were used in all states.¹ All products were fitted to identical schedules at each market level, with the exception of the sawlog producer-sawmill complex. For the latter a revised schedule allowing more pertinent coverage was used. Interest was focused on data for the year 1959, again with the exception of the sawlog producer-sawmill complex. Here, interest was focused on the year 1960.

A 100-percent sample of primary manufacturers and intermediate market agents was sought. In the case of sawmills a 100-percent sample was taken only for mills having an annual production of 100 M bd. ft. or more. A sample of mills producing less than 100 M bd. ft., if important in a study area, was left to the discretion of the investigator. Intermediate agent sampling, noticeably lacking in the sawlog producer-sawmill complex, was left to the discretion of the investigator using the standard intermediate agent schedule. Intermediate agents for other products, and producers for all products were sampled in each study area only to the extent that the investigator felt was necessary for a reasonable cross section. Again, sawlog producers were sampled on a revised schedule.

Problems of definition required arbitrary decisions. Agreement was reached as to the distinctions among producer, intermediate market agent and primary manufacturer, and the treatment of firms

¹The interview schedule used for producers appears in the Appendix. The intermediate market agent and primary manufacturer schedules were similar.

which exercised more than one role in the market.

A producer was defined as an individual (or firm) who harvests purchased stumpage or stumpage from his own land and sells the cut product roadside or delivered to a designated point without substantially changing its form. For posts, poles and piling, bark peeling or modification of shape by sawing was not considered a substantial change of the round product. Similarly, for cooperage timber cutting and/or splitting the round product into cooperage bolts was not considered a substantial change. Bark peeling of pulpwood, was also not considered a substantial change of form.

Essentially, two levels of intermediate agents were recognized. A first-stage intermediate market agent or dealer was defined as an individual (or firm) who purchases cut products from a producer and sells them to second-stage intermediate market agents or dealers, or to primary manufacturers. A second-stage intermediate market agent or dealer was defined as an individual (or firm) who purchases cut products from other intermediate agents or dealers, and sells them to primary manufacturers.

Only one type of dual role was prominently associated with interviewed market agents--producers who also act as dealers. These "producer-dealers" purchase cut products from other independent producers and sell these products along with material that they have harvested as producers. Producer-dealers were often interviewed both as producers and as dealers. When this occurred total production volumes were split and recorded, according to appropriate function, on two forms.

Intermediate agents, and agents performing a dual role, varied

by type of product. Sawtimber marketing agents are not prominent at the intermediate level. Both veneer and cooperage intermediate agents were prominently single stage agents; that is, they bought from producers and sold to primary manufacturers. Double stage intermediate functions were prominent in the marketing of pulpwood, and posts, poles and piling. The dual role of producer-dealer was present in the marketing of all timber products except sawlogs.

A primary manufacturer or processor was defined as a firm that sells its products only after performing some type of processing operation which substantially changes their original form. Primary manufacturers were not classified as producers of the product they process if they obtained their raw materials by harvesting their own stumpage or purchased stumpage.

Sawmills and veneer mills constitute the point of primary manufacture for saw and veneer logs. Wood pulping plants, generally integrated with paper and board plants, usually constitute the primary stage of manufacture for pulpwood. Barrel stave and heading plants constitute the primary stage of manufacture for cooperage, and wood preservation plants usually constitute the primary stage of manufacture for posts, poles and piling.

Sample Size

The total sample of 1,558 agents on which this report is based, with a partial classification by agent function, was drawn as shown in Tables 1, 2, and 3.²

²Producer-dealers are entered in both the producer table and the intermediate agent table.

TABLE 1--Producers sampled in the North Central region, by type of producer and study area, 1960

Type of Producer	Study Area									All Areas
	Mich.	Wisc.	Minn.	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	
Sawlogs	23	14	5	20	3	14	38	5		122
Pulpwood	45	13	9	4	2	5		5		83
Veneer	2	3		10	6	2		5		28
Cooperage				8		5	12			25
Posts, Poles & Piling	1			7		1	8		2	19
Total Single Product	71	30	14	49	11	27	58	15	2	277
Total Multiple Product	126	80	33	111	49	45	29	55	20	548
All Producers Sampled	197	110	47	160	60	72	87	70	22	825

TABLE 2--Intermediate market agents sampled in the North Central region, by type of intermediate agent and study area, 1960

Type of Intermediate Agent	Study Area									All Areas
	Mich.	Wisc.	Minn.	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	
Sawlogs										
Pulpwood	25	12	6	6		1				50
Veneer				3	2					5
Cooperage				2						2
Posts, Poles & Piling	5	1		5			5		1	17
Total Single Product	30	13	6	16	2	1	5		1	74
Total Multiple Product	10	30	9	15	2	3		9		78
All Intermediate Agents	40	43	15	31	4	4	5	9	1	152

TABLE 3--Primary manufacturing firms sampled in the North Central region, by type of firm and study area, 1960

Type of Primary Manufacturer	Study Area									All Areas
	Mich.	Wisc.	Minn.	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	
Lumber	86	42	56	67	41	26	90	26	23	457
Woodpulp & pulp products	9	25	7	1	1	2		2		47
Veneer	3	12	2	1	9	2		3	2	34
Posts, Poles & Piling	4	1	2	7		3	3			20
Cooperage stock				4	3	7	6	2	1	23
All Primary Manufacturers	102	80	67	80	54	40	99	33	26	581

There are no criteria available by which the number of sampled producers and intermediate market agents can be compared to the total number of agents in the entire region. A comparison can be made, however, between number of primary manufacturers sampled and total number of primary manufacturers in the region on the basis of Census data (Table 4). The sample amounted to some 24 percent of all the relevant primary manufacturers operating in the North Central region.

Sample comparisons can also be made on the basis of volume of production rather than the number of agents. For producers this is shown in Table 5. A calculation of percent sample on this basis indicates that the possibility of sampling a large number of agents producing only a minor volume of total regional production did not occur. Sample volume should not be overstressed, however, at the expense of sample by number of agents as many agents sampled gave useful market information, but would not report volumes produced. Sample volume comparisons are also made for intermediate market agents and primary manufacturers in Tables 6 and 7.

TABLE 4--Comparison of primary manufacturers sampled to population
of regional primary manufacturers

Primary manufacturer	Number Interviewed	Number in Region	Percent Sample
Woodpulp (woodpulp producers)	47	71	67
Lumber (sawmills & planing mills)	457	2,119	21(a)
Veneer (veneer & plywood plants)	34	84	40
Cooperage Stock (special products sawmills)	23	61	38
Posts, Poles & Piling (wood preserving plants)	13(b)	48	27
Total	574	2,383	24

(a)The 21 percent sample is heavily weighted with mills producing over 100 M bd. ft. per year.

(b)Seven companies were omitted. These include fence companies and treating plants not applicable or supplying insufficient information.

Source: Population of mills from U. S. Bureau of the Census, Census of Manufactures. Census data vary in time by product from 1958 to 1961.

TABLE 5--Comparison of producer volumes handled in the sample to total regional production, 1959(a)

Product	Sample production	Regional production	Percent sample of regional production
Pulpwood	.214 million cords	3.1 million cords	6.9
Sawlogs(b)	44 million bd. ft.	1,675 million bd. ft.	2.6
Veneer logs	10.5 million bd. ft.	106 million bd. ft.	10.0
Cooperage bolts(c)	4.2 million bd. ft.	75 million bd. ft.	5.6
Posts, Poles & Piling(c)	Posts--1,145 million Poles--29 M pieces Piling--152 M linear ft.	38.5 million pieces 294 M pieces 1,024 M linear ft.	3.0 10.0 15.0
All products (not including posts, poles & piling)	165.7 million bd. ft.	3,406 million bd. ft.	4.9

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(a) The percent shown is the percent of regional production; it is not the percent of total regional producer production. Regional production includes production by contract suppliers and mill or company logging crews. Hence, the only value of the table is its use in indicating roughly what percent of total production (based on sample areas) is produced by interviewed producers. Even if all producers were interviewed, total regional production would not be reached.

(b) 1960 figure used.

(c) Regional production for 1958 used.

TABLE 6--Comparison of intermediate market agent volume handled in the sample to total regional production, 1959(a)

Product	Sample production handled	Regional production	Percent sample production handled of regional production
Pulpwood	.513 million cords	3.1 million cords	16.5
Sawlogs	1 million bd. ft.	1,675 million bd. ft.	(b)
Veneer logs	10.4 million bd. ft.	106 million bd. ft.	9.8
Cooperage bolts	.325 million bd. ft.(c)	75 million bd. ft.	(b)
Posts, poles & piling	(b)	Posts--38.5 million pieces Poles--29 1/4 M pieces Piling--25 M pieces	(b)
All products (not including posts, poles & piling)	268.2 million bd. ft.	3,406 million bd. ft.	7.9

(a)The percent shown is the percent of regional production; it is not the percent of total regional producer production. Regional production includes production by contract suppliers and mill or company logging crews. Hence, the only value of the table is its use in indicating roughly what percent of total production (based on sample areas) is handled by interviewed intermediate agents.

(b)Negligible.

(c)Six agents in the Ohio study area. (Percent of Ohio production handled is 3.8).

TABLE-7--Comparison of sampled primary manufacturer receipts to total regional mill receipts, 1959

Product	Sampled receipts	Regional receipts	Percent sampled receipts of regional receipts
Pulpwood	2.88 million cords	3.8 million cords	75.8
Sawlogs	364 million bd. ft.	1,675 million bd. ft.(a)	21.7
Veneer logs	65 million bd. ft.	113 million bd. ft.	57.5
Cooperage bolts	18.75 million bd. ft.	75 million bd. ft.	25.0
Posts, poles & piling(b)	--	--	--
All products	1,887 million bd. ft.	3,763 million bd. ft.	50.1

(a)No figure available for sawlog receipts. Regional production figure used. The assumption is made that limited exports-imports should balance (average sawmill timbershed radius 37 miles, and average trucking distance to mill about 16 miles), hence regional production should approximate regional receipts.

(b)Not available.

REVIEW OF LITERATURE

Published literature pertaining to the marketing of timber and forest products in the United States is too numerous for a detailed and comprehensive review. The literature covered in this review is therefore restricted to research concerning timber and primary wood products marketing in the North Central region, or to research that has application or potential usefulness in understanding the marketing of raw forest products in the North Central region.

Theory and Background

Duerr (10, p. 323-374) indicates the position of marketing within the scope of forest economics. He considers marketing the performance of market services by firms. The functions of marketing are discussed as well as marketing agencies and their practices. Lastly, the importance of the geography of marketing is noted--thus linking places and persons to the functions of marketing. Worrell (52, p. 293-321) indicates the field of marketing in forestry; he places considerable emphasis on the marketing of forest products.

Gregory (15, p. 454) indicates the direction forest marketing research has taken in the past and suggests re-orientation. More emphasis would be practical concerning consumer-oriented research rather than producer-oriented research. Stoddard (47, p. 841) indicates the lack of statistical information that is vital to forest economics and marketing. He points out areas of federal support that are inadequate.

Timber Products Marketing

Regional Studies

The Northeastern Regional Technical Committee and the North Central Regional Technical Committee have been instrumental in establishing a field of research based on the marketing of timber and forest products from the resource ownership through the point of primary manufacture over wide geographic areas. The former (43) and (44) covered woodland owners and selling practices in the Northeast through buying by handlers and primary industry as well as the use of marketing assistance and information for a variety of products. They then considered the marketing of lumber in the Northeast as reported by Christensen et al. (4). The latter committee has investigated the marketing of specific timber products in active areas of timber production in nine of the North Central states. Comprehensive reports on the marketing process from woodland to primary manufacture were published. Manthy and James (33) reported on the marketing of posts, poles, and piling; Massie and James (35) on cooperage timber; and Manthy and James (34) on pulpwood.

State or Within State Studies

Duerr, et al., (9) reported on timber-products marketing in eastern Kentucky. This early work showed much foresight, and has great application in directing timber-products marketing research in other states. Local geography and history, as well as social and economic development are reconciled to the timber economy and

the emerging marketing picture. Quigley and Yoho (46) report briefly on the marketing of timber from Iowa farm woodlands. Their interest is in assisting the landowner selling timber. Turner and Mitchell (50) consider the same problem in marketing timber from farm holdings in southeastern Ohio. James (26) considers the marketing of pulpwood in Michigan. The report covers all aspects of pulpwood marketing, from the standing trees to delivery of pulpwood at the pulp mills. Holland (19) in conjunction with the cooperative study of the North Central Regional Technical Committee, reports on the marketing of timber products in the Claypan region of Illinois. This study describes the marketing process, the agents involved, and indicates areas of adverse affect on the forest based economy. Carothers (3) in his recent thesis, and using data he collected in conjunction with the North Central Regional Technical Committee, presents a penetrating analysis of the marketing of raw wood products in the northern Lower Peninsula of Michigan. His analysis is noteworthy for the comparison and contrast between pulpwood and sawlog marketing.

Allied or Component Reports

National Reports

Marketing studies rarely inform adequately without drawing on statistical information from allied areas of forest economics. While national statistics are not of prime importance, they are frequently vital in comparing specific aspects of marketing, especially on a state and regional basis where such statistics are

presented as portions of the national picture.

The Forest Service and Commodity Stabilization Service of the U. S. Department of Agriculture publish annual reports on demand and price situations for various forest products for various regions and states, and changes over time (18). Gill (14) provides statistics concerning wood used in manufacture (primarily in secondary manufacturing) and Hair (17) indicates the economic importance of timber in the United States. Judiciously used information of this type can support and provide for more meaningful marketing research reports. Similarly, national timber resource statistics as published by the Forest Service, most recently concerning the 1962 resource picture, are invaluable in ascertaining the timber base upon which marketing reports in many cases are based (13).

Regional Reports

Technical notes and papers are an important source of statistics on a regional level. Especially notable are short technical papers indicating the production and consumption of specific forest products. Horn (20) for example, reports pulpwood production in Lake States counties, while Mendel (39) reports pulpwood production and consumption in the Central States. Mendel and Gansner (40) similarly report veneer-log production and consumption in the Central States. Cunningham, et al., (7) report on the resource base in the Lake States and Hutchison and Thornton (24) report on the resource base in the Central States.

Regional utilization studies are sometimes important in completing the marketing picture. Brundage (2, p. 211) outlines

pertinent trends in the central hardwood region. Also, trends specific to the utilization or marketing of one product often appear in the literature. Jeffords (29, p. 463) comments on such trends for pine pulpwood marketing in the south. Seasonal production, changes in buying procedures, and the demand situation are noted. Lastly, reports similar in nature to Nelson (42), who describes the timber economy of a region, are helpful in supporting marketing research as they frequently describe and explain the productive processes between stumpage and primary products.

State or Within State Reports

Forest resource reports are widely available on a state basis. Usually these reports also include pertinent information concerning the wood-using industries of the state. These reports support marketing research in that they indicate the resource base, utilization, and industry descriptions. Hutchison and Morgan (23) reported on Ohio's forests and wood-using industries. Similarly, Hutchison (22) reports on the Indiana situation, King and Winters (30) on the Illinois situation, King et al. (31) on the Missouri situation, and Morgan and Compton (41) for the Central States Forest Experiment Station on the Iowa situation. Findell et al. (12) report specifically on Michigan's forest resources, Stone and Thorne (48) on Wisconsin's, and Cunningham et al. (8) on Minnesota's.

McCauley and Quigley (37) and McCauley (36) report on areas of component market research on a state basis. The former indicate markets for Ohio timber, while the latter report prices for forest products in Ohio. James and Lewis (27) indicate the transportation

costs to pulpwood shippers in Lower Michigan. They continue their marketing research on pulpwood in Lower Michigan (28) by noting production and describing pulpwood markets. Farrell (11) investigated the small forest ownerships of the Missouri Ozarks. His primary area of concern is the potential income from timber that the small woodland owner can derive from these forests. He discusses the resource, yields, markets, and costs and returns.

Product or Industry Reports

In many cases supporting marketing information, especially information at the primary or secondary manufacturing level, can be found in product or industry reports. Zaremba (55, p. 360) for example, indicates the relationships between southern forestry and softwood lumber markets. His prime concern is lumber demand and the improvement of wood's competitive position. Craig (6) provides a comprehensive analysis of profits and risks in the lumber industry. His suggestions for a healthier industry include the elimination of unnecessary costs, the promotion of wood products and the dissemination of information concerning profit positions.

Hagenstein (16) provides an excellent example of location decision for wood-using industries. His report is of particular value to the marketing picture in that it considers what input requirements are necessary for an industry. The marketing functions in aggregate in an area must fulfill these requirements, or industry is justified in location changes. Worley (51) outlines the local benefits that would then have to be foregone from timber industry expansion. Sullivan (49) provides an analysis of a complete industry.

He studied the wood container industry in Minnesota. However, only a relatively small part of the analysis was concerned with inputs of raw materials and the marketing story before manufacture into containers.

Specific Supporting Literature

Various pieces of literature deal specifically with problems that have application in marketing research. Price reporting has its place in state market reports. However, as shown by Zivnуска and Shidelar (56, p. 393) price reporting for standing timber involves several problems. They consider that it has yet to be demonstrated as feasible.

Much literature has been brought forth concerning the small forest holding. Clawson (5, p. 521) discussed the economic size of forestry operations, Berthy, (1, p. 527) and more recently Lord (32, p. 527) have described the economic problems involved with farm woodland ownerships. James (25) described the role played by farm woodlands in the timber economy of Michigan, while McClay (38, p. 88) concentrated on the problems involved with small private forest ownerships in general.

Marketing research in forest economics has not been extensively developed beyond primary and secondary manufacturing points. As might be expected, interest in the marketing chain was primarily focused at the end of the chain closest to the resource. Some research, however, has brought to light consumer tastes and preferences, thus giving limited direction to lower marketing levels. Zaremba (53, p. 90) and (54, p. 358) indicates insight into consumer

attitudes concerning wood and lumber used in house construction. Osborne (45, p. 570) indicates the relationships for wood preserving and changing markets.

Income from forest products has been reported. Hughes and James (21) indicate the nation's income from timber products in 1963.

THE FOREST RESOURCE

The North Central region has a diversity of timber types. Several broad divisions within the region, however, are important to this report. In the Lake States the northern counties are heavily timbered with both coniferous and deciduous forests. Red, white, and jack pine and spruce-fir are the two principal softwood types. The aspen-birch complex is prominent in the northern counties, especially in Wisconsin and Minnesota. The maple-birch-beech, or northern hardwood forest, is the other prominent hardwood forest type. This type, in general, extends farther south than aspen-birch. The oak-hickory type gains in prominence in the central and southern counties. Lowland hardwoods (elm-ash-cottonwood) are frequently found in lowland areas. In all three states, a majority of the southern counties are less than 10 percent forested and are considered nonforest in type (7, 12, 48).

In the four central states of Ohio, Indiana, Illinois, and Missouri, by far the most prominent forest type is oak-hickory. The heavily forested areas lie in the more southerly portions of these states; the north and central portions of these states have a high proportion of nonforested land. Elm-ash-cottonwood occurs in the river valleys, and the highly valuable white oak is scattered throughout most of the region. In general, oak is the most valuable timber species. In Iowa, oak-hickory and elm-ash-cottonwood comprise most of what is considered commercial forest land. In eastern Kansas, oak has a high relative importance. Pine forest types and walnut achieve importance in scattered and localized areas

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throughout the Central States.

The higher percentages of forested land occur in the northern Lake States, the southern Central States, and the Mississippi valley. These areas are active in timber production and contain the study sample areas (24, 22, 30, 31, 41, 23).

The commercial forest land of the region is heavily concentrated in the previously described areas. The ownership pattern is indicated in Table 8 for 1953 and in Table 9 for 1963. Private ownership is, by far, most prominent, although the ownership pattern is highly variable. Minnesota, for example, has more public forest land than private.

In the period between 1953 and 1963, the commercial forest land area decreased by some two million acres. This loss came primarily in farm forest ownerships.

Indications of growth, drain, and residual forest stock are shown in Tables 10 and 11. For the region as a whole, net annual growth of growing stock declined from 1953 to 1963. However, the annual cut of growing stock and sawtimber also declined, resulting in an increase in net volume of growing stock and sawtimber. A surplus is still being added to fairly substantial volumes of growing stock. Hardwood growing stock and live sawtimber are present in much larger volumes than softwood. This is of minor concern in the Central States which is primarily a hardwood region. In the Lake States, however, an adverse balance may be developing. Here growing stock and live sawtimber reserves are heavily weighted with hardwoods. This is especially true in Michigan and Wisconsin. While Wisconsin reserves remained somewhat stable, Michigan reserves of hardwood sawtimber increased by well over three billion bd. ft. These large

TABLE 8--Ownership of commercial forest land area, by state, in the North Central region, 1953

State	Public				Private				All Ownership
	Federal	State	Local	Total	Farm	Industry	Other	Total	
	(Thousands of acres)								
Michigan	2,482	3,819	86	6,387	3,877	1,447	7,138	12,462	18,849
Minnesota	3,055	3,484	3,619	10,158	4,881	587	2,481	7,940	18,098
Wisconsin	2,003	444	2,447	4,894	6,426	1,014	3,991	11,431	16,325
Illinois	216	10		226	3,050	10	652	3,712	3,938
Indiana	172	109	2	283	2,878	9	875	3,762	4,045
Iowa	23	13	6	42	2,321		142	2,463	2,505
Missouri	1,461	156		1,617	8,498	460	4,489	13,447	15,064
Ohio	88	168	41	297	3,047	30	2,022	5,099	5,396
Kansas	1			1	1,160		503	1,663	1,664
Total	9,501	8,203	6,201	23,905	36,138	3,548	22,293	61,979	85,884

Source: U. S. Forest Service, Forest Resource Report No. 14, 1958.

TABLE 9--Ownership of commercial forest land area, by state, in the North Central region, 1963

State	Public				Private			All Ownership
	Federal	State	Local	Total	Farm	Industry	Other	Total
	(thousands of acres)							
Michigan	2,540	3,695	85	6,320	3,841	1,548	7,412	12,801
Minnesota	2,813	3,304	3,416	9,533	3,344	715	3,464	7,523
Wisconsin	1,910	541	2,615	5,066	6,372	933	3,025	10,330
Illinois	229	11		240	2,216	17	1,288	3,521
Indiana	177	115	2	294	2,883	9	774	3,666
Iowa	13	22	2	37	2,282		276	2,558
Missouri	1,361	199	25	1,585	9,228	279	3,885	13,392
Ohio	88	231	41	360	2,844	74	1,843	4,761
Kansas	1			1	1,160		503	1,663
Total	9,132	8,118	6,186	23,436	34,170	3,575	22,470	60,215
								83,651

Source: U. S. Forest Service, Forest Resource Report No. 17, 1965.

TABLE 10---Net annual growth, annual cut, and net volume of growing stock and sawtimber on commercial forest land in the North Central region, 1952

State	Net annual growth			Annual cut			Net volume					
	Growing stock		Sawtimber	Growing stock		Sawtimber	Growing stock		Sawtimber			
	Sftd. Hdwd.	Sftwd. Hdwd.	(mil.bd.ft.)	Sftwd. Hdwd.	Sftwd. Hdwd.	(mil.bd.ft.)	Sftwd. Hdwd.	Sftwd. Hdwd.	(mil.bd.ft.)			
	(mil.cu.ft.)			(mil.cu.ft.)			(mil.cu.ft.)					
Michigan	135	298	287	723	67	148	156	439	2,278	7,634	5,469	15,672
Wisconsin	66	296	187	708	43	131	104	300	1,436	6,635	3,847	12,264
Minnesota	118	267	328	460	79	70	124	118	2,829	4,406	5,039	7,499
Illinois	1	134	2	494	.09	38	.6	172	14	3,036	44	11,650
Indiana	1	138	2	495	.14	52	.3	268	26	3,015	54	11,617
Iowa		49		219	.16	17	1.1	75	1	1,182		4,119
Missouri	12	258	44	741	6	78	32	284	334	5,169	809	12,386
Ohio	4	166	13	543	.4	53	2.5	278	96	3,917	346	14,304
Kansas		39		178		8	.03	28	8	946	6	3,365
Regional total	337	1,645	863	4,561	196	595	421	1,962	7,022	35,940	15,614	92,876

Source: U. S. Forest Service, Forest Resource Report No. 14, 1958.

TABLE 11--Net annual growth, annual cut, and net volume of growing stock and sawtimber on commercial forest land in the North Central region, 1962

State	Net annual growth			Annual cut			Net volume		
	Growing stock	Sawtimber		Growing stock	Sawtimber		Growing Stock	Sawtimber	
	Sftwd. Hdw. (mil. cu. ft.)	Sftwd. Hdw. (mil. bd. ft.)		Sftwd. Hdw. (mil. cu. ft.)	Sftwd. Hdw. (mil. bd. ft.)		Sftwd. Hdw. (mil. cu. ft.)	Sftwd. Hdw. (mil. bd. ft.)	
Michigan	139 276 383 653	48 118 149 347	3,233 9,287	7,400 19,096					
Wisconsin	49 277 163 470	38 126 124 343	1,499 7,367	4,201 12,095					
Minnesota	110 280 361 513	68 67 179 149	3,607 6,195	6,560 8,959					
Illinois	1 84 1 208	.5 29 2 171	16 2,328	28 8,548					
Indiana	2 115 13 468	1 32 4 184	33 3,326	62 12,503					
Iowa	50 217	.4 15 2 73	4 1,640	6 6,188					
Missouri	15 167 55 427	6 64 27 308	338 4,683	879 11,733					
Ohio	7 148 17 586	3 58 13 254	114 4,503	409 16,368					
Kansas	30 142	.2 7 .6 33	9 1,149	10 4,270					
Regional total	323 1,427 993 3,684	165 516 501 1,862	8,853 40,478	19,555 99,760					

Source: U. S. Forest Service, Forest Resource Report No. 17, 1965.

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hardwood sawtimber reserves, if utilized to a greater extent, might maintain a more balanced forest resource in the long run. In the Central States, the two states of Illinois and Missouri are notable for decreases in net volumes of growing stock and sawtimber. The former decreased stocks of hardwood sawtimber by about three billion bd. ft. in the 10-year period.

Production of specific forest products from the annual cut of timber are shown on a regional basis in Tables 12 and 13. The first considers production from growing stock, while the second denotes production from live sawtimber. Since only the major products with which this study is concerned are considered, their total is somewhat less than the cut for all products.

In Table 14 output of major forest products is presented on a state basis. Here some measure of comparison can be made on production from specific states for specific products. For sawlogs, veneer logs, and pulpwood, output figures for 1952 and 1962 may be compared. The output of sawlogs in the North Central region declined by some 200 million bd. ft. This was caused by major reductions in output in Wisconsin and especially in Michigan. Minnesota, on the other hand, increased production. Output in all the Central States increased with the exception of Iowa and Kansas, where output remained essentially stable. Veneer log production declined nearly three million bd. ft. Decreases in production in Michigan, Wisconsin, and Missouri were not quite offset by increases in other North Central states. While output in Iowa and Kansas is not large in comparison to the other states, it should be noted that these states have more than doubled production in a 10-year period. Pulpwood production in

TABLE 12--Roundwood production from growing stock by product and region, 1962

State	Sawlogs (thousand bd. ft.)	Veneer logs (thousand bd. ft.)	Hardwood			Posts & poles (thousand pieces)	Piling (thousand lin.ft.)
			Pulpwood (thousand cords)	cooperage bolts (thousand bd. ft.)			
Michigan	289,500	21,760	990			2,742	260
Wisconsin	251,300	24,975	935	5,150		4,132	70
Minnesota	150,100	9,288	955	2,050		3,187	190
Lake States	690,900	56,023	2,880	7,200		10,061	520
Illinois	100,000	10,863	66	20,098		307	1,570
Indiana	127,100	12,388	52	4,100		889	
Iowa	42,450	8,267	19	2,850		549	
Kansas	16,500	5,276		2,150		242	
Missouri	216,600	4,608	12	18,525		7,545	5
Ohio	191,700	10,223	221	12,034		1,035	85
Central States	694,350	51,625	370	59,757		10,567	1,660
North Central Region	1,385,250	107,648	3,250	66,957		20,628	2,180

Source: U. S. Forest Service, Forest Resource Report No. 17, 1965.

TABLE--13--Timber cut from sawtimber by roundwood product and region, 1962

State	Sawlogs	Veneer logs (thousand bd. ft.)	Pulpwood	Misc. Industrial	Total timber cut(a)
Michigan	255,549	21,631	150,007	32,023	459,210
Wisconsin	221,665	24,825	142,672	35,404	424,566
Minnesota	123,734	9,232	142,772	24,983	300,721
Lake States	600,948	55,688	435,451	93,410	1,184,497
Illinois	96,894	10,863	25,548	26,253	159,558
Indiana	126,887	12,388	19,753	8,977	168,005
Iowa	40,792	8,267	7,380	4,794	61,233
Kansas	15,597	5,276	4,679	2,777	23,650
Missouri	205,260	4,608	4,679	67,188	281,735
Ohio	181,066	10,223	24,522	18,903	234,714
Central States	666,496	51,625	81,882	128,892	928,895
North Central Region	1,267,444	107,313	517,333	221,302	2,113,392

(a)Not including fuelwood and logging residues.

Source: U. S. Forest Service, Forest Resource Report No. 17, 1965.

TABLE 14--Timber products output, by state, 1952 and 1962

State	Sawlogs			Veneer			Pulpwood		Hardwood		Posts &		Piling
	1952	1962	1952	1952	1962	1962	1952	1962	1962	1962	poles	1962	
	(thousand bd. ft.)	(thousand bd. ft.)	(thousand bd. ft.)	(thousand bd. ft.)	(thousand bd. ft.)	(thousand bd. ft.)	(thousand cords)	(thousand bd. ft.)	(thousand bd. ft.)	(thousand pieces)	(thousand pieces)	(thousand lin. ft.)	
Michigan	482.7	319.0	36.2	21.8	744.6	1,090.0				3,520		260	
Wisconsin	332.1	277.0	27.0	25.0	565.3	1,060.0			5.5	6,035		70	
Minnesota	191.3	161.0	7.3	9.3	921.3	1,030.0			2.2	4,700		190	
Lake States	1,006.1	757.0	70.5	56.1	2,231.2	3,180.0		7.7		14,255		520	
Illinois	110.0	130.9	9.3	11.8	45.0	99.0		27.4		451		1,570	
Indiana	190.3	150.0	10.1	14.1	12.0	88.0		6.2		1,300			
Iowa	55.0	55.0	4.2	9.0	1.0	36.0		3.9		800			
Kansas	17.6	17.0	2.5	5.5				2.3		525			
Missouri	200.3	300.0	8.4	5.2	12.0	21.0		27.3		11,060		5	
Ohio	249.1	205.0	10.1	10.7	35.0	263.0		12.5		1,510		85	
Central States	822.3	857.0	44.6	56.3	105.0	507.0		79.0		15,646		1,660	
North Central Region	1,828.4	1,614.0	115.1	112.4	2,336.2	3,687.0		87.3		29,901		2,180	

Sources: 1952 figures from Forest Resource Report No. 14, U. S. Forest Service, 1958.

1962 figures from Forest Resource Report No. 17, U. S. Forest Service, 1965.

the region has increased by more than one-third. Large increases in the Lake States are significant, especially in Minnesota. Although smaller volumes are applicable in the Central States, proportionally, phenomenal increases in output have occurred in the 10-year period. Iowa increased output from 1,000 to 36,000 cords, while the output in Ohio increased from 35,000 to 263,000 cords.

THE FOREST PRODUCTS INDUSTRIES IN THE NORTH CENTRAL REGION

The manufacture of primary and secondary forest products in the North Central region forms a highly complex industrial pattern. Mill or plant size varies between extreme limits depending on the criteria used to measure economic activity. Capital investment ranges from a few hundred dollars to many millions, employment from two or three persons in small sawmills to several hundred in large pulp and paper mills, and value added by manufacture from a few hundred dollars to millions of dollars. One point all these productive enterprises have in common, however, is that they are dependent on a renewable natural resource--wood--derived mainly from within the region for their means of operation. How this wood is obtained and allocated is extremely important. The marketing of raw forest products can help explain the efficiency, capacity, activity, and the operation of the varied, complex forest-products industries.

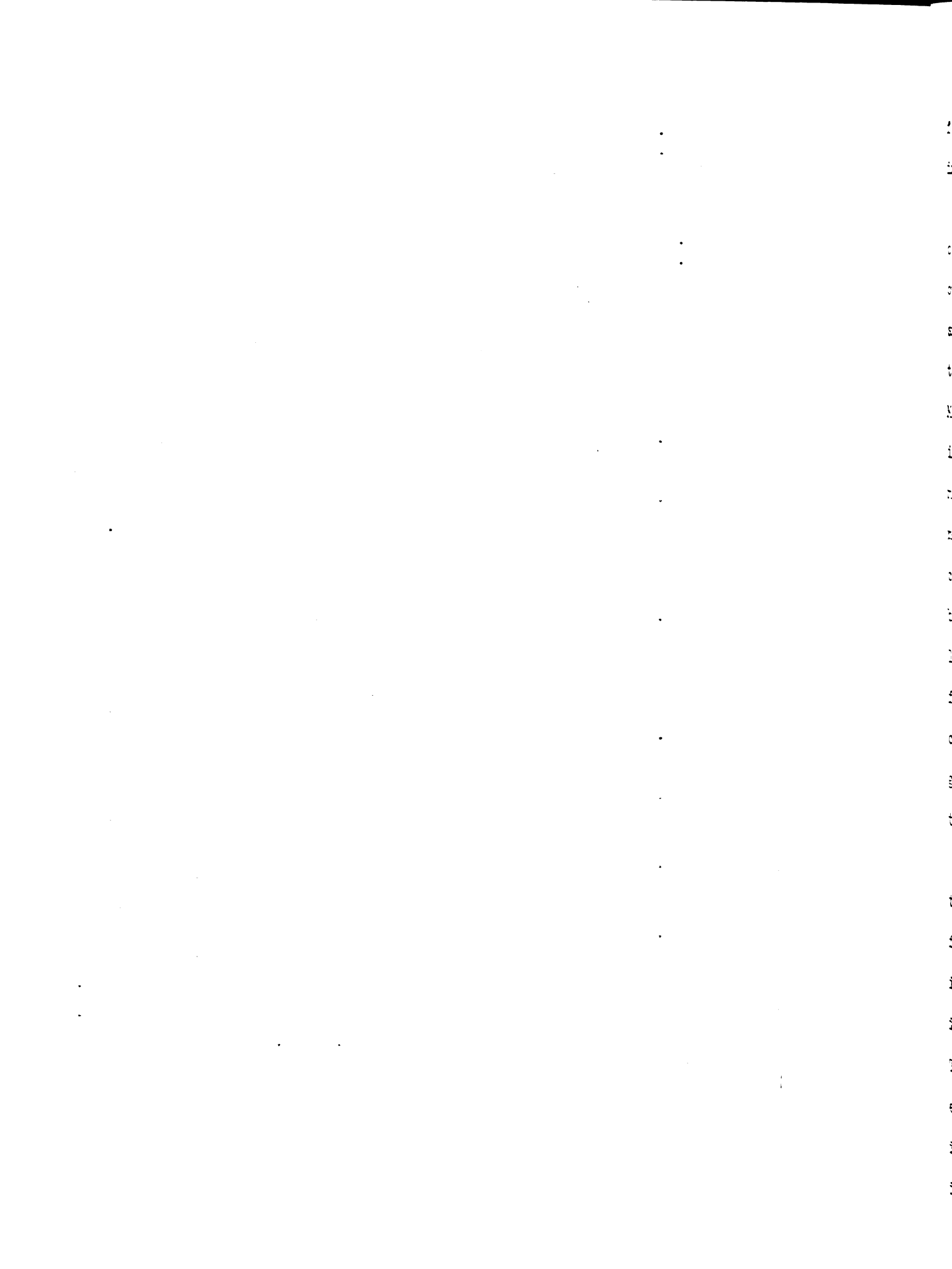
The 1958 Census of Manufactures enumerates the major active manufacturing establishments. It is by no means a complete tabulation as manufacturers (especially the smaller concerns) often move in and out of operation. Also, very small intermittently operating mills (i.e., small farm sawmills) do not receive classification as active establishments. Table 15 indicates the mills and plants in the North Central region and their comparison with national totals. The nine states contain more than a proportionate number of pulp and paper establishments, but less than a proportionate number of other types of mills. The region has 28.5 percent of all pulp and paper establishments, but only from 13 to 16 percent of other types of

TABLE 15--Wood products mills in the North Central region and United States, 1958

Type of mills	Mich.	Wisc.	Minn.	Ind.	Ohio	Ill.	Iowa	Mo.	Kans.	Regional total	U.S. total	Region as percent of U.S.	
						</							

(a) Mainly cooperage stock mills in the North Central region.

Source: U. S. Bureau of the Census, 1958 Census of Manufactures (Parts III and IV)



forest products plants and mills. No criteria are available to indicate the merits of this allocation.

Selected statistics concerning the wood-products industries of the North Central region are shown in Table 16. As in many other areas of the country, sawmills are plentiful in number but small in size. The average of six employees per sawmill indicates that there must be many small inefficient sawmills in operation. Many of these sawmills not only utilize the forest resource inefficiently, but they are a deterrent to a stable, efficient marketing system in that they hinder and disrupt the flow of raw material in many cases from more efficient uses. Other relative comparisons among the industries show that most establishments have between 20 and 100 employees. The pulp and paper complex is notably larger, with paper mills attaining the status of the giants in the field of wood utilization. Their large average employment figure, combined with a substantial number of establishments, denotes a great potential of influence in the marketing and utilization of the wood resource in the North Central region.

Total payroll figures in Table 16 are of little value in themselves, except to show absolute comparisons on expenditures for labor. However, if the total number of employees in an industry is divided into the corresponding payroll total, an indication of the average wage in a specific industry can be shown. This average wage can indicate to some extent the relative stability, efficiency, and soundness of the type of enterprise. That is to say it would be expected that the firmly established, more efficient industries would pay a higher average wage and use more permanent,

TABLE 16--Selected statistics for wood products manufacturers in the North Central region, 1958(a)

Type of product manufacturer	Number of estimates	Average number of employees per estimate	Payroll, average per employee (thousands of dollars)	Total payroll (thousands of dollars)	Value added by manufacture (thousands of dollars)	Value of shipments	Payroll as percent of value added by manufacture
Veneer & plywood plants	84	82	3.7	25,364	42,466	95,461	60
Veneer & plywood container plants	33	28	2.7	2,508	3,410	5,167	74
Wood preserving	50	36	3.8	6,933	14,990	37,306	46
Sawmills & planing mills	2,162	6	2.8	37,602	60,612	128,684	62
Hardwood dim. & flooring	65	47	3.4	10,576	15,477	35,442	68
Pulp mills	11	63	4.7	3,248	6,645	16,042	49
Paper mills	94	379	5.8	204,841	408,534	903,187	50
Paperboard mills	79	181	5.7	81,781	192,796	404,415	42
Building paper & board mills	58	95	5.1	28,371	56,449	117,344	50
Special products sawmills(b)	70	20	2.9	4,081	7,556	15,312	54
Cooperage mills	66	17	3.8	4,187	6,313	17,168	66

(a) Twelve states: Michigan, Wisconsin, Minnesota, Indiana, Ohio, Illinois, Iowa, Missouri, Kansas, South Dakota, North Dakota, and Nebraska.

(b) Mostly cooperage stock mills in the North Central region.

Source: U. S. Bureau of the Census, 1958 Census of Manufactures, MC58(2) - 24A, 24B, 24C, 26A.

highly skilled labor. The pulp and paper industry complex seems to fall ideally into this group. A relatively intermediate position is held by the veneer and plywood industry, the wood preserving industry, the hardwood dimension and flooring industry, and the cooperage industry. Notably lower in average wage is sawmilling. Both the sawmill and planing mill classification and the special products sawmill classification pay an average wage of less than \$3,000.

Value added by manufacture and the value of shipments are indicative of the relative importance of the industries in the economy of the North Central region. The difference, a lumping of costs (i.e., raw material and other production costs) is of only minor value for comparison purposes without a separation of the components. A measure of the degree of labor intensity is given for each industry in the form of payroll taken as a percent of the value added by manufacture. This is extremely useful in that it puts a "value" on labor or relates it to the value of the product. Labor plays a very vital role in value added by manufacture in three secondary industries: notably, veneer and plywood container plants, hardwood dimension and flooring plants, and cooperage plants. It plays a slightly lesser role in the primary manufacturing of veneer and plywood and in sawmilling and planing. Labor and machine capital seem to be of about equal importance in special products sawmills, in building paper and board mills, in paper mills and in pulp mills. Capital equipment plays a relatively greater role in wood preserving plants and paperboard mills.

Regional Timber Production

Statistics are available to denote estimates of timber production, but regional differentiation, product type, and type of measurement make it difficult to present meaningful regional and within region estimates and comparisons.

Table 17 considers undifferentiated roundwood, measured in cubic feet, harvested regardless of intended product. It relates state, regional, and U. S. production. Several relationships are noteworthy. U. S. timber production has decreased slightly in the four years shown. Eastern United States produces almost two-thirds of total U. S. production. However, the East has had a slight decline during the four-year interval, while the West has shown a slight increase. The North Central region has shown a net decline; production in the Central States increased 7.1 percent but this was offset by a larger 10.3 percent decline in the Lake States. North Central regional production declined slightly, moving from 8.7 percent to 8.6 percent of total national production. All of the Central States, with the exception of Kansas, increased production. All the Lake States decreased production, with the largest decreases coming in Michigan and Wisconsin.

The trends that have been indicated would be more meaningful if some indication of product differentiation could be shown.

Table 18 gives such a breakdown, indicating the major timber products into which the cubic foot-roundwood volumes are diverted in the North Central region. In the Lake States production in all major timber products declined, with the exception of pulpwood which increased

TABLE 17--Estimated volumes of round timber products harvested,
North Central region and other selected areas, 1954
and 1958

State or region	1954	1958
	(thousands of cubic feet)	
Ohio	62,350	68,000
Indiana	52,100	55,050
Illinois	43,850	45,650
Iowa	25,550	32,300
Missouri	107,450	112,100
Kansas	12,750	12,450
Central States	304,050	325,550
Michigan	227,550	193,150
Wisconsin	210,350	188,250
Minnesota	167,150	161,250
Lakes States	605,050	542,650
North Central region	909,100	868,200
Eastern United States	6,596,250	6,142,050
Western United States	3,831,300	3,904,100
United States	10,427,550	10,046,150

Source: The Economic Importance of Timber in the U. S., U. S.
Department of Agriculture, Forest Service, Misc. Publication, 941, 1963.

TABLE 18--Estimated volume of round timber products harvested in the North Central region, by state and product for 1954 and 1958

State	Sawlogs		Veneer logs		Pulpwood		All other products			Total	
	1954	1958	1954	1958	1954	1958	1954	1958	1954	1958	1958
	(million cubic feet)										
Ohio	30.9	30.7	1.8	1.0	4.8	10.4	24.8	25.9	62.3	68.0	
Indiana	23.1	23.8	1.8	1.2	1.3	1.8	26.0	28.2	52.2	55.0	
Illinois	14.7	16.8	1.6	1.7	3.8	4.8	23.8	22.4	43.9	45.7	
Iowa	6.2	7.5	0.8	0.8	0.3	1.1	18.4	22.8	25.7	32.2	F
Missouri	40.3	47.4	1.5	0.4	0.1	0.9	65.6	63.4	107.5	112.1	
Kansas	3.0	2.2	0.4	0.7	-	-	9.3	9.6	12.7	12.5	
Michigan	62.6	45.2	5.3	2.4	61.6	68.4	98.0	77.2	227.5	193.2	
Wisconsin	48.6	42.0	4.7	2.8	51.0	61.0	106.0	82.4	210.4	188.2	
Minnesota	28.0	23.5	1.2	1.2	64.3	69.6	73.6	67.0	167.1	161.3	
Total	257.4	239.1	19.1	12.2	187.3	218.0	445.5	398.9	909.3	868.2	

Source: The economic importance of timber in the United States, U. S. Department of Agriculture, Forest Service, Mics. Publ. 941, 1963.

substantially. The pattern in the Central States is more diverse. Net production increased; but increased and decreased production on an individual product basis varied by state. Pulpwood, in general, increased throughout the Central States. Veneer log production decreased in Ohio, Indiana and Missouri, but increased in Illinois and Kansas. Sawlog production declined slightly in Kansas, remained stable in Ohio and Indiana, but increased in Illinois, Iowa and Missouri. Production of other products declined in Illinois and Missouri but increased in the other states.

Unofficial estimates of the U. S. Forest Service can be used to show production of the five product types covered in this investigation for the states in the North Central region using specific units of measurement that are common to each product. These are shown over an eight-year period--1950 to 1958--in Table 19. A more meaningful relative importance is also shown through the listing of the total dollar value of the products, based on local points of delivery, in Table 20.

Production and value of the major forest products in the North Central region changed considerably between 1950 and 1958. Sawlog production declined, but the value of production increased. The increase in the average per unit value of sawlogs was about \$5. This may or may not have quality and/or availability implications, but the possibility is highly reasonable. Production and value of veneer logs and cooperage bolts decreased. The per unit value of veneer logs increased \$22. Such a large increase strongly supports the contention of a growing scarcity of quality veneer logs. Pulpwood bolts showed a substantial increase in production. Total value, however, did not

TABLE 19--Output of selected primary forest products for the North Central region, 1950 and 1958

	Sawlogs		Veneer		Cooperage		Pulpwood		Posts		Poles		Piling	
	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958
	(million bd. ft.)	(million bd. ft.)	(million bd. ft.)	(million bd. ft.)	(million bd. ft.)	(million bd. ft.)	(thousand std.cords)	(thousand std.cords)	(million pieces)	(million pieces)	(thousand pieces)	(thousand pieces)	(thousand lin. ft.)	(thousand lin. ft.)
State	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958
Michigan	470	330	65	20	-	-	570	895.7	9	5.8	29	17	3	261
Wisconsin	350	300	35	23.8	1.5	4	445	825.3	10	6.2	6	39	131	134
Minnesota	180	190	7	9	2.5	.6	800	903	7.5	6	65	175	66	219
Ohio	285	225	16	8.4	11	8.5	16	140.5	9	3.5	-	-	-	40
Indiana	185	180	18	10.9	4	2.3	11	24.6	4.3	3.6	-	-	-	20
Illinois	105	110	11	14	14	28.2	42	64.2	8	2.5	-	-	190	320
Iowa	55	60	2	6.8	1	1.5	-	15	5	1.2	-	-	-	-
Missouri	325	320	10	3	60	30	11	12	14	16.3	10	250	50	30
Kansas	17	20	-	7.5	-	.3	-	-	.8	1.5	-	-	-	-
North Central region	1,972	1,735	164	103.4	94	75.4	1,895	2,877.3	67.6	46	110	481	440	1,024

Source: Unofficial estimates of the U. S. Forest Service.

TABLE 20--Total value of selected primary forest products produced in the North Central region at local points of delivery, 1950 and 1958

	Sawlogs		Veneer logs		Cooperage bolts		Pulpwood		Posts		Poles		Piling	
	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958
State	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958
	(millions of dollars)													
Michigan	18.8	15.5	6.5	2.7	-	-	10.3	14.4	2.5	1.3	.07	.05	-	.08
Wisconsin	13.3	12.9	2.8	2.8	.07	.24	7.1	12.5	3.0	1.55	.01	.12	.05	.03
Minnesota	6.1	7.2	.5	.7	.09	.03	14.4	15.4	2.0	1.2	.2	.53	-	.07
Ohio	9.1	9.0	1.1	.8	.9	.77	.2	1.9	3.1	1.9	-	-	-	.02
Indiana	6.7	8.1	1.7	1.6	.3	.14	.1	.3	1.5	2.0	-	-	-	.01
Illinois	3.4	4.4	.7	1.1	1.2	1.27	.5	.8	2.8	1.4	-	-	.05	.13
Iowa	1.8	2.1	.1	.7	.1	.09	-	.2	2.0	.6	-	-	-	-
Missouri	8.8	9.6	.8	.3	4.8	2.55	.1	.16	5.2	N.A.	.02	.38	.01	.01
Kansas	.5	.5	-	.6	-	.03	-	-	.3	N.A.	-	-	-	-
North Central region	68.5	69.3	14.2	11.3	7.46	5.12	32.7	34.66	16.9(a)	9.95	.3	1.08	.11	.35
Average per unit value	35 (M bd.ft.)	40 (M bd.ft.)	87 (M bd.ft.)	109 (M bd.ft.)	79 (M bd.ft.)	68 (M bd.ft.)	17.25 (std.cord)	15.87 (std.cord)	.25 (piece)	.22 (piece)	2.73 (piece)	2.25 (piece)	.25 (linear ft.)	.34 (linear ft.)

(a) Posts total without Missouri and Kansas.

- = negligible

Source: Unofficial estimates of the U. S. Forest Service.

N.A. = Not Available

increase at a comparable rate, with the result that the average price per cord decreased slightly over \$1. Post production has decreased, and the average per unit price has remained relatively stable. Pole production increased substantially, but the average per unit price decreased slightly. Piling production also increased substantially, but the average per unit price increased only a little.

Regional Consumption of Timber by Primary Industry

A few comments are important concerning consumption of timber by the primary forest products industries in the North Central region. Regional production figures cannot be taken as a source of raw material inputs for primary industry. They indicate available inputs, but apparent consumption or an estimate of raw material receipts can only be made by considering exports and imports of material on a regional basis. For sawlog inputs into sawmills this is not considered highly relevant. The sawmill industry, on a percentage basis, has several hundred times the number of production units that the other industries possess, and spatially these units have a wide distribution, providing productive sawmilling enterprises wherever the raw material appears in any degree of abundance. Similarly, the relatively low value of sawlogs, their weight and bulk, impose severe limitations on shipping. Hence, the production of sawlogs in the North Central region, allowing minor adjustments for exports and imports, should give a fair indication of the apparent consumption of sawlogs by sawmills. Few, if any, statistics are available to fully support this, but the industry sampled in the North Central regional study upon which this dissertation is based

does, in fact, fit the situation.

Veneer log production and the consumption of veneer logs by primary manufacturers in the North Central region varies considerably. Transportation of veneer logs across the region's boundaries is fairly extensive. For this reason production is rarely the same as consumption. This pattern is partially a result of the high relative value of veneer logs which can justify long shipping distances. In general, as shown by Table 21, the Lake States, the Central States, and the whole North Central region consume more veneer logs than they produce. In the Lake States, Michigan and Wisconsin are the big producers and consumers; Minnesota produces and consumes only a minor volume in comparison. Both Michigan and Minnesota are net exporters, and Wisconsin is a net importer. Wisconsin is the largest producer, and by far the largest consumer of veneer logs in the Lake States. In the Central States, Ohio, Illinois, and Missouri and Iowa are net exporters of veneer logs. Indiana, while appearing to produce veneer logs in quantities somewhat similar to adjacent Central States, is a net importer of veneer logs. Indiana's consumption is more than the other Central States combined.

Pulpwood has traditionally been a product that has been transported long distances in comparison with other forest products. It has a lower relative value than veneer logs, but price alone cannot be considered as a significant reason for distance shipped. Ease of handling of a bulky product (in comparison to logs) and the spatial distribution of the large primary manufacturing plants or pulp mills must also be considered. Production and consumption of pulpwood varies widely in the North Central region. A detailed

TABLE 21--Veneer log production and consumption in the North Central region, for selected years, 1952-1963

State	Years											
	1952			1954			1956			1958		
	P*	C**	P	C	P	C	P	C	P	C	P	C
(millions of bd. ft.)												
Michigan	40.2	28.5	34.5	21.9	39.7	23.6	20.0	12.6	18.5	12.1	15.3	7.6
Wisconsin	30.0	59.5	27.1	59.6	30.4	66.9	23.7	43.1	25.5	51.3	25.2	41.9
Minnesota	8.1	1.9	10.4	2.2	9.0	1.6	9.0	1.8	10.1	1.1	10.0	3.2
Lake States	78.3	89.9	72.0	83.7	79.1	92.1	52.7	57.5	54.1	64.5	50.5	52.7
Ohio	-	-	-	-	8.7	5.7	8.0	6.1	11.1	6.7	8.6	5.0
Illinois	-	-	-	-	8.4	6.9	9.1	8.3	11.8	9.7	9.4	9.2
Indiana	-	-	-	-	9.4	28.8	9.9	25.0	12.4	32.3	16.6	34.9
Missouri & Iowa	-	-	-	-	15.4	8.7	13.5	8.3	15.8	8.2	12.6	8.1
Central States(a)	-	-	-	-	41.9	50.1	40.5	47.7	51.1	56.9	47.2	57.2
North Central region					121.0	142.2	93.2	105.2	105.2	121.4	97.7	109.9

* P = production

** C = consumption

(a) Figures not available for Kansas until 1963; production then given as 5.5 million bd. ft., and consumption as negligible.

Source: Lake States Forest Experiment Station, Tech. Notes, No.--284, 403, 442, 496, 497, 567, 609, Central States Forest Experiment Station, Tech. Note No. 112, Tech. Papers No. 166, 189; and U. S. Forest Service, U. S. Department of Agriculture, Research Note WO-6, December 1964.

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description follows, but a simple graphical analysis shows the result for the Lake States and the Central States. A regional graph is not shown, for fear of misrepresenting the minor importance of the Central States and the extreme importance of the Lake States in formulating the total regional picture on any meaningful volume basis.

The consumption of pulpwood in the Central States is minor in comparison to the Lake States, but an increase from under 100,000 cords in 1950 to 500,000 cords in 1963 has occurred. Figure 2 indicates this trend which peaked in 1962. The downward trend is explained largely by the fact that chipped slabs and edgings and other primary and secondary plant by-products have come into wide use for pulping between 1961 and 1963. In 1961 only two percent of total pulpwood consumption was in the form of residues; by 1963 the use of residues had increased to over 15 percent. Considering the relatively low use of pulpwood in comparison to the Lake States, it is not surprising that other fibrous materials serve as a basic raw material in many cases.

Lake States production and exports of pulpwood are shown in Table 22 and the trend in production and apparent consumption of pulpwood are shown in Figure 3. The Lake States use considerable imports, but have been relying more heavily upon locally produced wood in recent years. In 1951 imports reached 980,000 cords, or 38 percent of total consumption. By 1963, they had declined to about 394,000 cords, or 10 percent of total consumption.

The three Lake States form an important but diverse production and consumption pattern. Wisconsin has traditionally imported more

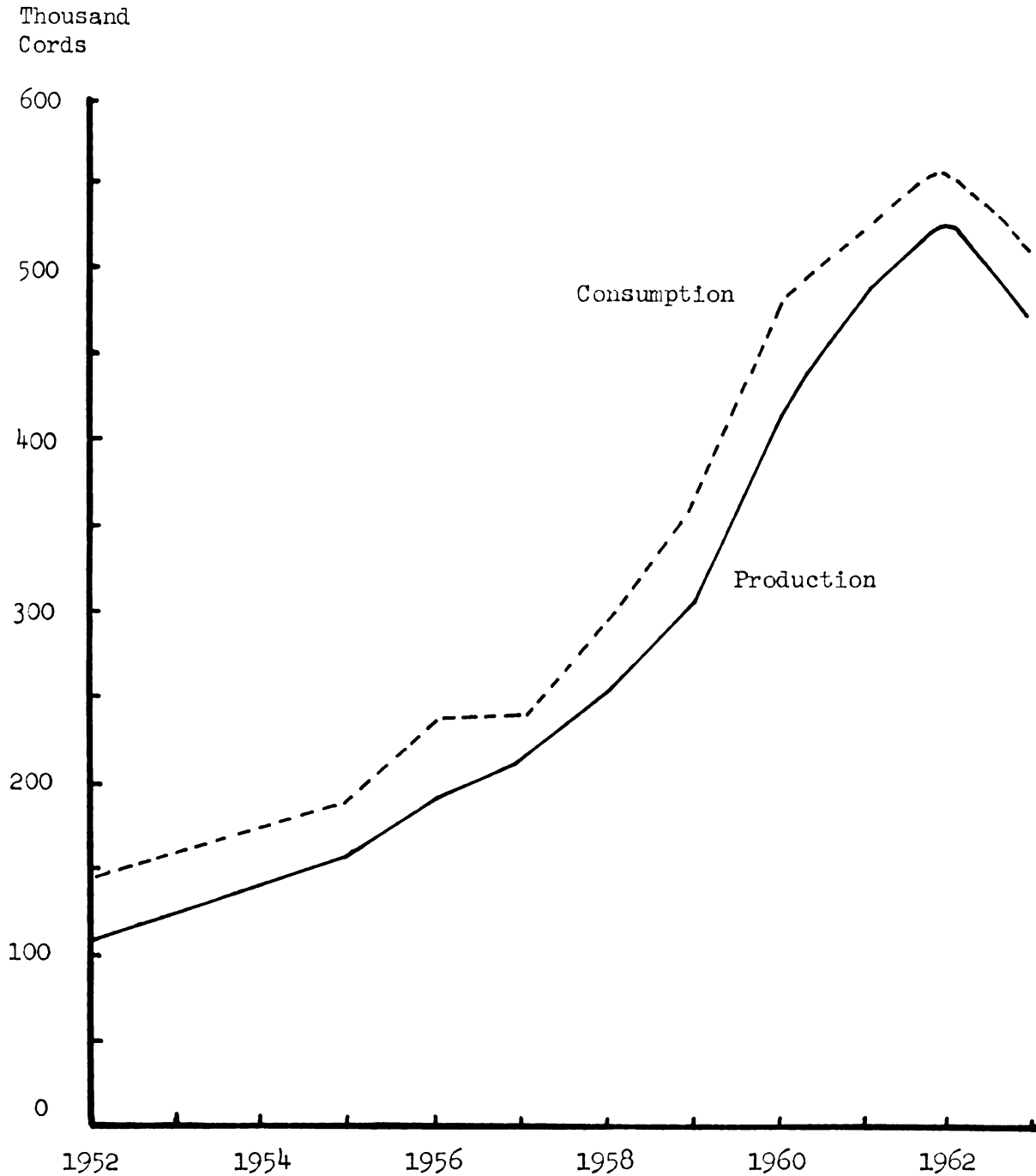


Figure #2--- Pulpwood production and consumption in the Central States, 1952-1961.

Source: Central States Forest Experiment Station, U. S. Forest Service, Columbus, Ohio. 1952 data from Misc. Release 13. 1955-1961 data from Tech. Paper 168. 1962-1963 data from Research Note CS-23.

TABLE 22--Production and exports of pulpwood in Michigan, Wisconsin and Minnesota, 1958-1962

State and year	Total production	Retained for use in state	Exported to:			
			Minn.	Wisc.	Mich.	Other
(thousands standard cords)						
Minnesota, 1958	903	626		267	7	3
1959	994	721		251	7	15
1960	1,048	711		308	-	29
1961	968	712		240	-	16
1962	979	753		216	1	9
1963	1,062	827		221	-	14
Wisconsin, 1958	828	811	14		-	3
1959	972	915	21		3	33
1960	1,052	1,008	19		-	25
1961	1,078	1,050	14		1	13
1962	1,140	1,114	15		1	10
1963	1,204	1,176	20		2	6
Michigan, 1958	900	458	-	442		-
1959	1,053	603	-	447		3
1960	1,237	727	-	510		-
1961	1,106	628	-	464		14
1962	1,223	677	-	540		6
1963	1,264	669	-	595		-

Source: 1958-1962 figures: Lake States Forest Experiment Station, Research Paper LS-5, 1963.

1963 figures: Lake States Forest Experiment Station, Research Note LS-48, 1964.

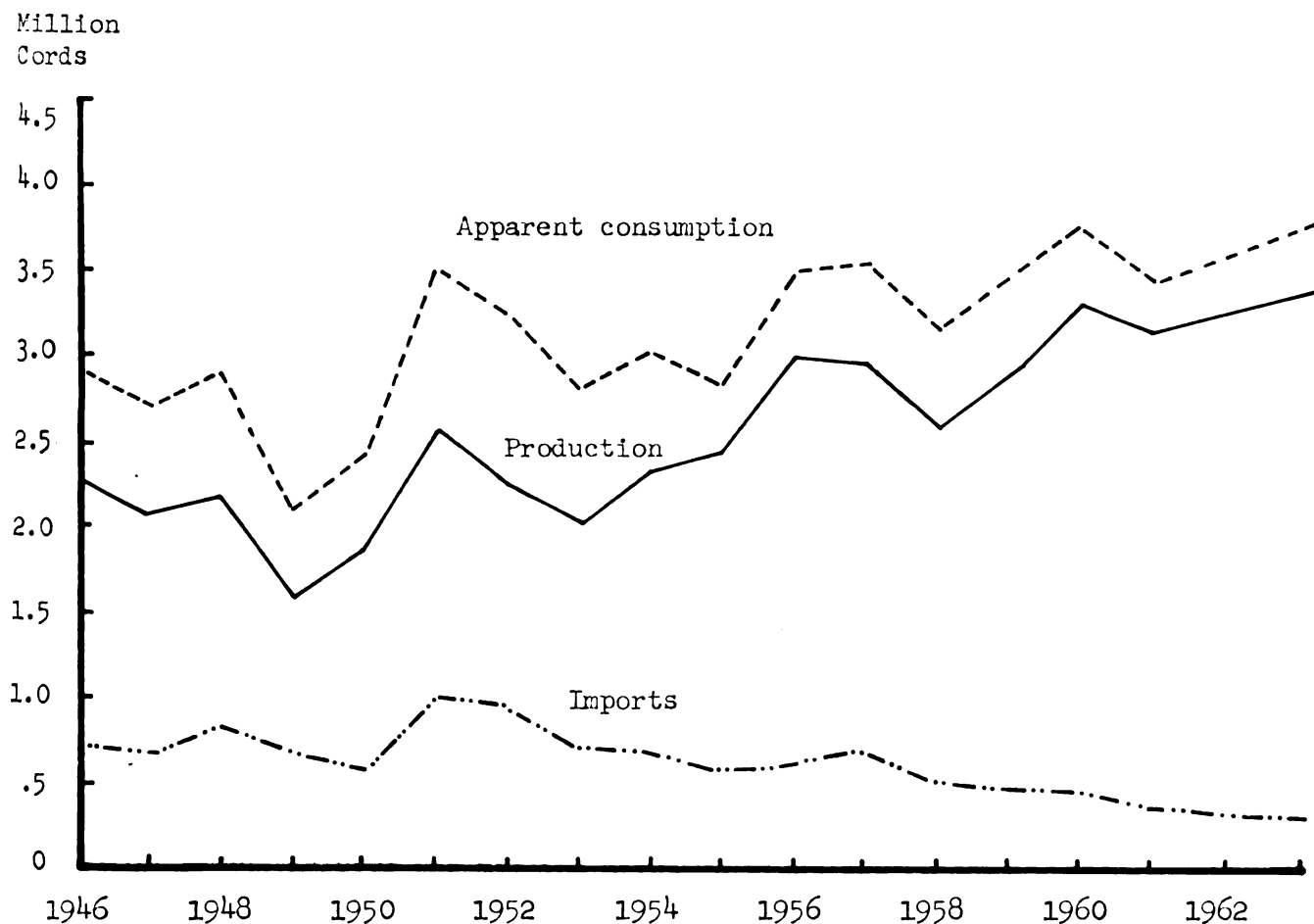


Figure 3---Pulpwood production, imports and apparent consumption in the Lake States, 1946-1963.

Source: Lake States Forest Experiment Station, U. S. Forest Service, St. Paul, Minn., Tech. Note series, and Research Note LS-48.

pulpwood than it produces. This trend reversed for the first time in 1961, when increasing production passed declining imports. Curtailment was noticeably sharp in imports of Canadian pulpwood. Wisconsin is noticeably the largest consumer of pulpwood in the Lake States. Wisconsin consumption averaged about two million cords annually during the 1950's, whereas Minnesota and Michigan consumed in the vicinity of three-quarters of a million cords each. As one would expect, both Michigan and Minnesota produce more pulpwood than they consume, with the excess production going to Wisconsin. The Upper Peninsula of Michigan is expected to remain a stable supply area for Wisconsin mills, but imports from Minnesota to Wisconsin show signs of decreasing. Canadian imports to all three states have shown a declining trend. Production has shown a generally increasing trend; it exceeded 1.2 million cords in both Wisconsin and Michigan in 1963, but remained more nearly constant at slightly over one million cords in Minnesota in 1963.

Production and consumption of posts, poles and piling cannot be placed in the same frame of reference as veneer logs, sawlogs, and pulpwood without making some adjustments. Total production, after considering imports and exports, cannot be considered as being consumed by a primary forest-products industry. Posts, poles, and piling, recognized as cut forest products, are in themselves final consumer products. Additional manufacturing of the product, or the first time this woods product enters a mill or plant (i.e., wood preserving in most cases) could be considered secondary manufacturing. Thus, production and consumption of these products must be first considered without reference to consumption by a

primary manufacturing industry. The residual not consumed in the raw form that undergoes preservation will be considered along with the outputs to primary manufacture in the next section even though accepted terminology speaks of this as secondary manufacturing.

Production figures for posts, poles, and piling are extremely hard to compile on a regional basis. Local differences in defining what constitutes the product, personal home production and consumption, the various criteria used by public and private agencies in compiling statistics--these all contribute to inconsistencies in estimating production and consumption.

Manthy and James, using unofficial estimates, Census of Agriculture data, and various reports, estimate 1958 production at slightly less than 40 million posts, about 294,000 poles, and 25,000 pieces of piling in the North Central region. Unofficial estimates of the United States Forest Service indicate that production may be as high as 46 million posts and that Missouri pole production, depending on classification criteria, could range from 63,000 pieces to 250,000 pieces. If Manthy and James' figure of 63,000 pieces is increased to 250,000 pieces, the Forest Service estimate, regional production can be set at 480,000 pieces in 1958. The unofficial Forest Service estimate of piling produced is approximately one million linear feet. Manthy and James, using state report figures and Census data, approximate this with a production figure of 25,000 pieces.

Considering all the various estimates, agreement can be seen on a decrease in post production from about 67 million posts in 1950 to some 40 million in 1958. Missouri, the region's larger

producer, contrary to the trend in other states, has increased production. This increase in output reflects an increased demand by wood preservation plants for shortleaf pine posts. Pole production, limited mainly to the Lake States (historically a long-time producer of a large-size pole product) and to Missouri (a more recent producer of diverse sized poles), has increased. On an individual state basis Michigan production decreased from 29,000 pieces in 1950 to 17,000 pieces in 1958; Wisconsin increased production from 6,000 pieces in 1950 to 39,000 pieces in 1958; and Minnesota increased production from 65,000 pieces in 1950 to 175,000 pieces in 1958. Missouri, depending on the various estimates considered and the pole size classification used, increased production from about 10,000 poles in 1950 to either 63,000 pieces or 250,000 pieces in 1958. Piling production estimates are available both in linear feet and by the piece. Production in the Lake States has fluctuated widely between 1950 and 1960, and since 1958 a slight downward trend is noticeable. In 1958, Michigan produced 261,000 linear feet, Wisconsin 134,000 linear feet, and Minnesota 219,000 linear feet. Estimates, in number of pieces, indicate that the decline from 1958 to 1960 has been as follows: Michigan from 7,000 to 6,750 pieces, Wisconsin from 3,750 to 1,000 pieces, and Minnesota from 5,500 to 4,000 pieces. The Central States by comparison produce very little piling, with one notable exception. Illinois produced 320,000 linear feet of piling in 1958 as compared to 190,000 linear feet in 1950. The total regional production of over one million linear feet in 1958 can be divided as follows: 600,000 linear feet in the Lake States and

400,000 linear feet in the Central States.

Only limited statistics are available to denote cooperage bolt production; estimates of consumption by cooperage stock mills, to denote inter-regional and inter-state exports and imports, are not available. However, previous research on timber marketing in the North Central region indicates that cooperage bolts are not trucked significant distances to cooperage stock mills, and that the mills are mainly portable and locate close to their raw material supply (35). Thus, although some flow occurs across regional boundaries and between states, production estimates do give some measure of consumption trends by cooperage stock mills.

The regional production of cooperage bolts is composed mainly of white oak bolts for tight cooperage; less than 10 percent of the region's production was from other species for slack cooperage. Regional production was estimated to be 94 million bd. ft. in 1950, 75.4 million bd. ft. in 1958, and 107.7 million bd. ft. in 1960. The Central States (as can be seen in Table 23) produce most of the region's cooperage bolts, with the Lake States production accounting for about only 10 percent of the total. The leading producers in the Central States have consistently been Missouri, Illinois, and Ohio. The 1962 production and consumption decreases are thought to be partially the effect of curtailed industry production while awaiting the outcome of proposals to change federal regulations regarding the re-use of whiskey barrels. The most drastic reduction in production and consumption came in Missouri. As might be expected, cyclical fluctuations and demand are strongly linked to the production of new charred white oak whiskey barrels.

TABLE 23--Cooperage timber production and consumption in the Central states for selected years, by state

	1950	1952	1958	1960		1962	
State	P(a)	P	P	P	C(b)	P	C
	(million bd. ft.)						
Ohio	11.0	9.4	8.5	13.6	14.7	12.4	12.7
Indiana	4.0	3.0	2.3	6.9	6.8	6.2	7.0
Illinois	14.0	11.2	28.2	27.4	26.9	25.0	25.4
Iowa	1.0	3.5	1.5	3.5	4.4	3.9	2.8
Missouri	60.0	52.5	30.0	40.9	40.7	27.3	28.0
Kansas	-	-	0.3	5.0	(c)	2.3	(c)
Total	90.0	79.6	70.8	97.3	93.5(d)	77.1	75.9(d)

(a) P = production

(b) C = consumption

(c) Consumption unknown

(d) Omits Kansas

Sources: 1950 and 1958 estimates are unofficial records of the U. S. Forest Service. 1952 estimates are from various publications of the Central States Forest Experiment Station, U. S. Forest Service. 1960 and 1962 estimates from the Central States Forest Experiment station, Note 153, 1962, and Research Note CS-22, 1964.

Regional Production of Wood Products by Primary Industry

Consumption of timber products by the primary manufacturing industries can now be related to the outputs of wood products by these industries. Those industries of relatively minor importance, and for which production estimates are limited, will be mentioned first: Also, as previously noted, posts, poles and piling will be considered here regardless of the fact that the final consumer product is often a raw wood product not undergoing primary manufacture in a plant or mill, and that further manufacture of this product (namely preservation treatment) is considered by many as secondary manufacture.

Posts, poles and piling production estimates are mainly derived from previous North Central regional research (33). Only about 10 percent of the posts produced in the region receive preservation treatment. Preservers, moreover, frequently import posts from the West and South. The North Central region, although increasing the number of local poles receiving preservation treatment, is a net importer of poles. In 1959 about three times as many poles were preserved as were produced within the region. Again, imports came mainly from the West and South. The region is also a net importer of piling, and treating plants in general handle about two and one-half to three times as much piling as was produced in the region. The volume of piling treated has been increasing. However, fluctuations in local production indicate that a stable flow of imports is balanced with total annual demand by increasing or decreasing preservation of local material. Local piling production is thus

dependent on increases in construction activity.

Cooperage stock production statistics are not available, but some evidence is available from previous regional research to indicate the distribution of cooperage stock produced in the region. In the preceding section it was pointed out that cooperage bolts are produced close to cooperage stock mills, and that the North Central region does not import significant amounts of cooperage bolts. However, exports of cooperage stock out of the region and inter-state flow within the region are of major importance. Available data indicate that while considerable cooperage stock is used for barrel manufacture within the region, large quantities are exported to foreign countries, other regions, and adjacent states. Reduced bulk, ease of handling, and a relatively high value (about \$600 per thousand staves and the common price of \$3 per set of heading) allow for long distance shipping of the product. Major importing areas include the British Isles, Canada, and closer to the region, the barrel-making and distilling companies centered in Kentucky. In 1958 cooperage timber production in the region approached 75 million bd. ft. and increased to almost 108 million bd. ft. in 1960. Output of cooperage stock can only be estimated by blowing up sample figures on known production from sampled tight cooperage stock mills, which is at best a rough measure. On this basis, the Central States, responsible for nearly all the tight cooperage stock production, probably produced in the vicinity of 15 million staves and a half million sets of heading in 1958.

Estimates of veneer and plywood production by mills in the North Central region are not readily available. Some indications are

present, however, to point out general production patterns. Hardwood plywood market shipments are shown in Table 24. This one sector of the industry seems to be substantially increasing production. Exact estimates of veneer production are not available. Mills in the North Central region did ship some 32.7 million dollars worth of veneer, which at 1958 prices indicates that production could have approached 1.5 billion square feet of commercial and utility grades of veneer. Container mills shipped about 5.2 million dollars worth of veneer containers. This would reflect a production figure of about 500 million square feet at 1958 prices.

The production of plywood and veneer in the North Central region is heavily concentrated in two states. Wisconsin and Indiana accounted for about 85 percent of the value of all veneer and plywood shipped from North Central mills in 1958. Wisconsin is the leading state in the nation in the production of hardwood plywood, and is responsible for over one-half of the regional production. Indiana is the leading state in the nation in the production of hardwood veneer, and is responsible for over one-half of the veneer produced in the region.

Most of the wood pulp manufactured within the North Central region is produced and consumed in vertically integrated plants which manufacture paper or paperboard. However, paper and paperboard mills are more than twice as numerous as pulpmills. A regional deficit in wood pulp production necessitates that paper and board mills import about 40 per cent of the wood pulp consumed within the region. This wood pulp comes from other regions of the United States, Canada and Europe. The 1958 Census of Manufactures indicates wood pulp production and consumption for the North Central region (Table 25).

TABLE 24--North Central region hardwood plywood market shipments
(except container and packaging type), 1954-1960

Year	Veneer core	Other core	All hardwood plywood
(millions of square feet)			
1954	69.8	22.4	92.2
1955	94.0	28.4	122.4
1956	93.0	26.6	119.6
1957	90.0	24.5	114.6
1958	85.5	22.5	107.0
1959	103.2	27.5	130.7
1960	90.5	27.0	117.4
1961	113.1	25.7	138.8
1962	134.6	28.5	163.1

Source: U. S. Bureau of the Census, U. S. Census of Manufactures, 1958, Special Report MC58(s) --2, 3.

TABLE 25--Production, consumption and net imports of wood pulp, North Central region, 1958

State	Production	Consumption	Net imports
	(thousand tons)		
Michigan	390	797	407
Wisconsin	1,181	1,282	101
Ohio	120	638	518
Indiana	(	150	(
	(126		(57
Illinois	(	33	(
East North Central	1,817	2,900	1,083
West North Central	528	861	333
North Central region	2,345	3,761	1,416

Source: U. S. Bureau of the Census, 1958 Census of Manufactures.

It should be noted that waste paper and other fibrous material plays just as important a role as wood pulp as a source of raw material for paper and board mills. In 1958 the region's paper and board industry consumed about 3.9 million tons of waste paper and other fibrous material. This was mainly in the Central States; the Lake States paper and board mills depended largely on wood pulp. The Lake States wood pulp production varies widely as to type. Sulphate, sulphite, ground wood, and semi-chemical pulps are all produced in quantity. The Central States wood pulp production is not as extensive; here production is mainly semi-chemical, or defibrated and exploded pulps. Production of wood pulp in the North Central region has increased from about one million tons in the 1930's to nearly three million tons

in 1961. Despite this gain, the region has declined drastically in relative importance. The West and South, producing about the same amount in the 1930's, increased production about five million tons and over fifteen million tons, respectively, in 1961.

Lumber production in the North Central region, while not a large percentage of national production, is of considerable importance. Hardwood lumber production is specifically important, and in 1961 the region produced about 18 percent of all hardwood lumber produced in the United States. Also, in 1961 the region produced five percent of the national output of eastern softwood lumber, which totals 1.3 percent of all softwood lumber produced in the United States. Over-all, the North Central region is responsible for about 4.5 percent of national lumber production.

The Lake States produced about 712 million board feet of lumber in 1958 which declined slightly to about 691 million board feet in 1961. Central States production in 1958 amounted to some 845 million board feet. Tables 26 and 27 give production figures for selected years from 1939 to 1963 for the North Central region and the United States, respectively. Yearly comparisons may be of interest in many cases, but general production trends can best be pictured graphically as shown in Figures 4 and 5. Here it should be noted that national lumber production has shown considerable fluctuation from year to year, but regardless of fluctuation, showed increased production during the early 1950's. A decrease in production occurred in 1957 and again in 1960, but 1962 and 1963 estimates indicate that production has again increased.

Eastern softwood lumber production shows, comparatively, little

TABLE 26--Lumber production in the North Central region for selected years, 1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939(a)	479.9	1,333.7	1,813.6
1940(a)	477.3	1,401.8	1,879.1
1941	585.5	1,637.3	2,222.8
1942	535.2	1,599.0	2,134.2
1943	444.7	1,439.3	1,884.0
1944(a)	485.0	1,692.9	2,177.9
1945	360.1	1,359.6	1,719.7
1946(a)	438.2	1,496.3	1,934.5
1947(a)	521.1	1,660.0	2,181.1
----	----	----	----
1954	348.8	1,315.1	1,663.9
1955(b)	193.0	1,386.0	1,579.0
1956(b)	256.0	1,418.0	1,674.0
1957(b)	436.0	1,269.0	1,705.0
1958	350.2	1,206.7	1,556.9
1959(b)	(c)	(c)	1,674.0
1960(b)	384.0	1,194.0	1,578.0
1961(b)	349.0	1,088.0	1,437.0

(a)Includes Nebraska.

(b)Includes North Dakota and Nebraska

(c) Not available.

Sources: 1939 to 1945 estimates from Steer, Henry B., Lumber Production in the United States, 1799-1946, Misc. Publ. No. 669, U. S. Department of Agriculture, Forest Service. 1946 and 1947 estimates from U. S. Bureau of the Census, 1947 Census of Manufactures, MC-24A. 1948 to 1954 estimates from U. S. Bureau of the Census, 1954 Census of Manufactures, MC-24A-16, and various estimates of the U. S. Forest Service. 1955 and 1956 estimates from U. S. Bureau of the Census, Facts for Industry, M24T-06 and M24T-07. 1957 estimates from U. S. Bureau of the Census, Current Industrial Reports, M24T (59)-1. 1958 estimates from, U. S. Bureau of the Census, 1958 Census of Manufactures. 1959 estimates from U. S. Bureau of the Census, Current Industrial Reports, M24T(59)-1. 1960 and 1961 estimates from U. S. Bureau of the Census, Current Industrial Reports, M24T(61)-1. 1962 and 1963 estimates from U. S. Department of Commerce, the U.S. Industrial Outlook for 1963.

TABLE 27--Lumber production in the United States for selected years, 1939-1963(a)

Year	Eastern softwood	Total softwood (billions of bd. ft.)	Hardwood	All lumber
1939	11.3	23.3	5.5	28.8
1940	12.4	25.6	5.5	31.1
1941	14.2	29.9	6.7	36.6
1942	13.9	29.5	6.8	36.3
1943	11.9	26.9	7.4	34.3
1944	10.2	25.2	7.8	33.0
1945	9.0	21.1	7.0	28.1
1946	11.5	25.9	8.3	34.2
1947	11.6	27.9	7.5	35.4
----	----	----	---	----
1949	(b)	(b)	(b)	32.2
1950	(b)	(b)	(b)	38.0
1951	10.6	29.5	7.7	37.2
1952	10.6	30.2	7.2	37.4
1953	9.7	29.6	7.2	36.8
1954	9.3	29.3	7.1	36.4
1955	(b)	29.8	7.6	37.4
1956	(b)	30.2	8.0	38.2
1957	(b)	27.1	5.8	32.9
1958	7.8	27.4	6.0	33.4
1959	(b)	30.7	6.4	37.1
1960	7.1	26.7	6.3	33.0
1961	7.0	25.9	6.0	31.9
1962	(b)	(b)	(b)	32.9
1963	(b)	(b)	(b)	34.3

(a) 1960-1961 not including Alaska; 1963 figure is an estimate.

(b) Not available.

Sources: Same as for Table 26.

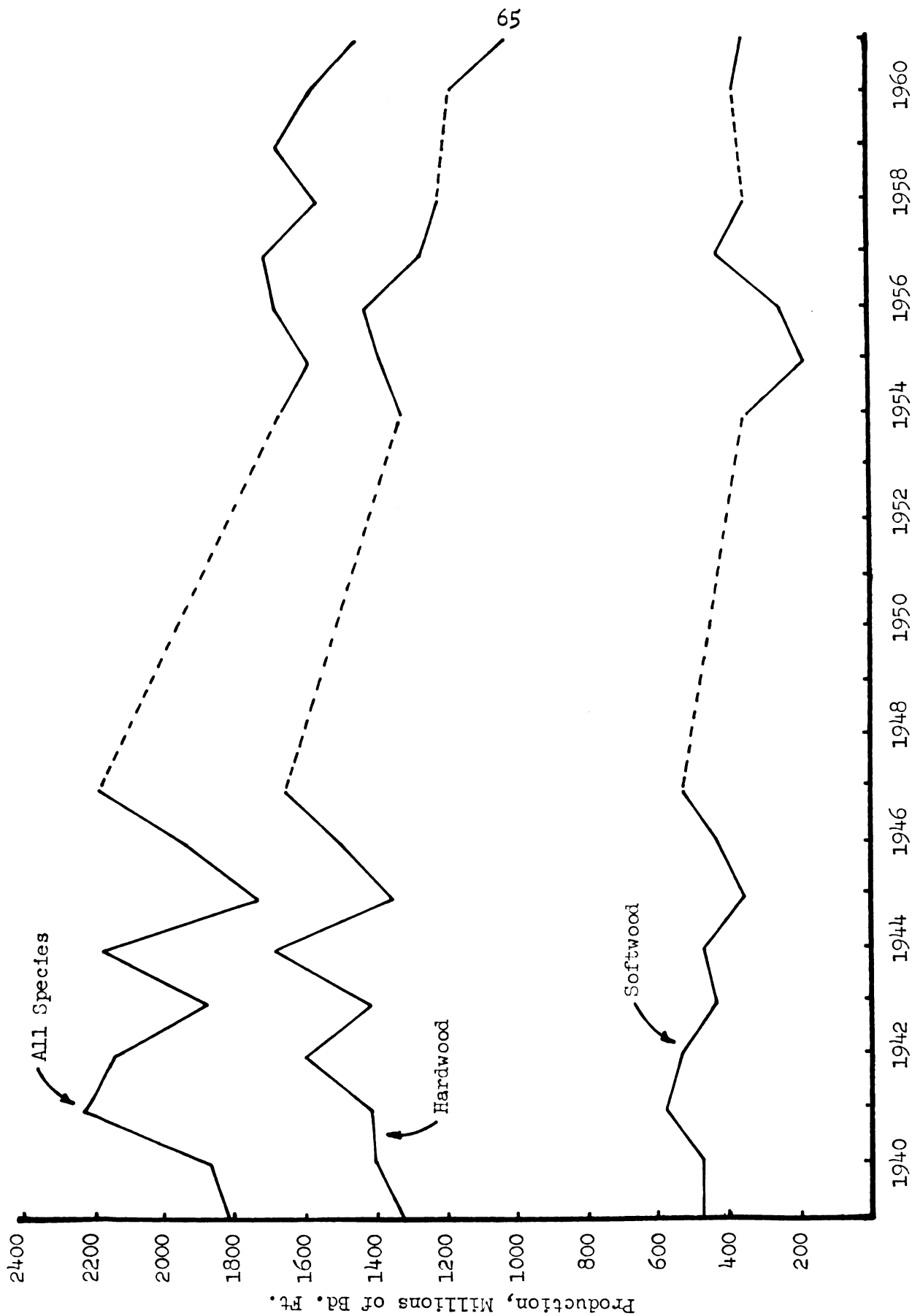


Figure 4--North Central Region lumber production for selected years, 1939-1961.

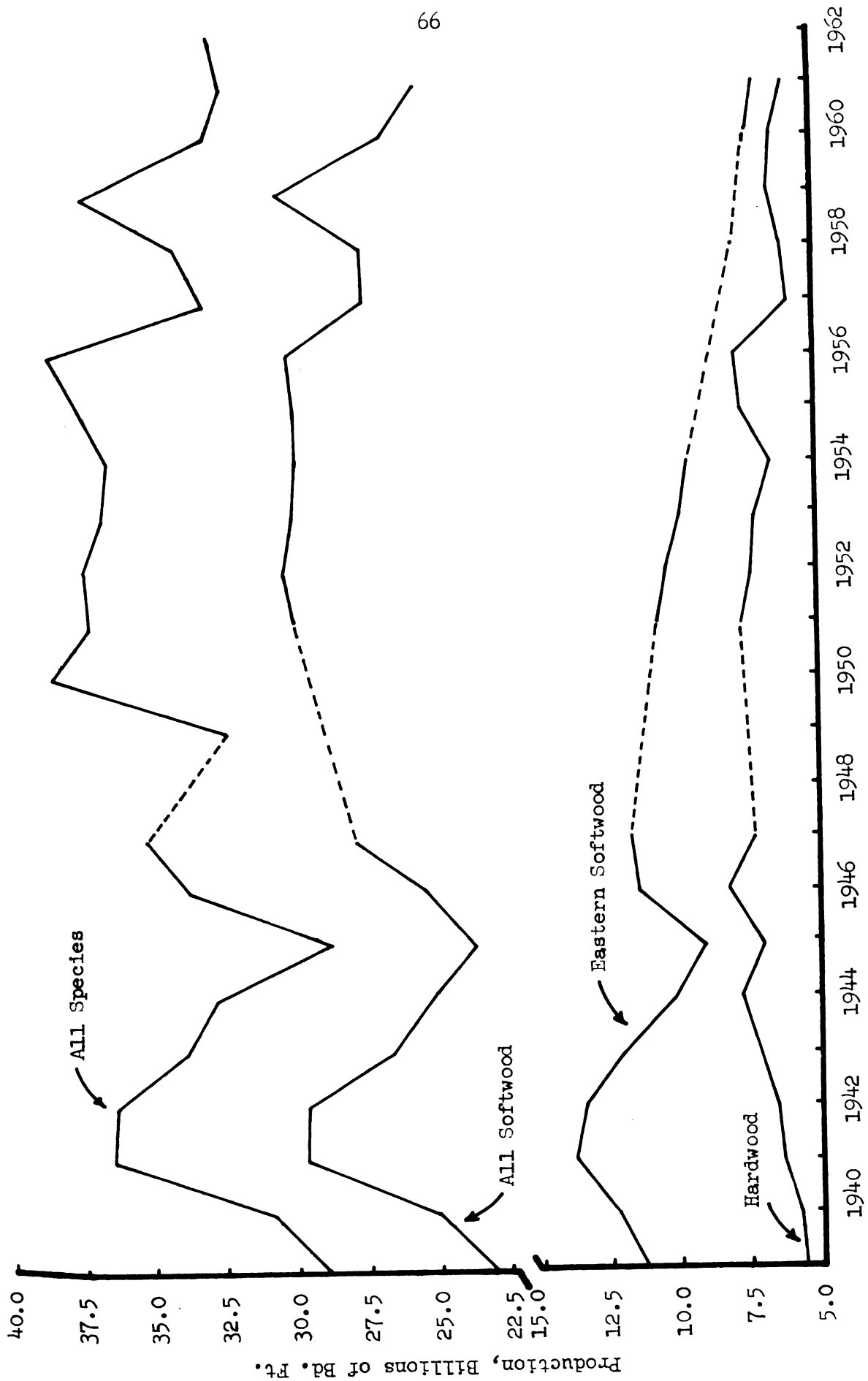


Figure 5-- U. S. lumber production for selected years, 1939-1961.

fluctuation and has declined. Hardwood lumber production shows slightly more fluctuation in yearly production. In general, slight increases in production occurred in the 1940's, but a slight general decrease in production occurred during the 1950's and early 1960's.

In the North Central region, lumber production has notably declined since the 1950's, with most of the decline coming in hardwood production. Softwood lumber production declined up to 1955, but increased from 1955 to 1957. Production then remained relatively stable at slightly less than 400 million bd. ft.

The nine states comprising the North Central region vary widely in their contribution to total regional lumber production. Briefly, the percentages of regional production of both hardwood and softwood lumber, by state, for the most recently available year are shown below:

State and Year	Percentage of total regional lumber production for latest available year	
	Softwood	Hardwood
	(percent)	
Michigan (1961)	14.6	20.4
Wisconsin (1961)	11.1	17.4
Minnesota (1960)	18.4	7.6
Illinois (1961)	2.6	10.4
Indiana (1961)	2.0	10.8
Missouri (1958)	7.7	23.8
Ohio (1961)	4.0	15.9
Iowa (1958)	2.8	3.3
Kansas (1958)	1.1	0.8

Lumber production figures for each state in the North Central region for selected years from 1939 are shown in the Appendix in

Tables 99 through 107. In general, lumber production has fluctuated widely through the years. In the Lake States the trend for both hardwood and softwood lumber production has been one of a decline. One exception is notable: the increase since 1958 in hardwood lumber production in Minnesota resulting in greater hardwood lumber production than softwood production by 1960. The trends for the three Lake States are depicted graphically in Figures 6, 7, and 8. Hardwood lumber production has taken precedence over softwood lumber production in every state within the region. Michigan, Wisconsin, Missouri and Ohio are the major producers of hardwood lumber. In the Central States, increases of several hundred percent in softwood lumber production are noticeable since the 1940's, with the exception of Missouri. In hardwood lumber production, recent increases are evident in Illinois and Missouri. Indiana has continued to decrease its production, as have Ohio and Iowa. Some limited evidence is available to indicate that Kansas is slowly increasing production.

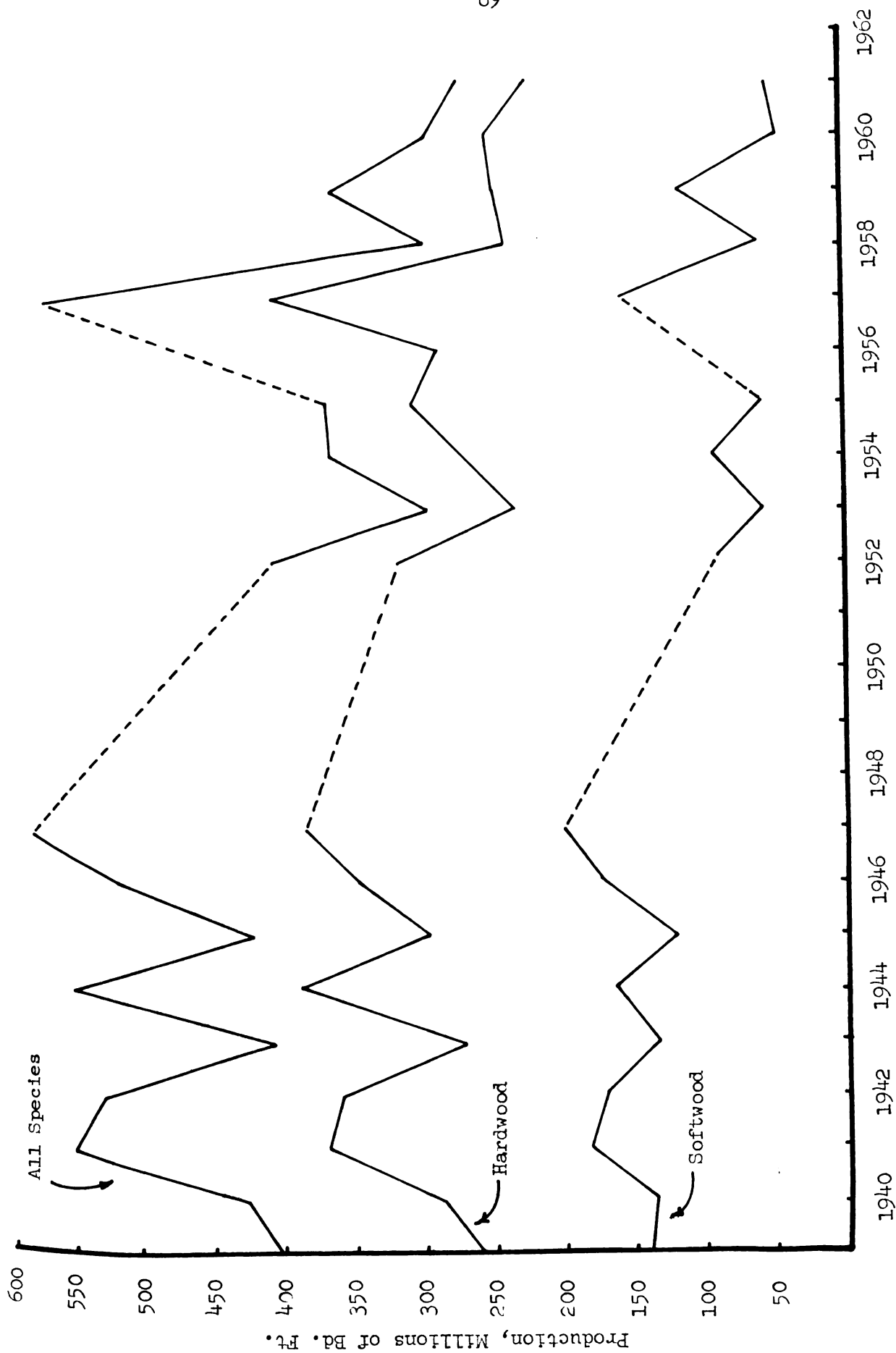


Figure 6-- Michigan lumber production for selected years, 1939-1961.

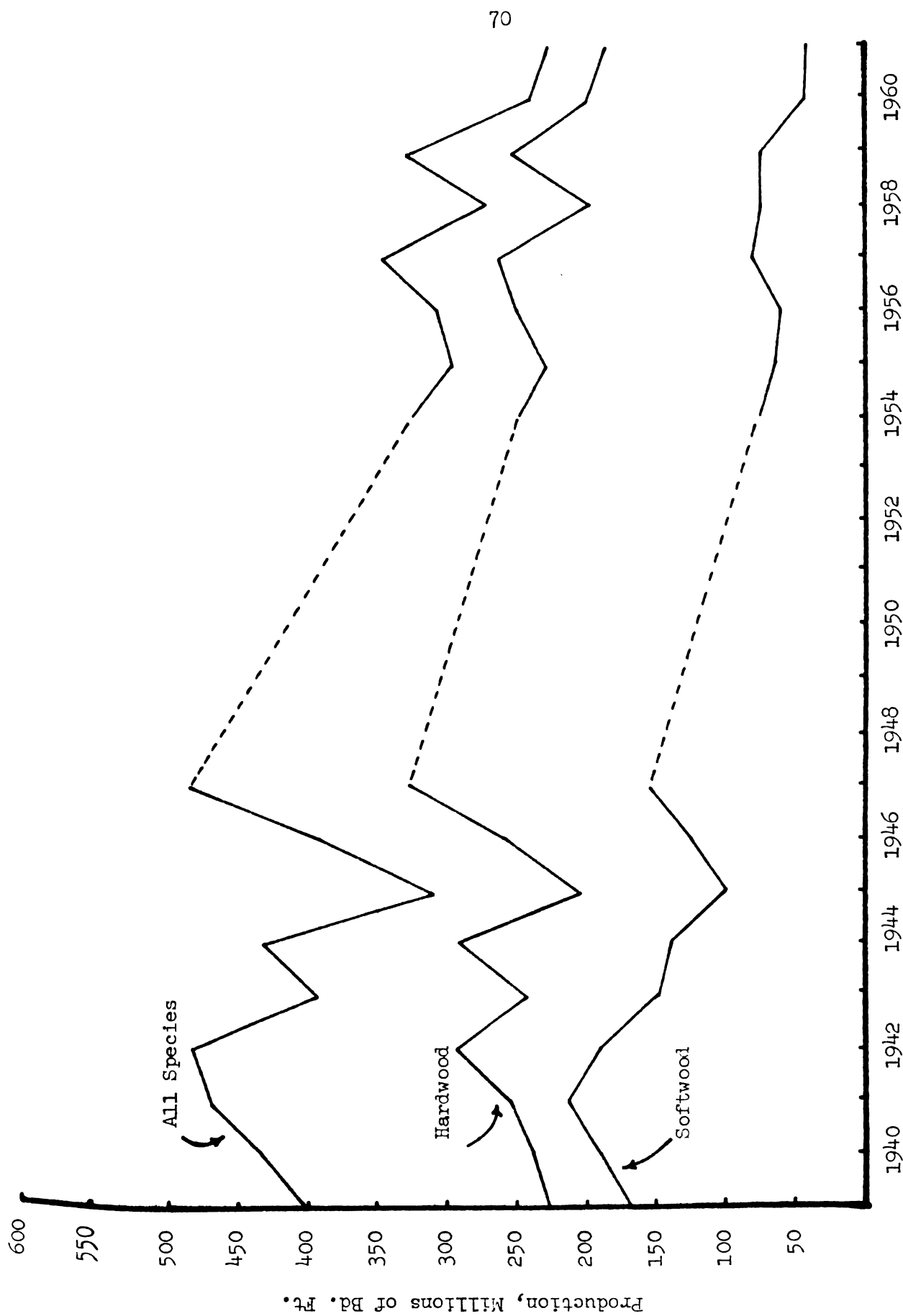


Figure 7--- Wisconsin lumber production for selected years, 1939-1961.

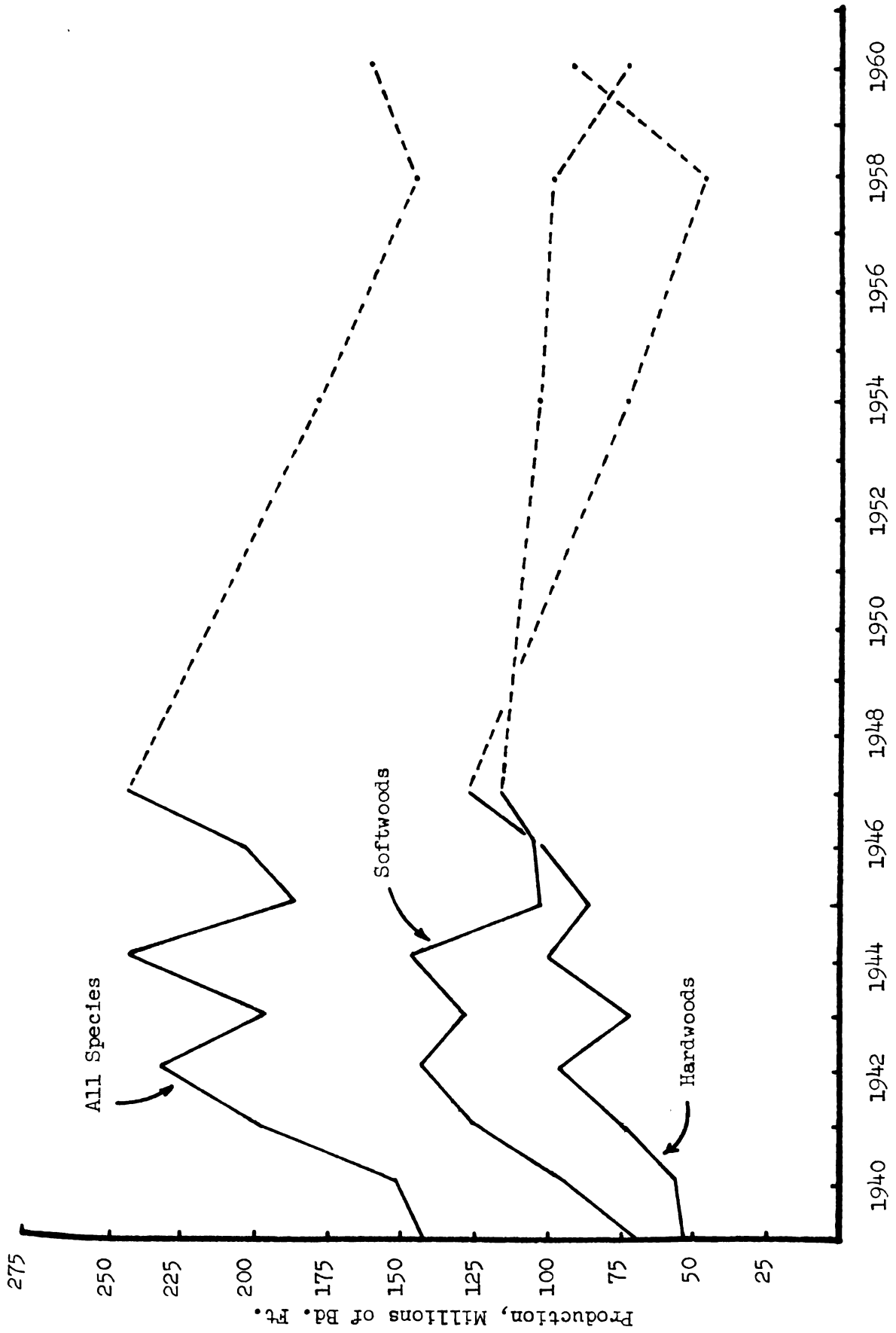


Figure 8-- Minnesota lumber production for selected years, 1939-1960.

LANDOWNERSHIP SOURCES OF WOOD

Timber products cut by firms in the North Central region are somewhat concentrated as to landownership source, depending on the specific product. In general, slightly more timber products, proportionately, are cut from private land than from public land. This is indicated by Table 28. Volume of product is reported for the year 1959, while ownership was considered for the year 1963. Table 28 summarizes the ownership of commercial forest land in the region and compares this with the actual percent of volume cut in the study areas by product. For the region as a whole, farm ownership includes 40 percent of the classified commercial forest. Excepting pulpwood in the Lake States and cedar posts in Michigan (the former depending more heavily on public land and the latter on other private) the remaining timber products cut in the region's study areas are dependent heavily on farm land. A greater proportion of timber in the sampled areas is coming from lands classified as farm than from other ownerships.

Production on private lands is mostly attributable to lands not under any form of intensive forest management. This situation does not present special problems in the short run, but in the long run, there is a question as to whether increasing timber requirements can be met. An increasing shift to utilization of timber on public land may possibly meet the future demands for timber. However, the risk is very high that public lands may not be able to meet the required production without sacrificing their higher level of management, thus precipitating even further reductions in sustained timber output.

TABLE 28--Landownership sources of timber products cut in the study areas of the North Central region, 1959(a)

Landownership	Ownership of commercial forest land 1963			Type of product				
	Central Lake		Region	Pulpwood		Sawlogs		Cooperage
	sts.	sts.		Central	Lake	Region	Region	
	(percent of total)			sts.	sts.	(percent of volume)		
Own land	1(b)	6(b)	4(b)	0	(c)	15	9	1
Farmer	64	26	41	87	12	45	60	87
Other private	27	27	27	6	21	21	27	9
Nat. Forest	6	14	11	)	20	10	3	2
State Forest	2	15	10	)	21	)	)	1
Other public	0	12	7	)	12	) 9	) 1	0
Unknown	--	--	--	--	14	--	--	--
Total	100	100	100	100	100	100	100	100

(a)Sawlogs for the year 1960.

(b)Only land owned by forest industries. Percentages of volume to the right include both forest industries and producer owned land.

(c)No estimate

Source: Ownership of commercial forest land from the Appendix, Forest Resource Report No. 17, U. S. Forest Service, 1965.

Over 90 percent of the pulpwood harvested in the Central States comes from private land, and nearly all of this is from farm holdings. In the Lake States, however, more pulpwood is derived from public land, despite the fact that private ownership is more extensive in area than public ownership.

Sawlog production in the North Central region is concentrated primarily on private land. Inventories of sawtimber on public forests are limited; depletion of timber in the past, combined with the time restrictions imposed by forest management, has limited present production.

Veneer log production is, similarly, heavily concentrated on private land with most of the production coming from farm land. An even larger proportion of cooperage logs and bolts comes mainly from farm holdings. Timber quality is a severely limiting factor in veneer and cooperage log production. Evidently, the quality needed is most readily available, at the present time, from farm holdings in the North Central region.

Posts and poles production by land ownership sources, is shown in Table 29. Cedar posts in Michigan and Wisconsin are produced mainly from private land. "Other" private land supplies as much, if not more, of the cedar poles cut than farm land. About one-third of the post production comes from public land. Pine posts in Missouri are derived from all types of private ownerships, with only slightly more than 10 percent coming from public lands. In Ohio, locust posts, both for fence and highway use, are cut on private lands, predominantly farm holdings.

An evaluation of the data collected in sample areas of the North

TABLE 29--Landownership sources of posts and poles produced in selected study areas of the North Central region, 1959

Landownership	Ownership of commercial forest land, 1963					Type of product			
	Mich.	Wisc.	Mo.	Ohio		Cedar posts	Pine posts and poles	Locust posts	
	(percent of total)					Mich.	Wisc.	Mo.(a) (percent of volume)	Fence Highway (Ohio)
Own land	8(b)	6(b)	2(b)	1		0	6	26	1 0
Farmer	20	41	62	56		21	33	42	52 93
Other private	39	20	26	36		52	27	19	20 7
Nat. forest	13	12	9	2		2	8	11	0 0
State forest	19	4	1	4		24	14	2	0 0
Other public	1	17	0	1		1	12	0	0 0
Unknown	--	--	--	--		--	--	--	27 --
Total	100	100	100	100		100	100	100	100 100

(a) Production in Missouri, but by both Illinois and Missouri firms.

(b) Only land owned by forest industries. Percentages of volume to the right include both forest industries and producer-owned land.

Source: Ownership of commercial forest land from Timber Trends in the United States, Forest Resource Report No. 17, U. S. Forest Service, Washington, D.C., 1965.

Central region indicates that the raw material for the region's timber industries is being cut mainly from lands in private ownership. Furthermore, the percentage of the volume coming from private land, and especially farm land, is higher proportionately than the percentage of total commercial forest that private land represents. One exception is noteworthy. Pulpwood in the Lake States is cut mainly on public lands which represent about 40 percent of the commercial forest area.

PATTERNS OF RAW MATERIAL ASSEMBLY
IN THE WOOD PRODUCTS INDUSTRY

The Pulp and Paper Industry

The chapter on Land Ownership Sources of Raw Material shows that pulp mills in the Central States receive less than 10 percent of their supply from public land, with more than 90 percent coming from private holdings. In the Lake States, some two-thirds of the supply comes from public land. Localized timbersheds are common in the Central States, with pulpwood and other fibers being drawn from within 20 to 100 miles of the mill. In the Lake States, timbersheds are larger and, often, not localized. Minnesota mills reach out over 100 miles; Michigan mills, about 235 miles; and Wisconsin mills, about 475 miles.

Both truck and rail transportation of the raw material is common in the Lake States, but trucking predominates in the Central States. Average truckhaul distances reported by Lake States mills in 1959 ranged from 12 to 160 miles. The average in Minnesota was 28 miles; in Wisconsin, 33 miles; and in Michigan, 71 miles. Truck hauls in 1959 averaged about 50 miles in the Central States and seldom exceeded 100 miles. The modes of transportation used in the Lake States are shown below in Table 30. Wisconsin makes heavy use of rail transport and Michigan has a significant percentage of pulpwood shipped by water.

Table 30--Mode of transportation by which pulpwood was delivered to sampled Lake States mills, 1959

Study area	Truck	Railroad	Water	Total
	(percent of volume)			
Michigan	67	23	10	100
Wisconsin	27	70	3(a)	100
Minnesota	56	44	--	100
Lake States	38	58	4	100

(a) Combination of water and rail.

Source: (34)

Pulp mills obtain their raw material from three general sources: (1) mill-produced, (2) independent producers, or (3) pulpwood dealers. The functions and sub-classifications of these agents are discussed in other chapters. Lake States mills depend mainly on producers (57 percent) for their supply, but receive 26 percent and 16 percent from dealers and self-production, respectively. In the Central States, all but about 14 percent of the supply comes from producers; the latter comes from dealers.

Points of delivery are discussed in the various agent chapters, but it can be noted that for pulpwood in general, the delivery pattern is fairly complex. Most of the supply arrives directly at the mill storage yard by truck, but large shipments are received by rail (or water in Michigan) from concentration points, regardless of agent source or the complexities of agreements between mill and supplier.

The Veneer Industry

About 95 percent of the veneer log production in the North Central region comes from private land. Mills in the North Central region have large timbersheds, and the average procurement radius is 245 miles. Lake States and west Central States mills have slightly smaller timbersheds than east Central States mills. Face veneer mills have larger timbersheds (average radius of 312 miles) than container veneer mills (average radius of 72 miles). In general, the larger the mill, the larger the timbershed.

Both truck and rail are used to transport raw material to face veneer mills. Container veneer mills do not use rail transportation. Large face veneer mills, especially those in the western part of the region, rely heavily on rail transportation. Mills in the northern and eastern parts of the region rely heavily on delivery by truck.

Veneer mills obtain their raw material from several sources. The container veneer industry purchases raw material locally and tends to compete with the sawmill industry. Most of the supply comes from producers, but a minor fraction is self-produced. Agent source of quality veneer is shown in Table 31:

Table 31--Agent source of quality veneer logs, 1959

Sub-region	Producer	Dealer	Mill	All Sources
	(percent of mill requirements)			
Mich., Wisc., Minn.	75	16	9	100
Ohio, Ind., Ill.	41	16	43	100
Mo., Kan., Iowa	71	13	16	100

Most of the raw material used arrives directly at the mill log

yard by truck. Substantial amounts are picked up roadside by mill trucks. An important point to note is that it is difficult to classify a supplier who owns a sawmill as a producer or dealer in veneer logs. If the logs are actually produced by the sawmill owner he is a producer, but if they are sorted from logs produced by someone else, then the sawmill owner becomes a dealer in veneer logs. Sawmills are the source of a large portion of the veneer logs sold to veneer mills. Nearly one-half of the veneer "producers" interviewed are also small sawmill operators.

The Sawmilling Industry

In the North Central region about 80 percent of the sawmilling industry's supply of logs comes from private lands, mostly from farm lands. Timbersheds for sawmills are relatively small in size, except where walnut is involved. Sawmills specializing in walnut will go considerable distances for their raw material; in Kansas, 128 miles or more. In the North Central region, sawmills reach out about 37 miles at most to secure their raw material.

Nearly all sawlogs arrive at the mill by truck. Only a minor portion of the volume is skidded directly to portable sawmills. The average trucking distance to mills in the North Central region is 15.8 miles.

Sawmills obtain their raw materials either with their own crews or from producers. Only 10 percent of the sampled volume was obtained by other means (i.e., dealers logging and hauling under contract, etc.). Some 42 percent of the volume was accounted for by employees of the sawmills, and 48 percent by producers.

The Cooperage Stock Industry

About 89 percent of the cooperage timber comes from farm woodlands, eight percent from "other" private land, and three percent from public land.

Cooperage stock mills need a raw material of high quality that is relatively expensive. They have, therefore, larger timber sheds than sawmills. On the average, their radius of supply area is 85 miles. However, the smaller size, portability, and scattered distribution of cooperage mills (regardless of the fact that grade cooperage bolt logs sometimes bring a better price as cooperage material than as veneer material) has resulted in smaller timber sheds than is characteristic of the veneer industry.

Cooperage bolts are delivered to the mill by truck. The maximum truck hauling distance is, on the average, 106 miles. Average truck hauling distance is 41 miles.

Cooperage stock mills obtain most of their raw material in the form of cooperage bolts delivered to the mill by producers. Producers supply 62 percent of the total volume, and dealers three percent. Several of the producers could probably be classed as dealers since they are sawmillers who sort out cooperage material and sell it to cooperage mills. Point of delivery is almost always directly to the cooperage mill. In some cases, however, the cooperage mills have their trucks visit local sawmill log yards to pick up cooperage quality material.

The Post, Pole and Piling Industry³

Cedar posts in Michigan and Wisconsin are obtained mainly from private land, but significant numbers of posts come from public land. Pine posts and poles in Illinois and Missouri are mainly obtained from private lands (some 87 percent), mostly from farm lands. Ohio fence and highway posts come mainly from farm lands. Piling may come from any landownership source, but is generally a by-product of a stumpage purchase for other raw forest products.

Size of timbershed presents an exceedingly complex picture, as there is no one specific type of primary manufacturer. Cedar posts may be utilized without further manufacture, but are also important to fence companies. Treating plants, conventionally considered the primary point of manufacture, usually do not treat cedar.

Fence companies in Michigan have timbersheds from about three counties for the smaller companies up to several counties in both the Upper and Lower Peninsulas for the largest company. Pine posts and poles treated in Illinois and Missouri are obtained locally as well as from great distances. Much of the supply is shipped in by rail from other states. In Ohio, fence and highway posts treating plants tend to have timbersheds reaching out between 25 and 100 miles from the plant. Piling is obtained locally as well as imported from other states.

Cedar posts and pickets are generally transported to the fence companies by truck. Pine posts and poles treated in Missouri and

³Sample composed mainly of: (1) Cedar posts in Michigan and Wisconsin; (2) Pine posts and poles in Illinois and Missouri; (3) Ohio fence and highway posts; and (4) limited piling production.

Illinois arrive by both truck and rail, and fence and highway posts in Ohio generally arrive at the treating plants by truck.

Cedar posts going to fence companies are supplied mainly by dealers, although they are not recognized as such. Only minor amounts come directly from producers. Producers also sell large amounts of cedar posts to retailers. Dealers, similarly, supply manufacturers, wholesalers, retailers, and consumers. Pine post and pole treating plants in Illinois supply seven percent of their own requirements, but obtain 85 percent of their supply from producers. In Missouri, most of the supply comes from producers, but about one-fifth is self-produced. Dealers are not prominently used by the sampled treating plants, but are known to supply other plants. In Ohio 25 percent of the oak and pine highway posts are supplied by sawmills to the treating plants in sawn form; the remainder of the supply, in round form, is purchased directly from producers. Locust fence posts are usually marketed by farm producers directly to other farms or to intermediate agents. The latter are truckers, sawmill operators, or store operators.

Point of delivery in the post, pole and piling industry is generally the place of business of the buyer (i.e., treating plant, sawmill, store). Posts, poles and piling shipped in to treating plants from out-of-state are first assembled at rail-heads or concentration yards.

PRODUCERS OF RAW FOREST PRODUCTS

Characteristics of Producers

Timber producers in the North Central region are an extremely heterogeneous group with a wide diversity of characteristics.

A size classification for producers is hard to formulate because many producers harvest two or more different products. However, an approximate classification is presented in Table 31. The significant point to note here is the concentration of producers (with the possible exception of pulpwood) in the small size classes.

Numbers of producers in different size classes are compared with the corresponding volumes handled in Table 32. It can clearly be seen that a large number of producers in the smaller size classes produce only a small portion of the volume of timber produced in the region. Conversely, the fewer large producers (about 20 to 30 percent, depending on product) produce from about 70 to 85 percent of the timber volume.

The degree to which producers specialize or diversify is shown in Figure 9. About 34 percent tend to specialize or concentrate on one product. Sixty-six percent of the producers produce at least two products, often three, and sometimes as many as four products. Figure 9 also indicates the combinations of products produced by those classified as multiple-product producers. For example, 225 of the sawlog producers interviewed also produced other products--135 produced pulpwood, 66 produced veneer logs, 19 produced posts, poles and piling, 55 produced cooperage bolts and 35 produced a variety of miscellaneous products.

TABLE 31--Size class of sampled producers in the North Central region, by product, 1959(a)

Size class(b)	Sawlogs	Veneer logs (number of producers)	Cooperage bolts	Pulpwood	Total
Small	141	50	31	33	255
Medium-small	104	(	33	75	212)
Medium-large	76	(48	10	22	108)+48
Large	19	23	11	30	83
Very large	--	--	--	32	32
All sizes	340	121	85	192	738

(a)Sawlogs producers for the year 1960.

(b)Classification:	Sawlogs (MBF)	Veneer logs (MBF)	Cooperage bolts (MBF)	Pulpwood (cords)
Small	1-49	0-24	0-9	0-99
Medium-small	50-149	(	10-39	100-499
Medium-large	150-499	25-100	49-99	500-999
Large	500 & up	100 & up	100 & up	1,000-1,999
Very large	--	--	--	2,000- & up

TABLE 32--Number of producers and volume produced, by size class of produce and product produced in the North Central region, 1959(a)

Size class(b)	Sawlogs		Veneer logs		Cooperage bolts		Pulpwood	
	No.(c)	Vol.(d)	No.	Vol.	No.	Vol.	No.	Vol.
	(percent)							
Small	41	8.5	41	7	36	4	17	1
Medium-small	31	19	(	(	39	17	39	11
Medium-large	22	42.5	(40	(24	12	16	11	8
Large	6	30	19	69	13	63	16	22
Very large	-	-	-	-	-	-	17	58
All sizes	100	100	100	100	100	100	100	100

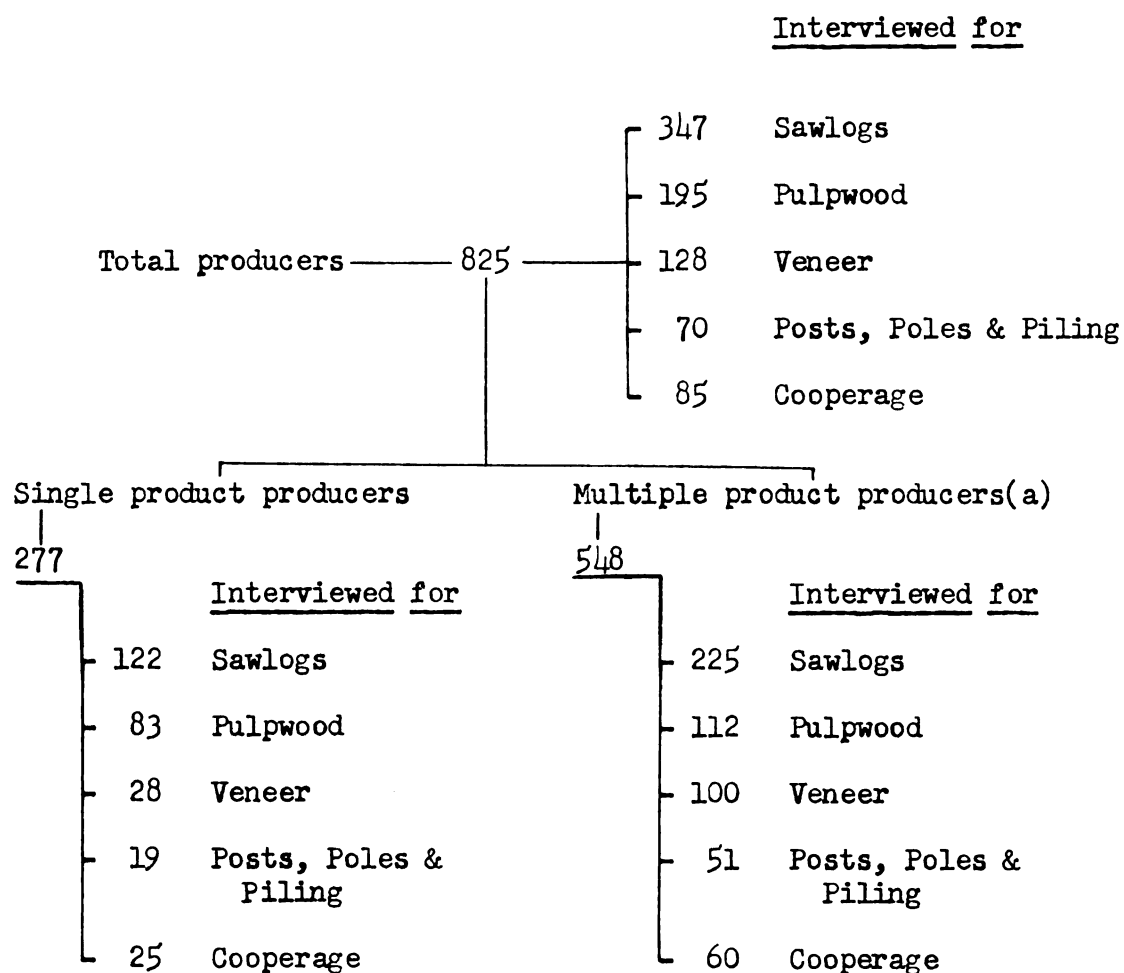
(a)Sawlogs producers for the year 1960.

(b)Classification:	<u>Sawlogs</u> (MBF)	<u>Veneer logs</u> (MBF)	<u>Cooperage bolts</u> (MBF)	<u>Pulpwood</u> (cords)
Small	1-49	0-24	0-9	0-99
Medium-small	50-149	(	10-39	100-499
Medium-large	150-499	(25-100	49-99	500-999
Large	500 & up	100 & up	100 & up	1,000-1,999
Very large	--	--	--	2,000 & up

(c)Numbers of producers sampled.

(d)Volume accounted for by producers sampled.

Figure 9--Producer classification and specialization



(a) A further breakdown of multiple-product functions is presented on the next page.

Figure 9--(Continued)

Multiple-product producers

Producers interviewed for:	Also produced:	
Sawlogs — 225 —	Pulpwood	135
	Veneer	66
	Posts, Poles & Piling	19
	Cooperage	55
	Other Miscellaneous	35
Pulpwood — 112 —	Sawlogs	78
	Veneer	20
	Posts, Poles & Piling	39
	Cooperage	6
	Other Miscellaneous	30
Veneer — 100 —	Sawlogs	25
	Pulpwood	16
	Posts, Poles & Piling	17
	Cooperage	17
	Other Miscellaneous	25
Posts, Poles and Piling — 51 —	Sawlogs	17
	Pulpwood	36
	Veneer	12
	Cooperage	6
	Other Miscellaneous	14
Cooperage — 60 —	Sawlogs	15
	Pulpwood	8
	Veneer	42
	Posts, Poles & Piling	7
	Other Miscellaneous	15

Classification of producers is complicated by the fact that most producers have at least one other occupation. In Table 33 the numbers of full- and part-time producers are shown, and part-time producers are listed by their major alternate occupations. As a matter of fact, many part-time producers have two or more alternate occupations. The most common combinations are sawmill-farmer, sawmill-other, and farmer-other.

Considering the whole region, about two-thirds of the producers sampled consider timber production as a part-time occupation. Of the 529 part-time producers sampled, 23 percent are also sawmill operators; 41 percent, farmers; and 36 percent, other.

Timber-producing activities are frequently seasonal. About 70 percent of the cooperage-bolt producers, and 80 percent of the posts, poles and piling producers tend to operate on a seasonal basis. Similarly, 80 percent of the veneer log producers operate seasonally. Pulpwood and sawlog producers also tend toward seasonality, but to a somewhat lesser degree. The seasonal production patterns are highly variable, affected by the work demands of alternate occupations, purchasing patterns of primary manufacturers, and the influence of weather on logging conditions.

With the exception of sawlog producers, timber-products producers nearly always use at least one part-time or full-time employee. Posts, poles and piling producers have an average of one employee; in Michigan, the employee is usually seasonal; in Missouri and Illinois, he is usually full-time. Cooperage producers tend toward one full-time employee. Most small pulpwood producers have one employee either part-time or full-time. Large pulpwood

TABLE 33--Producers classed as full-time or part-time and principal alternate occupations of part-time producers in the North Central region, by major product, 1959 and 1960

Occupation	Sawlog	Pulpwood	Veneer	Posts, poles & piling	Cooperage	All products
	(number of producers)					
Full-time producers	142	80	25	13	24	284
Part-time producers:						
Sawmill operators	12	23	41	18	28	122
Farmers	111	50	24	15	18	218
Other occupations	75	39	31	22	15	182
Unclassified	7	--	--	--	--	7
Total part-time producers	205	112	96	55	61	529

producers may have four or five full-time employees. Veneer log producers have an average of more than two full-time employees and one part-time employee. Since a large portion of the veneer-log producers own sawmills, there is an implication here that sawmill workers may also be employed in veneer-log production.

Sawlog producers report that they frequently work without any employees. In fact, only 37 percent indicate that they use full-time employees, and 47 percent part-time employees. Those using employees report an average of two full-time employees and nearly three part-time employees. The extensive one-man operations in sawlog production cannot be visualized as efficient operations. It is difficult to visualize them at all without the assumption that part of the work is subcontracted to individuals who would be regarded as employees in another context.

Producers in the North Central region have been in business, on the average, some 10 to 15 years. Product, size of operation, and location strongly influence the number of years in operation. More than 50 percent of the cooperage producers have been in business only one to six years, while about 20 percent have been in business for more than 20 years. Large posts, poles and piling producers have operated for over 20 years, but smaller ones in Michigan and those in the Central States less than 10 years. Pulpwood operators average 13 years in business in the Lake States, and seven years in the Central States. Veneer-log producers average 15 years in business, and sawlog operators, 12 years. These figures indicate a considerable turn-over in producers (movement to and from production), which may or may not be excessive for any one product.

However, considering the added fact of multi-product and/or occupation roles, together with a great diversity in volumes handled (to be discussed under the next heading), a pattern of inefficiency and non-stability is suggested.

Timber Products Handled

The volumes of wood involved in the producer function often cannot be accurately ascertained due to difficulties in delineating the producer function. Producers, as defined, are responsible for a (1) total output, (2) volume handled, and (3) volume produced. Volume produced includes only those volumes produced by an agent whose primary function is production and who harvests stumpage to attain his production. Volume handled includes minor volumes acquired by producers by means other than harvesting, but these volumes are sold freely in the open market along with the larger volumes actually harvested by the producer. Total output includes volume handled and the output of producers who are also primary manufacturers obtained through the harvest of their own or purchased stumpage.⁴ The characteristics of the latter agents are aptly described under the section on primary manufacturers in accordance with their definition, but a few output figures are relevant in that they reveal more correctly total volumes being harvested by agents interviewed.

⁴The dual function of producer-dealer did not cause a similar problem as volumes in most cases could be assigned to the appropriate function and the agent was accordingly recorded as one firm with an intended dual function; both functions could be analyzed separately.

Producers of posts, poles and piling have an output that closely approximates volume handled. In most cases also, this does not differ appreciably from volume produced. Cooperage mills, however, acquire an average of about 35 percent of their own supply of cooperage bolts. Thus, while producers of cooperage bolts indicate volumes handled closely approximate volumes produced, output in the sample areas would be more than one-third again as large. Similarly, veneer-log producer volumes could be increased by 24 percent. Pulp mills supply nearly one-third of their own raw material. Producer production of pulpwood in 1959 in the sample areas of the region was some 15,000 cords less than the volume handled, indicating producers do not always concentrate on harvesting, but deal among themselves and contract minor volumes to be harvested. Sawlog producers are not clearly represented under the definitions used in this report. Self-production by sawmills is four times as prevalent as buying from producers. Most sawmillers are, in effect, their own sawlog producers. Many sawmill owners (generally smaller agents) switch back and forth between log production and primary manufacture, depending on whether their sawmill is running or not. Volumes produced almost approximate volumes handled.

Timber handled by producers, by product and size class of producer, is shown in Table 34. To some extent Table 34 does not fully reflect producer size as producers often produce more than one product. In general, however, pulpwood producers concentrate mainly on pulpwood, and sawlog producers (but to a lesser extent) on sawlogs. Veneer log producers are less specialistic. Many produce more than one product, especially sawlogs or cooperage bolts. Cooperage producers

TABLE 34--Volumes of timber products handled by producers in the North Central region, 1959 and 1960

Product (by size class of producer)	Volume handled (cords)	Producers reporting	Average volume per producer (cords)
Pulpwood			
0-100	1,683	33	51
101-500	23,100	75	308
501-1,000	17,556	22	798
1,001-2,000	47,370	30	1,579
2,000 or more	124,480	32	3,890
Total	214,189	192	1,115
	(MBF)		(MBF)
Sawlogs			
1-49	3,722	141	26
50-149	8,414	104	81
150-499	18,742	76	247
500 or more	13,288	19	699
Total	44,166	340	130
	(MBF)		(MBF)
Veneer logs			
0-24	570	50	11
25-100	2,583	48	54
100 or more	7,371	23	320
Total	10,524	121	87
	(MBF)		(MBF)
Cooperage bolts			
0-9	127	31	4
10-39	717	33	22
40-99	589	10	59
100 or more	2,820	11	256
Total	4,253	85	50

TABLE 34--(Continued)

Product (by size class of producer)	Volume handled (pieces)	Producers reporting	Average volume per producer (pieces)
Posts, poles & piling			
Cedar posts	455,400	28	16,264
Shortleaf pine posts	678,300	(10	(70,680
Shortleaf pine poles	28,500		
Locust posts	4,500	3	1,500
Highway posts	6,000	8	750
Piling	5,100	10	506
Total	1,177,800	59	19,963

are specialists in some cases, but in general they turn out twice as much material in sawlogs, veneer logs, and other raw products as they do cooperage bolts.

Table 34 points up the fact that the larger producers in each product category (relatively few in number) account for a large portion of the timber volume handled. The numerous small producers are the uncertain element in production. They expand and contract with changes in the market. In times of expansion, (or even without an expansion should they locate and acquire a "block" of, or "lump sum" title to quality material), they lay down their alternatives and rush to production. In times of contraction these same producers are the first to leave production. Not able to compete with the larger producers, they often return to alternate occupations. Regardless of where the stability initiating actions start, during a contraction the burden is shifted from the stronger to the weaker--in general down the marketing chain, until the small producers and the small forest landowners at the end absorb the shock.

Size of Wood Supply Area

The extent of a producer's timbershed is determined by a number of interrelated factors. These include: (1) the geographic relationship of the producer's home both to suitable stands of timber and available markets; (2) the degree of specialization in occupations, market roles, and species and products handled; (3) the scale of the producer's operations; and (4) the degree of competition encountered for available stumpage. All of these influence the

distance producers travel to obtain adequate amounts of raw material.

In general, timber producers operate in small timbersheds. Only the producers who tend to specialize more in cooperage-bolt or veneer-log production reach out much more than 25 miles for their timber supply. Large producers show a definite tendency to go out farther than small producers. Figure 10 indicates the similarity between pulpwood, sawlog, and posts, poles and piling producers. Two factors underlie the longer hauls required for veneer logs and cooperage bolts. These products are more valuable per unit of volume and are thus able to support higher transportation costs. Also, they are products where quality is important. Producers, knowing this, have harvested the quality material in the vicinity of their homes and now must travel farther for the more profitable quality material.

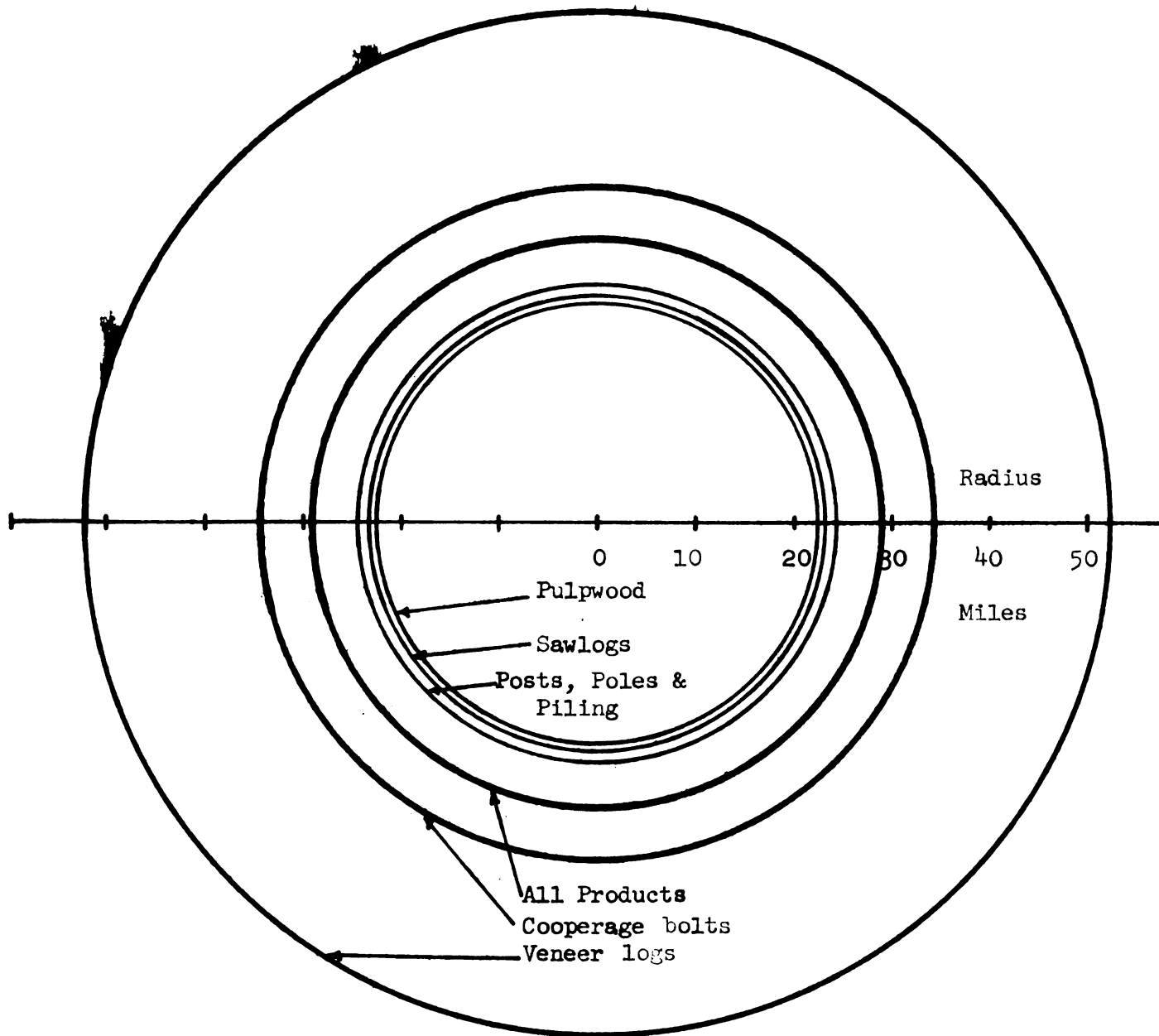
Producers indicate that the average timbershed has increased slightly in size in the past 10 years. A few, noticeably small producers, state that they have refused to seek timber farther from their homes, and have, in fact, reduced the size of their operations. The influence of lesser competition, as well as better bargaining power with neighbors for stumpage, might be factors which would compensate for restricted access to more and/or quality stumpage.

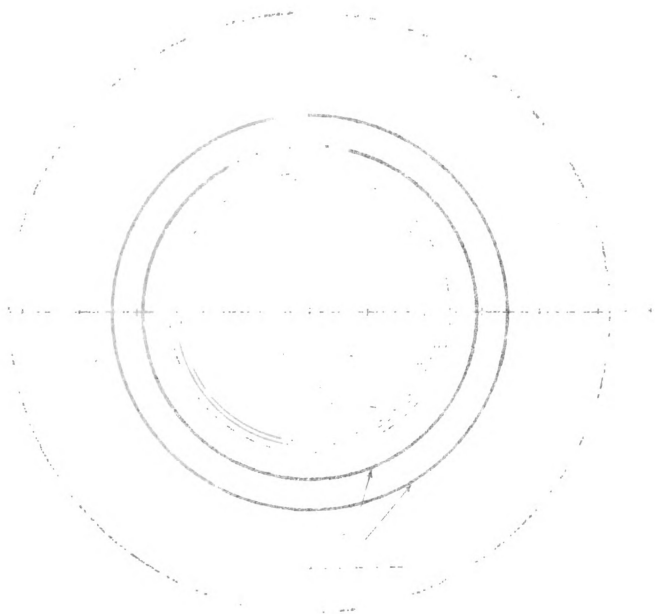
Minimum Logging Chance for Producers

Limited information is available to indicate that some producers will only accept logging chances above some minimum size. Insufficient information on veneer-log producers and post, pole and piling producers precludes considering what the minimums are for these products.

Clearly defined minimums were obtained for pulpwood operations in

Figure 10--Average radius of producers' supply operations, by product, 1959 and 1960





Michigan and in Minnesota. In Michigan, 90 percent of the sampled producers indicate that a logging chance must have five cords to the acre, that the total tract (usually a minimum of 40 acres) must have about 160 cords, and that the stumpage value of the pulpwood should be about \$250 to justify a pulpwood operation. In Minnesota, 50 percent of the producers sampled indicate that a tract must have at least 80 cords with a delivered market value of about \$1,325 to justify pulpwood logging.

About 33 percent of the cooperage producers sampled in the Central States indicate that they must have at least 20,000 board feet of sound white oak on a tract before they will consider logging. Some 22 percent also state that the tract must have a value of \$950 as stumpage.

Sawlog producers in the region also recognize acceptable minimums. About 37 percent indicate that a tract must have close to 2,000 board feet; and some 46 percent state that the tract must contain 20,000 board feet; and some 17 percent state that the tract must have a minimum stumpage value of \$200.

A footnote of interest can be added here. From the data supplied on minimum volumes and stumpage values, it can be deduced that producers intended paying about \$1.60 per cord for pulpwood stumpage in Michigan, about \$45 per M bd. ft. for sound white oak cooperage timber in the Central States, and about \$10 per M bd. ft. for sawlog stumpage in the region.

Wood Procurement Methods and Policies

Methods of Stumpage Acquisition

Over two-thirds of all the producers contacted in the North Central region who purchase stumpage reported that they initiate their contracts with landowners. The remaining, and in many cases, larger producers rely on landowners (both public and private) to initiate some or all of their contracts.

For those producers initiating their contracts, it was found that most of them are active in seeking out suitable stands of timber. These producers are continually "scouting," and when a tract is located, the owner is contacted personally concerning an offer to purchase. Only a few of the producers use mail, newspaper advertising, or a third party in locating suitable stumpage. Sawlog producers, in particular, follow the personal contact method.

Number of contracts per year varies both by main product produced and by geographic location. Veneer log producers average about three contracts per year in the Lake States, about 15 in the eastern Central States, and nearly 40 in the western Central States. Many of the latter are small producers who average less than one thousand board feet per contract. Lake States pulpwood producers producing less than 1,000 cords per year average about three contracts; those producing over 1,000 cords average six contracts. In the Central States, regardless of size, pulpwood producers average two or three stumpage purchases a year. Sawlog producers vary widely. About 28 percent make only one contract per year; 57 percent make two to 10 contracts per year; 15 percent make more than 10 contracts per year.

The average for all sawlog producers is seven contracts. Posts, poles and piling producers vary widely by size class and geographic area. Cooperaage producers tend to make numerous agreements for fairly small volumes; they average 14 contracts per year.

Stumpage contracts are usually negotiated from a few days to one or two years in advance of harvesting operations. In general, larger operators tend to negotiate for stumpage well in advance of harvesting operations; smaller operators often delay negotiations until a few weeks before they intend to begin harvesting. Large pulpwood operators in the Lake States usually negotiate for stumpage six to 18 months in advance, and some of the larger firms buy tracts large enough to meet requirements for two or more years. Smaller pulpwood producers and those in the Central States usually negotiate less than four months in advance of harvesting. Sawlog producers in the North Central region negotiate from a few days to a year before harvesting. About 30 percent negotiate from one day to one week in advance, 40 percent from two weeks to 10 weeks, 19 percent from 11 to 25 weeks, nine percent from 26 weeks to one year, and two percent over one year in advance of logging.

About half of the pulpwood producers and a fourth of the sawlog producers purchase stumpage only if they have a market or a contract for the sale of their product. On the other hand, 10 percent of the sawlog producers interviewed indicated that their stumpage purchases in 1960 were not specifically for sawlogs. This fact supports the hypothesis that many producers reject specialization and tend to produce whatever timber products appear to be profitable.

Purchase Contracts

Producers purchase stumpage from public lands under written contract as required by public landowners. However, most of the timber cut in the North Central region comes from private land where oral contracts are used as widely as written contracts. Oral contracts generally favor the producer. They allow him wide leeway in his harvesting method, choice of timber, and method of payment. If the timber operator considers the stumpage a bargain, and if he has sufficient capital, he will, in many cases, purchase merchantable timber on the tract for a cash lump sum paid in advance. This is often attractive to the landowner, and it assures the producer of a good supply of timber usually at a very reasonable price. If the value of the stumpage is more open to question, and especially if the producer is low on capital, payment may be made to the landowner on the basis of a mill scale after the producer has harvested and sold the timber. In some cases a combination of the two methods mentioned is used.

Written contracts with public landowners merit little discussion here. They are formal, and consistent by agency. They protect the interests of the public landowner and offer timber (generally on some sort of competitive basis) for sale on a reasonably equitable basis for both landowner and purchaser.

Written contracts for the purchase of private timber do not exhibit the consistency and formality of public contracts. In most cases, their common characteristic is that they are a bill of sale tendered the landowner for his stumpage by a producer, primary

manufacturer, or other agent. The main purpose of the contract is, usually, to guarantee that the landowner does not default on a worthwhile tract of timber.

About 66 percent of the stumpage purchased by Lake States pulpwood producers from private landowners is obtained under written contract. Some 55 percent of the stumpage purchased by cooperage producers, and about 27 percent of the stumpage purchased by sawlog producers are purchased under written contract with private landowners. Veneer log and post, pole and piling producers also make frequent use of written contracts with private landowners.

In general, written contracts refer to "all merchantable" or "all marketable" timber on the tract. Frequently, species and amount of timber are not mentioned. This allows the producer broad leeway in that he can cut any timber he considers marketable. Specialized producers may be more specific. Many cooperage producers, for example, indicate they will cut only merchantable stave bolt material from trees in the white oak group.

Few producers specify how much they will cut. In most cases less than 10 percent indicate any contract limitations on cutting. Size of timber is usually not mentioned by pulpwood producers, but cooperage producers frequently indicate a minimum stump diameter of 14 to 16 inches. About 70 percent of the sawlog producers refer to some minimum stump diameter in the contract. "Good" or "sound" quality timber is frequently written into contracts by cooperage specialists, but such a reference is not used by most other producers. Time or period of harvest is, for the most part, a feature of contracts; in most cases, it is more than six months and, not infrequently, it is listed

as one or more years. Method of payment is almost always a feature of the contract. Three methods are notable. The first, applying to about 35 percent of the contracts, is lump-sum payment in advance of harvesting. The second, applying to some 55 percent of the contracts, is payment on a per unit of volume measure (M bd. ft., cord, etc.), with measurement made after harvest by the producer's buyer. The third method is a combination of the other two.

Logging provisions appear in about 50 percent of all producer-landowner contracts. The remaining 50 percent of the contracts do not specify any logging provisions, and the producer is free to harvest in any manner he sees fit. His conscience and his standing in the community appear to be the only checks which would promote his using approved logging practices. The situation becomes even more complex in that about one-third of the producers harvesting under a contract without logging provisions state that they would not accept any logging limitations even at a landowner's insistence. The lack of market power on the part of landowners is further pointed up by the fact that in nearly all cases where contracts contain logging provisions, the provisions are those selected by producers. Logging provisions, when stated, usually call for the producer to do some of the following: (1) log only in good weather; (2) clear or remove slash; (3) repair and/or be responsible for the maintenance of fences, gates, roads, and waterways, etc.; (4) agree to the location of access roads; and (5) promise "no damage" to the property. Fewer than five percent of all the producers interviewed indicate that they have any responsibility for young growing stock during logging operations, and more than 85 percent state that they would not assume any responsibility

for the care of young growing stock, even at a landowner's insistence.

Evidence of concern for maintaining or increasing the productivity of privately owned tracts, harvested either under written or oral contract, is almost totally lacking. Producers are not interested in any concern the landowner may have in silviculture or forest management, and in fact, oppose such a concern if it imposes any restrictions on their methods of operation.

Subcontracting of Logging and Hauling Operations

Producer subcontracting of both logging and hauling operations often occurs in the North Central region. It is more prevalent among the year-round producers harvesting large tracts and handling two or more products than among small seasonal producers, although small producers often make use of a part-time contract helper. Some eight to 40 percent of sampled pulpwood producers, depending on geographic area, subcontracted part or all of their logging. Similarly, some 10 to 60 percent subcontracted for hauling operations. About 19 percent of the sawlog producers interviewed subcontract logging, and about 17 percent, hauling. For veneer the figures were 14 percent and 19 percent, respectively; for cooperage, 17 percent and 20 percent. About one-third of the cedar post producers in Michigan and Wisconsin subcontract some or all of their logging, but subcontracting of hauling operations is not common. Producers of posts in Ohio, Illinois, and Missouri do little subcontracting of logging or hauling.

Subcontracting is often adopted by producers to avoid the financial outlays and employee responsibilities involved in maintaining a logging crew or transportation equipment. Many producers indicate that sub-

contracting is "cheaper." Others believe that their time is more valuable for other purposes.

Sales of Timber

The output of timber producers, depending on products produced, moves to market in widely varying patterns.

Cedar posts in the Lake States are sold mainly to intermediate agents, but considerable numbers are also sold to manufacturers, retailers, and consumers. Pine posts and poles in Missouri and Illinois move directly to treating plants, bypassing intermediate market agents. In Ohio locust fence posts are often sold directly to truckers who combine transportation with an intermediate market agent function. Pine and oak highway posts are sold directly to treating plants.

Cooperage bolts in the Central States are nearly always delivered and sold directly to the primary manufacturers--in this case stave and heading mills.

Veneer log output of producers usually goes directly to the veneer mill. However, veneer mills indicate about 24 percent of their supply is obtained from their own logging operations, and about 16 percent from intermediate agents. The intermediate agents are sawmillers who sort out high grade logs for sale to veneer mills.

Pulpwood producers sell 83 percent of their output directly to primary manufacturers and 17 percent to intermediate market agents. Delivery is nearly always to the mill or f.o.b. rail siding. Sawlog producers invariably sell their sawlogs directly to a sawmill.

Posts, poles and piling producers selling directly to a primary

manufacturer usually sell to a single firm. Cooperage producers also tend to concentrate on supplying only one stave and/or heading mill. Veneer log producers, on the other hand, indicate more competition for their product. They sell to an average of three mills each, depending on the price received. Pulpwood producers in the Central States tend to sell to only one pulp mill or dealer. In the Lake States, however, as a result of varying species requirements by mills, producers tend to sell to several pulp mills or dealers. Half the sawlog producers in the region limit their sales to a single sawmill; the other half sell to two, three, four, five or even more sawmills.

Producers, in general, report no difficulty in obtaining price information. They indicate that mill- and dealer-offered prices are well-known to them. Rarely does the producer exert any upward market power in the form of price negotiation. The producer, however, does exert market power downward to the private forest landowner. The landowner frequently accepts the producer's offered price.

Estimating gross sales value of producers' timber products is exceedingly complex. Most producers do not keep accurate records; the records obtained from interviews were fragmentary.

Producers interviewed primarily for cooperage timber production indicate that their average gross sales value of cooperage timber is \$3,400; their average gross sales value for all timber products is \$10,800. Veneer log producers in the region indicate an average gross sales value for all timber products between \$13,000 and \$16,000. Unfortunately, a gross sales value for veneer logs alone could not be isolated.

Many pulpwood producers concentrate on pulpwood (Table 35). Of the 177 producers giving gross sales information, 45 percent indicate they produce pulpwood almost exclusively. Non-specialist pulpwood producers, while producing other products and having other functions (i.e., dealer in pulpwood or other products, and sawmill operators) tend to be highly dependent on pulpwood. Specialist pulpwood producers average \$14,400 gross income from pulpwood, \$25,300 from all occupations. Non-specialist pulpwood producers average some \$12,000 from pulpwood production, \$8,000 from other timber production, and \$31,000 from all occupations.

Sawlog producers report an average gross sales for sawlogs of \$4,469 (Table 36). Large Lake States producers deal in larger volumes with bigger gross sales values than large producers in the other regions. In general, large producers receive less per thousand bd. ft. than smaller producers. Sufficient information was not available for sawlog producers to accurately indicate gross sales values of other timber products produced.

Considering all timber-products producers, it is obvious that there is a great size range with a consequent range in gross sales value (Table 37).

Large producers, relatively few in number, produce large volumes and have large gross sales values, and a far greater number of smaller producers produce small volumes and have very small gross sales values.

Many of the small producers interviewed are actually contractors or loggers--they cut timber, sometimes transport it, even sell it--but the buying and business details and, frequently, the selling are

TABLE 35--Income data for pulpwood producers in the North Central region, 1959

<u>Specialist pulpwood producers</u>		
Number reporting	.....	82
Average volume in cords	.....	1,095
Average gross receipts	.....	\$14,400
Average percent of gross income represented by pulpwood production	.....	57
Average total gross income from all sources	.....	\$25,300
 <u>Non-specialist pulpwood producers</u>		
Number reporting	.....	95
Average volume of pulpwood in cords	.....	932
Average volume of other timber in M bd. ft.(a)	.....	157
Average gross receipts from pulpwood	.....	\$12,385
Average gross receipts from other timber	.....	\$ 8,355
Average gross receipts from all products(b)	.....	\$20,740
Average percent of gross income represented by timber production	.....	67
Average total gross income from all sources	.....	\$31,000

(a)Not including posts, poles, and piling.

(b)Includes posts, poles and piling, firewood, and miscellaneous products.

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TABLE 36--Average volume and gross sales value of sawlogs sold by sawlog producers, by region and size class, 1960

Region and size class in thousand bd.ft.	Number of producers reporting	Average volume per producer (thousand bd. ft.)	Average gross value per producer (dollars)	Average gross value per thousand bd.ft. (dollars)
<u>Lake States</u>				
1-49	53	20.5	786	38
50-149	39	81.2	3,252	40
150-499	24	255.6	9,125	36
500 or more	11	793.9	26,537	33
Total	127	150.5	5,350	36
<u>East Central</u>				
1-49	49	23.9	802	34
50-149	32	88.8	3,308	37
150-499	23	255.6	9,927	39
500 or more	3	646.7	14,458	22
Total	107	110.6	3,896	35
<u>West Central</u>				
1-49	29	19.2	504	26
50-149	27	79.6	2,755	35
150-499	22	268.7	7,681	29
500 or more	4	738.3	14,525	20
Total	82	141.1	3,855	27
All Producers	316	134.6	4,469	33

TABLE 37--Average gross sales values of all timber products sold by producers, by size of producer, 1959 and 1960

Size class of producers(a)	Number reporting	Average gross sales value (dollars)	Average percent of gross income	Average estimated total gross income (dollars)
Small producer	154	3,774	37	10,200
Team producer	16	6,567	38	17,300
Medium producer	49	15,637	49	31,900
Larger producer	17	45,621	41	111,270
All producers	236	9,443	40	23,600

(a)Description of size classes:

Small producer--A producer who either works by himself, or has one and sometimes two part-time helpers, but rarely has a full-time helper--even a family member. This producer nearly always has an alternate occupation.

Team producer--A producer who acknowledges that his entire production is nearly always due to two men working as a team, without outside help. This is usually a partnership, or two brothers, or a father and son combination. These two men often do not report alternate occupations, but sometimes they participate part-time in farming.

Medium producer--A producer who has at least one permanent helper or contractor and at least one or two part-time helpers and, if no permanent helpers, at least four to six part-time helpers. He may have an alternate occupation; frequently a dealer or sawmill function.

Larger producer--A producer who has more than one permanent employee or contractor and several part-time employees or contractors. He often has an alternate and/or allied occupation in which the employee participates (e.g., sawmill, dealership).

arranged by a larger producer with whom they have some kind of an agreement. The small contractors often consider themselves producers, and not employees. Thus, no employer-employee relationship exists with any legal or social responsibilities. These small contractors perform many, if not nearly all, of the functions of a producer, but they are not really producers, or for that matter, employees. Perhaps the best description would be contractors by arrangement, with the latter meaning that the function of decision making and/or compensation is largely controlled by another party. These men work seasonally or part-time and produce small volumes of timber. While this system could have considerable merit if executed efficiently and equitably, it could also, under conditions of inefficiency and exploitation, especially with high rural seasonal unemployment, amount to nothing more than a portion of the marketing system controlling a source of cheap labor.

Deliveries of timber products and the timing of deliveries are dependent on several factors. Pulpwood has been adequately covered in a previous report, but one or two points are notable. Deliveries are not uniform even by full-time producers, and part-time producers are almost invariably seasonal. Deliveries are at a maximum during the winter and reach a low by April or May. Deliveries by producers are dependent on weather and road conditions, on other work alternatives, and on the availability of mill purchase contracts.

Post, pole and piling producers in the Lake States indicate that sales usually follow logging and are concentrated in the late winter and early spring. Sales in the Central States are more scattered throughout the year, and deliveries often coincide with decreased

activity in alternate occupations. Cooperage timber deliveries do not show a regional trend. Stumpage availability, alternate employment, and weather conditions peculiar to an individual state or area account for deliveries at various times of the year. Veneer log production in the Lake States tends to be somewhat seasonal with deliveries to the veneer mills reaching a peak after the winter logging season.

Deliveries in the Central States tend to be more scattered throughout the entire year.

Sawlog producers report a general situation comparable to veneer log producers. However, besides reporting that the timing of their deliveries are dependent upon weather and logging conditions, and on the demands of other businesses, they also report that deliveries are made at their convenience and when enough time has elapsed to accumulate sufficient volumes for efficient hauling. Nearly 80 percent of the producers report that timing of deliveries is not required by their product buyers.

INTERMEDIATE MARKET AGENTS

Information concerning agents in the North Central region who act as middlemen between the producer and the primary manufacturer of raw forest products is limited. Accurate description of this segment of the marketing system is difficult; it is limited mainly to those agents who prominently deal in a specific product.

In the sample of 152 intermediate agents, 74 handle one product, 68 handle two or more products, and ten cannot be clearly classified by product.⁵ The most common intermediate market agent is the pulpwood dealer; nearly one-third of the agents interviewed deal exclusively in this product. Pulpwood dealers in the North Central region have been described on a regional basis by Manthy and James (34) and specifically for Michigan, by Carrothers (3).

Intermediate agents are responsible for handling a minor volume of posts produced in the region, and an adaptive intermediate agent function has been assumed by many of the region's sawmills in that they handle or sort and re-sell high quality sawlogs as veneer logs and/or cooperage bolts. Intermediate agent functions are of very minor significance for sawlogs.

Pulpwood Dealers

Two types of dealers are recognizable in the North Central region --agent middlemen and merchant middlemen. The former are actually commission representatives of pulp mills and do not take title to the

⁵See page 8, Table 2, for sample breakdown.

wood. They receive from \$0.50 to \$1.50 per cord for services rendered to the pulp mill. These services can be, for example, any or all of the following: organizing numerous producers to supply the mill, aiding producers to get into production by financial assistance, timing the flow of wood from producers to the mill, locating timber supply, and relieving the mill of the costs and responsibilities of direct procurement. The merchant middleman takes title to the wood, He is not an agent of the pulpmill. His profits are obtained from the margin between his buying price from producers and his selling price to the mill. Pulpmills consider him to be a large producer and not a dealer.

Timber Handled

Pulpwood dealers in the Central States were found to be relatively unimportant, except in Ohio. The eight dealers interviewed in Ohio handle 20 percent of the pulpwood marketed by Ohio producers. Dealers in the Lake States handle large volumes: 29 Michigan dealers handle 17 percent of the pulpwood marketed by producers in Michigan's Lower Peninsula; 31 Wisconsin dealers handle 26 percent of the pulpwood marketed by producers in Wisconsin; and 14 Minnesota dealers handle 15 percent of the pulpwood marketed by producers in Minnesota.

Pulpwood dealers tend to specialize; 54 of the 82 dealers interviewed concentrate specifically on pulpwood. The remaining 28 also deal in posts, sawlogs, veneer logs, or cooperage bolts. About 40 percent of the dealers interviewed are also pulpwood producers. The latter group tend to be the smaller dealers; in most cases, they produce more pulpwood themselves than they purchase as intermediate agents.

Characteristics of Dealers

In the North Central region about 60 percent of the dealers sampled were merchant middlemen. However, only in Lower Michigan do these merchant middlemen handle a substantial volume of the pulpwood moving through dealer channels. Merchant middlemen are usually responsible for smaller volumes than agent middlemen and frequently are also part-time producers. This might very well explain, in part, a lack of recognition by many pulp mills. While many merchant middlemen and especially merchant middlemen-producers (especially those handling smaller volumes) are only recognized by the mills as producers and not middlemen, several merchant middlemen in Lower Michigan who handle large volumes are recognized and used fairly extensively as a source of supply. Merchant middlemen do not seem to be increasing in their role--apparently any increases in supply are being filled by direct producer-to-mill deliveries.

In general, lack of increases in dealer volumes throughout the region, support the contention that the dealer function is not increasing in significance. Increased wood requirements of the pulp mills are being obtained from independent producers or company logging operations. (Ohio appears to be an exception in that some large dealers have moved into operation in the last five years and are actively supplying pulp mills.) Possible explanations for decreasing significance of the dealer system should be noted. Evidently, increased availability of local wood that can be trucked to the mill favors producers. Dealers were favored when shipping distances to the mill were longer and when rail transportation was

used more extensively. Also important is the fact that by moving away from agent middlemen, the pulpmill saves \$0.50 to \$1.50 per cord in dealer bonuses. Failure to recognize merchant middlemen, along with the absence of agent middlemen, deflates the market power of the mill suppliers. More and smaller suppliers give the mill less dependency on any one supplying individual. This, in turn, relieves any pressure to increase price through control over major supply volumes.

Dealers range in size from 200 cords per year to over 100,000 cords per year, but over three-fourths of the dealers sampled handle less than 5,000 cords per year. In general, larger dealers are apt to be full-time dealers, whereas small dealers tend to be part-time dealers. Dealers handling less than 5,000 cords, and especially those handling less than 1,000 cords per year, usually have an alternate occupation. This is shown in Table 38. Many of them have two or more alternate occupations, one of which is frequently timber production. While dealers often tend to have alternate occupations, in respect to their handling of raw forest products, they tend to specialize rather than diversify. Table 39 indicates that almost two-thirds of the dealers sampled handle only pulpwood. The remaining one-third are divided equally into those handling one additional product and those handling two or more products. Dealers handling two other products frequently handle larger volumes in at least one of the other products than in pulpwood. Aspen is the principal species handled in Michigan and Wisconsin, although pine and spruce-fir are also handled in considerable volume. Minnesota dealers handle three or more species and do not tend to specialize.

TABLE 38--Occupations and size class of sampled pulpwood dealers, 1959

Occupation	Size class in cords handled			
	1,000 or less	1,001-5,000	5,001-10,000	Over 10,000
(number of dealers)				
<u>Full-Time dealers</u>				
Regular	2	12	6	6
Cooperative Assoc.				1
Total	2	12	6	7
<u>Part-Time dealers</u>				
More than one other occupation	14	5	-	-
Sawmill operator	2	3	1	1
Store or service station	1	-	-	3
Farmer	2	1	-	1
Wage earner	-	1	-	-
Timber producer	7	5	-	-
Other occupation	2	5	1	-
Total	28	21	2	5
All Dealers	30	32	8	12

TABLE 39--Products handled and size class of sampled pulpwood dealers,
1959

Products handled	Size class in cords handled			
	1,000 or less	1,001- 5,000	5,001- 10,000	Over 10,000
(number of dealers)				
One additional product				
Sawlogs	4	-	1	-
Veneer logs	1	1	-	1
Cooperage bolts	-	1	-	-
Posts, poles & piling	2	2	-	-
Other	1	-	-	-
Total	8	4	1	1
Two or more products				
Pulpwood only	6	4	-	4
Pulpwood only	16	24	7	7
All products	30	33	8	12

Ohio dealers specialize in mixed hardwoods.

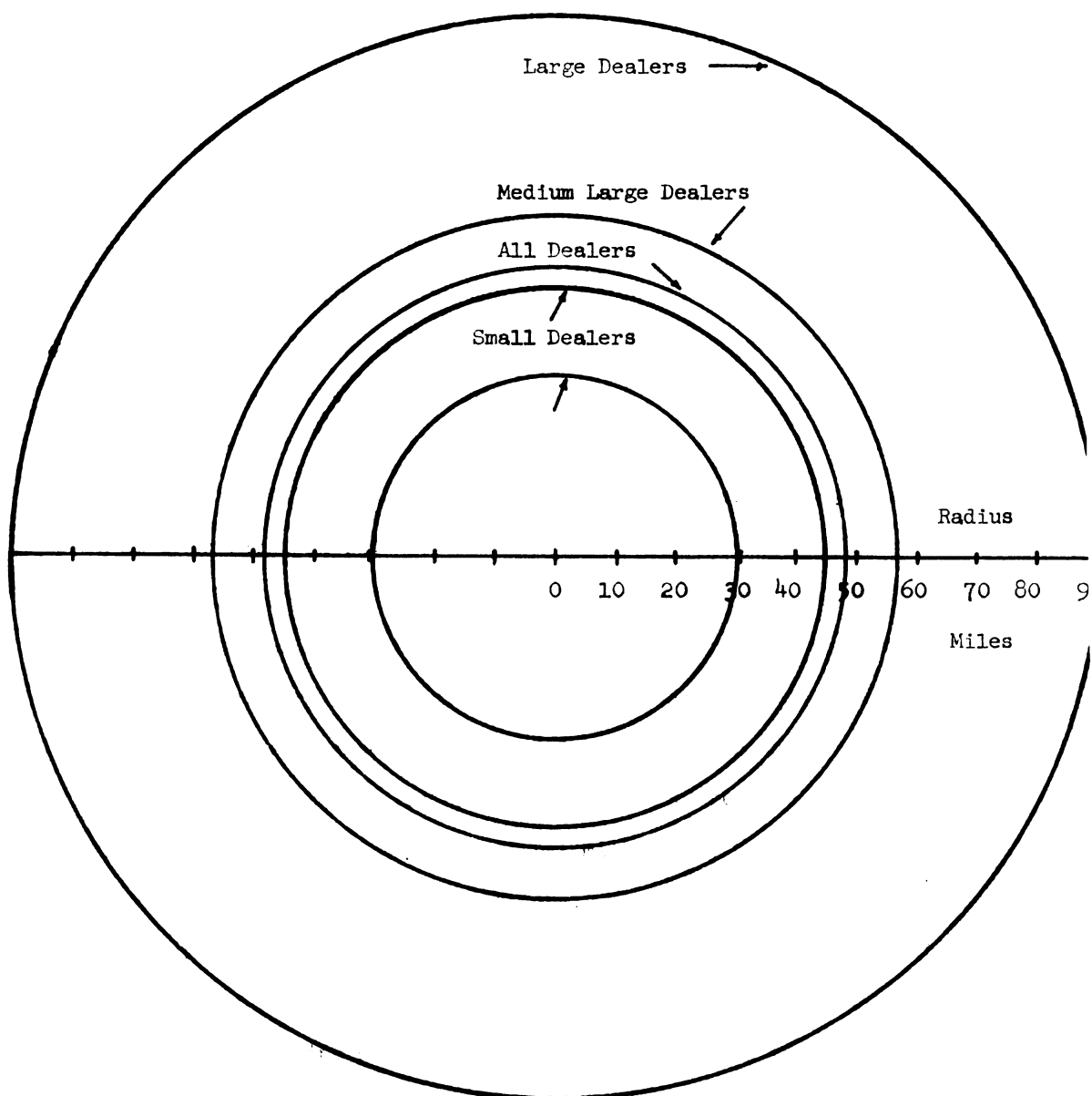
Sizes of wood supply areas are shown in Figure 11. As might be expected, dealers handling larger volumes reach out farther for their supply. Small dealers (in many cases dealer-producers) only reach out about 30 miles, whereas large dealers (frequently specialists) reach out an average 90 miles for their supply. The regional average supply radius for dealers is 48 miles. Some slight state variation is noticeable. Minnesota dealers, regardless of size, generally reach out farther than dealers in Michigan and Wisconsin. Size seems to be only of minor importance in Ohio; the average radius is some 30 to 40 miles regardless of volumes handled.

Wood procurement methods and policies

Dealers obtain their wood from one supplier or as many as two hundred. In Michigan, dealers average 28 suppliers; in Wisconsin, 48; in Minnesota, 118; and in Ohio, 70.

In Michigan large dealers are fairly active in seeking out and contacting wood suppliers. Smaller dealers and dealers in the other states are not as active in seeking out suppliers; more frequently contact is made by the producer. Most dealers have either informal or written purchase agreements with their suppliers. Dealers in Wisconsin purchase 86 percent of their volume under written agreement. In Minnesota the corresponding figure is 22 percent, and in Michigan, one percent. Remaining volumes are purchased under oral agreements. Looseness in purchase agreements is inherent in dealer operations and functions, and most dealers do not consider agreements legally enforceable. Most dealers will not handle pulpwood unless they have

Figure 11--Average radius of wood supply area of sampled dealers, by size class of operation,^a 1959.



- ^aSmall Dealer - less than 1,000 cords handled.
 Medium Dealer - 1,001-5,000 cords handled.
 Medium Large Dealer - 5,001-10,000 cords handled.
 Large Dealer - over 10,000 cords handled.

a contract for delivery or resale at the time of producer delivery.

Written agreements are usually made several months in advance and nearly always more than one month in advance of purchase. Informal agreements are generally made less than one month in advance of purchase. Payment is usually made on the basis of mill scale (per cord or ton) upon receipt of the wood at the mill or railhead. Depending on the type of middleman (agent or merchant) payment may be made at the mill or collected from the merchant middleman. Prices are standardized, and suppliers delivering the same species to the same point generally receive the same price. Some dealers do, however, pay a bonus of from \$0.50 to \$1.50 for wood hauled from distances greater than 50 miles.

Pulpwood in the region can be accepted roadside, at the dealer's or pulp company's yard, or f.o.b. railhead. Roadside acceptance is common in Michigan and with smaller Wisconsin dealers. Railhead delivery is secondary in importance (by percent of volume) in Michigan but account for more than 50 percent of total volume in the remaining states. Delivery to the dealer's yard is fairly common in Minnesota, and to a lesser degree, in Ohio. Only in Wisconsin and to a lesser degree in Ohio (24 percent of the volume and 19 percent, respectively) is direct delivery of the wood to pulpmill widely used.

Dealers frequently aid producers. Financial aid, however, is limited in scope. Most dealers will only offer loans or prepayments on pulpwood that is cut and ready for delivery. Few dealers offer loans for operating expenses or stumpage purchases. Other types of aid include technical advice, assistance in finding markets for other timber products, and the supplying of producers with price and

market information.

Deliveries of pulpwood are strongly seasonal. In Minnesota and Wisconsin, peak volumes are delivered from December to early March. Minimum volumes are delivered from late March through June. In Ohio and Michigan, peak volumes are delivered in the summer and early fall, and minimum volumes are delivered from January through April.

Dealers in Michigan frequently sell to only one pulp mill. Dealers in the other states more commonly have two or more outlets.

Post and Pole Intermediate Agents

This section covers cedar posts in Michigan and Wisconsin, pine posts and poles in Missouri, and locust fence posts in Ohio.

Timber Handled

Dealers in Wisconsin handled an average of over 100,000 posts in 1959, while those in Michigan averaged 31,000. Cedar post dealers handle only minor amounts of other timber products, except for pulpwood. Most cedar post dealers have a primary interest in pulpwood.

In Missouri, dealers in pine posts and poles tend to be specialists. They do not handle large volumes of other products or engage in other businesses. However, most dealers are also major producers of posts and poles. Often, they produce more volume than they handle as dealers.

Sampled post dealers in Ohio purchased 12,400 locust posts from producers in 1959. Posts are accumulated at a sawmill, store, or other place of business during the late winter months for the sale period which begins in April.

Characteristics of Dealers

Cedar post dealers average 21 years in business and usually handle more pulpwood than posts. They usually operate part-time, handle other timber products, and are often producers of timber products as well. Pine post and pole dealers in Missouri average four years in operation and usually operate full-time; they purchase unpeeled posts and poles and deliver them peeled to treating plants. Locust post handling is a sideline activity of dealers in Ohio whose main occupations are either sawmilling or store operation.

Size of Wood Supply Area

Cedar post dealers in Michigan and Wisconsin, regardless of size, have a radius of operations of between 50 to 60 miles. Dealers in pine posts and poles in Missouri have a considerably smaller radius of operations. On the average, they reach out only 22 miles. Locust fence post dealers in Ohio receive their posts locally from producers in their area. Most purchases are made on the spot delivered to their place of business.

Wood Procurement Methods and Policies

In Michigan and Wisconsin cedar post dealers frequently have an oral agreement with suppliers, usually initiated by the seller. Many purchase posts at their yard with no prior agreement. If delivery is to be made in the future, and especially if advance payment is made, then written contracts are often used. Most posts are purchased delivered at dealers' yards, but some are purchased

roadside and f.o.b. railhead. Dealers frequently assist producers with loans.

In Missouri pine posts and poles are usually purchased delivered to the dealer under loose oral agreements. Most transactions are "on-the-spot" purchases resulting from offers to buy. Loans and other forms of assistance to producers are made only occasionally.

Dealers in locust fence posts, similarly, purchase posts "on-the-spot" delivered. Generally, delivery is made without prior agreement.

Sales of Posts and Poles

Cedar posts are accumulated during late winter, and sales reach a peak in the spring--inventories reach a minimum by October. Sales are varied and frequent, and can be to one type of buyer or to several. In Michigan, outlets are frequently retailers or manufacturers. In Wisconsin, wholesalers are the chief outlet. Smaller firms tend to have local sales, while large firms also supply city or out-of-state outlets.

Pine posts and poles are sold year-round in Missouri. However, following producer seasonality, they tend to peak in the spring and fall and reach minimums in mid-winter and mid-summer. Sales are mainly to treating plants in Missouri and adjacent states (especially Illinois); shipping distances average 175 miles.

Locust fence post dealers sell their product locally to farmers or to a special intermediate agent, namely, truckers who are roving post buyers. The latter purchase most of the posts and transport them to retailers or consumers in other areas.

Sawmills as Veneer Log Intermediate Agents

Sawmill owners frequently act as producers and intermediate agents for raw forest products they accumulate with their inputs of sawlogs. Many sawmills indicate it is more profitable to sell high grade logs as veneer logs rather than utilize them in their sawmill operations. In some areas, other products are also handled. Many sawmills in the Central States handle white oak logs for cooperage bolts, and in Wisconsin, many sawmills also handle pulpwood. Occasionally, the marketing of veneer logs, cooperage bolts, or pulpwood takes precedence over sawmilling operations.

About one-fourth of the sawmills sampled in this study sold at least some of the logs they had accumulated. The average volume of logs sold per firm in 1960 was slightly in excess of 100 M bd. ft.

Sample Size and Timber Handled

In the Lake States, Michigan and Minnesota sawmills are not as prominent handlers of veneer logs as Wisconsin sawmills (Table 40). Some 39 percent of the sampled Wisconsin sawmills handled an average of about 31 M bd. ft. of veneer logs in 1960. One-half of these sawmills also handled an average of 1,475 cords of pulpwood. Seven other sampled sawmills in Wisconsin, while not handling veneer logs, handle pulpwood or other products.

A large portion of the Central States sawmills deal in veneer logs, especially in the western part of the region. Sawmills in the three eastern Central States (Ohio, Indiana, Illinois) handle greater volumes than mills in the Lake States but lesser volumes than mills

TABLE 40--Numbers of sawmills acting as veneer log intermediate agents and average volumes handled, by study area, 1960

Study area	Number of mills	Percent of state sample	Average volume handled (MBF)
Michigan	10	11	9
Wisconsin	16	39	31(a)
Minnesota	4	7	-(b)
Ohio	24	36	31
Indiana	16	39	16
Illinois	8	31	31
Iowa	15	60	67(c)
Missouri(d)	-	-	-
Kansas	14	61	132

(a)Omits one company handling in excess of 1,000,000 bd. ft.

(b)Sample inadequate.

(c)Omits one company handling in excess of 1,000,000 bd. ft.

(d)No mills recorded as agents in study area.

in Iowa and Kansas. Eastern Central States mills handle walnut veneer logs in larger volumes than any other species; white oak veneer logs and cooperage bolts rank next in importance. Nearly 60 percent of the sampled sawmills in Iowa and Kansas sell veneer logs. They prominently handle walnut. Some sawmills in both states also handle white oak stave and heading material. Some Kansas sawmills sell walnut sawlogs as well as veneer logs.

Characteristics of Agents

An important question that needs clarification is whether sawmills selling veneer logs are acting in an intermediate agent role or in a producer role. Table 41 shows that mills do both, and that in most study areas, the intermediate agent role is somewhat less prominent than the producer role. Logs purchased from producers and resold to veneer mills give rise to an intermediate agent function. Veneer logs from owned land, or from sawmill purchased stumpage, whether cut by sawmill employees or contractors, must be viewed as the product of the producer function.

Many sawmills in the North Central region, especially those large enough to have substantial volumes in their log yards, have become an important source of veneer logs for the region's veneer mills. In more cases than not, the sawmill does not recognize its suppliers of veneer logs as veneer log producers, and the veneer mills do not recognize the sawmill as any sort of intermediate agent. Sawmills buy sawlogs; the higher grade logs are then sorted out for resale as veneer logs. The motive is simply profit. Sawmills sorting out veneer logs indicated on the questionnaires that they do this

TABLE 41--Source of logs for sawmills selling veneer grades to veneer mills, by study areas, 1960

Study area	Source		
	Owned lands	Purchased stumpage (percent of volume)	Independent producers
Michigan	0	48	52
Wisconsin	20	38	42
Minnesota(a)	-	-	-
Ohio	9	49	42
Indiana	9	76	15
Illinois	3	55	42
Iowa	5	52	43
Missouri(b)	-	-	-
Kansas	7	48	45

(a)Sample inadequate.

(b)No mills recorded as agents in study area.

because it is "more profitable" or that the logs had a "higher value" as veneer logs.

PRIMARY MANUFACTURERS OF TIMBER PRODUCTS

The forest products in the North Central region were discussed on a broad basis in an earlier section. No attempt was made to fully explore characteristics specific to any one type of industry. In the following section, specific characteristics peculiar to each timber-products industry and their relation to the regional framework will be discussed.

Pulp and Paper Mills

Many of the distinctive characteristics that separate pulp and paper mills from other primary manufacturers are inherent in the physical size of the processing or productive facilities. Usually, paper or board products as well as pulp manufacture are involved. In the Central States, mills tend to specialize in board products, while Lake States mills tend to specialize in paper products. Lake States mills commonly produce as many as four or five grades of paper. A classification of mills by principal product is shown in Table 42.

Pulp and paper mills vary greatly in size (Table 43.) Central States mills are noticeably smaller (averaging 19,000 cords of wood consumption in 1959) than Lake States mills (averaging 66,000 cords of wood consumption in 1959). In the Central States, the principal species used are hardwoods, while in the Lake States, aspen and softwoods form the major raw material inputs (Table 44). Smaller mills in the Lake States indicate a preference for aspen. Larger mills tend to use more softwoods.

TABLE 42--Principal products of sampled pulp and paper manufacturers,
1959

Product	Michigan	Wisconsin (number of firms)	Minnesota	Central States
Pulp and excelsior	1	4		1
Papers				
Fine paper		2	1	
Tissue	2	5	1	
Book paper	1			
Other papers	1	12	2	
Paperboard and building board(a)				
Container board	2	1		2
Other paperboard		1	2	
Building paper				3
Building board(b)	2			1
Total	9	25	6	7

(a)Includes corrugated medium.

(b)Includes particle board.

TABLE 43--Distribution of sampled pulp and paper mills by size class of mill and study area, 1959

Study area	Thousands of cords purchased				Total sample
	Less than 10,000	10,000-50,000	50,000-100,000	More than 100,000	
	(number of mills)				
Michigan	2	3	3	1	9
Wisconsin	4	4	10	7	25
Minnesota		4	1	1	6
Lake States	6	11	14	9	40
Ohio(a)					1
Indiana		1			1
Illinois	1	1			2
Iowa		2			2
Missouri	1				1
Central States	2	4			7
North Central region	8	15	14	9	47

(a)Data not reported by mill.

TABLE 44--Pulpwood species received at sampled Lake States mills, by study area, 1959

Species	Peeled	Rough (thousand cords)	All Pulpwood
MICHIGAN			
Aspen-Birch	102.1	205.0	307.1
Mixed hardwoods	1.8	27.5	29.3
Spruce-Fir	78.8	-	78.8
Pine	10.4	109.9	120.3
Total	193.1	342.4	535.5
WISCONSIN			
Aspen-Birch	348.4	214.7	563.1
Mixed hardwoods	9.4	158.2	167.6
Spruce-Fir	146.2	323.6	469.8
Pine	37.9	319.0	356.9
Hemlock	14.9	67.2	82.1
Tamarack	1.0	15.5	16.5
Other(a)		48.6	48.6
Total	557.8	1,146.8	1,704.6
MINNESOTA			
Aspen-Birch	160.5	67.7	228.2
Spruce-Fir	14.0	62.8	76.8
Pine	9.0	58.5	67.5
Other(b)		18.5	18.5
Total	183.5	207.5	391.0

(a)Includes ponderosa and lodgepole pine.

(b)Species not specified.

Transportation

Pulpwood, unlike most other raw forest products, is often transported by rail, especially where long hauls are involved. As hauling distances diminish, truck hauling becomes more common.

A wide spatial distribution of pulp mills and an abundant wood supply promote truck hauling. On the other hand, concentrations of pulp mills and a relative scarcity of specific species, if not total wood supply, promote the importation of wood by rail from adjacent areas or neighboring regions. In general, rail haul is not used for distances of less than 100 miles. Truck hauls often exceed this distance, but rail haul definitely becomes more prominent with the longer distances.

Competition for pulpwood supplies, which is enforced by spatial mill concentration, and individual species requirements, tends to increase the size of procurement territories. Mills in the Lake States, and especially in Wisconsin, fit this situation. These mills often have supply areas 200 to 400 miles from the mill, and in some instances, specific quality or species requirements are met from shipments originating in Canada or western states.

Procurement Systems

Procurement systems range from dependence on one type of agent source to more complex systems where wood is drawn from a combination of company lands, contract loggers, independent producers, and intermediate agents. The main agent sources of wood in the Lake States are shown by study area and mill size class in Table 45.

TABLE 45--Agent source of wood supply delivered to Lake States pulp mills, by size class of mill, 1959

Study area and size class (cords)	Contract cutter	Producer (thousand cords)	Dealer cords)	All agents
Michigan				
Less than 50,000		57.9	16.7	74.6
More than 50,000		396.8	64.1	460.9
Total		454.7	80.8	535.5
Wisconsin				
1,000 - 50,000	3.1	69.7	85.0	157.8
50,001 - 100,000	205.5	322.8	171.5	699.8
More than 100,000	164.0	445.0	238.0	847.0
Total	372.6	837.5	494.5	1,704.6
Minnesota				
10,001 - 50,000	32.0	68.1	15.3	115.4
More than 50,000	31.2	140.4	104.0	275.6
Total	63.2	208.5	119.3	391.0
Lake States				
Less than 10,000	.6	10.0	16.7	27.3
10,001 - 50,000	34.5	185.7	100.3	320.5
50,001 - 100,000	205.5	559.6	235.6	1,000.7
More than 100,000	195.2	745.4	342.0	1,282.6
Total	435.8	1,500.7	694.6	2,631.1

Nearly all mills purchase wood from producers, and in many cases the most popular system involves only one agent--the independent producer. The 40 sampled Lake States mills purchased pulpwood from 9,800 producers in 1959. The average purchase per producer was 153 cords in the Lake States (an average of 440 cords in Michigan, 138 in Wisconsin, and 73 in Minnesota) and 210 cords in the Central States. Producer contracts vary in size, but Michigan mills tend to use fewer and larger contracts.

Where producers are an important source, mills frequently supply the agent with financial aids and other services. Loans and advance payments are made if the producer has harvested sufficient timber to provide adequate security, or the company may buy stumpage for the producer, deducting the cost from the price paid the producer for the delivered wood.

Dealers are an important (but seldom exclusive) agent source of pulpwood, especially in the Lake States. Dealer contracts averaged 2,300 cords in 1959. The main responsibilities of the dealer are concentrating the output of a large number of small producers, scheduling deliveries (which in a sense helps to stabilize supply), and relieving pulp companies of responsibility for observance of labor laws by producers. Dealers often relieve the mills of the need to supply financial aids and services to producers, but they themselves often receive loans or prepayments from mills. In many cases dealers receive a commission for services rendered of from \$0.50 to \$1.50 per cord.

A number of mills have lessened their dependence on the dealer procurement system. One reason, at least in theory, is that by direct purchase from producers, pulp companies are better able to regulate

the dispersion of logging through an area and, hence, the ability of forests to maintain sustained flows of timber yield. With their own procurement personnel, pulp companies are also able to promote better woodland management by private landowners. An improved forest inventory situation and wider use of local hardwoods have made direct purchase from producers more attractive. Also, improved highway systems and trucking facilities since the early 1950's have made it more economically feasible for producers to transport wood to mills and over much longer distances. Lastly, the use of pulping processes requiring green wood has encouraged company procurement. Inventories have declined in importance and a continuous flow of wood, that is however flexible enough to meet frequent and rapid adjustments, can be maintained by direct contact with many producers rather than a few large dealers.

Several mills, particularly larger mills in Wisconsin, use company employees or contract cutters. Rarely do mills rely on this method for more than 25 percent of their supply requirements. Contract cutters relieve the mills of heavy investments in logging equipment and the expenses involved in maintaining logging crews, including workmans' compensation payments. Company logging and, to a lesser degree, contract cutting, can help overcome problems inherent in seasonality of supply.

Purchase Agreements

In general, where keener competition for available supplies of wood exists, the mills are more active in initiating wood purchase agreements. In areas of lesser competition, suppliers

usually initiate agreements. Suppliers initiate agreements at two-thirds of the Central States mills and one-half of the Lake States mills.

Informal agreements are common. These may be advertisements that the mill is buying upon delivery, oral requests for wood from suppliers, or letters to suppliers stating that the mill needs pulpwood.

Most agreements, as indicated by sampled mills, take some written form. These written agreements, however, are not formal in one sense: neither party would consider them legally enforceable. The agreements are formal, however, in the sense that if specified conditions are not met, future transactions would either be altered or curtailed. The more formal purchase agreements usually specify details concerning volumes, price per cord, method and time of payment, specifications for acceptable wood, and method of delivery. Time of delivery, while not highly specific because of producer problems with weather, transportation, and labor, etc., usually refers to a period within which deliveries are to be made. Payment is usually made upon delivery or within two weeks. Bolt lengths and minimum end diameters are frequently specified, and the unit of measure indicated (usually the standard cord, although other volume units are used). A few mills also purchase by weight. Measurement is done by the buyer.

Seasonal Deliveries and Storage

Deliveries of pulpwood over a yearly period are mainly dependent on weather conditions, the availability of woods labor and what might

be called traditional "logging season" in an area. In the Central States the logging season is heavily dependent on the availability of off-season farm labor. In the Lake States this is also true, but weather conditions are important. For instance, there is an understandable preference for logging wet spruce-fir sites in the winter. Local pine and aspen in the Lake States can be logged year round, depending on the availability of labor, but logging falls off in early spring because of wet conditions and highway weight restrictions.

In Minnesota and Wisconsin, deliveries to the mills are at a peak in January, February, and March. They are lowest during April and May. In Lower Michigan, receipts peak in late summer and are at a minimum from March to early June. In the Central States, there is lesser seasonal variation, but deliveries tend to be greatest during local area off-farming seasons.

As insurance against uncertainties in pulpwood deliveries and requirements, most pulp mills stock several months' supply of wood. Mills having a technological preference for green wood tend to carry smaller inventories; mills using dry, aged wood, carry larger inventories--a few up to a year's supply. On the average, mills carry a four to six months' supply as inventory.

Veneer Mills

The veneer industry in the North Central region manufactures two types of hardwood veneer. First, and foremost, a major segment of the industry produces quality veneer. This material itself, or in the form of hardwood plywood, is used in the manufacture of furniture and fixtures, wall and door panels, radio and television cabinets, small

boats, etc. The furniture and fixture industry is, by far, the largest user of quality veneer. Secondly, a lower-valued product, container veneer, is used in the manufacture of fruit and cheese baskets and boxes, and similar containers.

Of the 117 veneer and plywood plants in the North Central region, 84 produce face or commercial veneer (quality veneer) and plywood, and 33 produce container veneers and/or containers. The veneer and plywood mills shipped over one-quarter of the United States production in 1958, valued at over 75 million dollars; the container veneer and container mills shipped slightly over six million dollars worth of products.

Characteristics of Veneer Mills

Of the 34 veneer mills sampled, only five quality veneer mills and one container veneer mill came into operation within the last 10 years. Most of the mills sampled are older, long-established firms. The average length of operation for established mills is 28 years for quality veneer, and 33 years for container veneer. As indicated by number of employees and inputs of raw material, veneer mills comprise an industry of many small firms in comparison to pulp and paper mills. However, they may be considered relatively large in comparison to the majority of the region's sawmills and cooperage stock mills. Five of the sampled mills had over three million board feet of log receipts in 1959, and 14 had receipts between one and three million board feet. Table 46 indicates that "small" and "medium" sized mills are more numerous than larger mills. Nearly one-half of the mills employ between 50 and 100 employees

TABLE 46--Sampled veneer mills by size class of mill, by sub-region,
1960

Sub-region	Type of veneer	Size class in terms of log receipts			Unknown	Total
		Below 1,000	1,000-3,000	Over 3,000		
(thousand bd. ft.)						
Lake States	Quality	2	7	3	-	12
	Container	4	-	-	1	5
Total		6	7	3	1	17
East Central	Quality	1	6	1	1	9
	Container	1	1	1	-	3
Total		2	7	2	1	12
West Central	Quality	2	-	-	(	2)
	Container	2	-	-	(1	2) ¹
Total		4	-	-	1	5
North Central region		12	14	5	3	34

(Table 47). Quality veneer mills average 82 persons, while container veneer mills average 28 persons.

While veneer mills occur in all states within the region, the spatial distribution is noteworthy in specific areas. Wisconsin is the leading state in the nation in the manufacture of hardwood plywood and accounts for over one-half of the regional production. Indiana, on the other hand, leads both the region and the nation in the production of hardwood veneer. Ohio accounts for one-third of the regional output of container veneer.

Veneer mills in the northern portion of the region rely mainly on northern hardwoods. The major species, in order of importance, are birch, hard maple, elm, basswood, and oak. In the eastern sub-region, walnut, cottonwood and white oak are favored. In the western sub-region, primary interest is centered on walnut. Mills obtain about 90 percent of their log supply from within the region. The remaining 10 percent is imported, largely from Kentucky and Canada. Northern mills concentrate heavily on hardwood plywood and flush doors; eastern mills mostly supply hardwood veneer to the furniture industry. They consume a lesser volume of logs, but because the chief species is black walnut and mainly high quality veneer (i.e., a high percentage of face veneer) the value of products produced is higher. Much of the black walnut used is imported from other areas, chiefly Kentucky and the western sector of the region.

Quality veneer mills sampled in Wisconsin and Indiana, the two states responsible for most of the region's production, indicate that they operated at an average of 89 percent of full capacity in 1960. Container veneer mills averaged 69 percent of full capacity in the

TABLE 47--Sampled veneer mills by number of employees, by sub-region,
1960

Sub-region	Type of veneer	Number of employees					Total
		1-19	20-49	50-99	100-149	150+	
Lake States	Quality	-	1	4	5	2	12
	Container	3	-	2	-	-	5
Total		3	1	6	5	2	17
East Central	Quality	-	-	6	2	1	9
	Container	-	-	2	1	-	3
Total		-	-	8	3	1	12
West Central	Quality	1	1	1 (1	-	-	3 (1
	Container	-	1	)	-	-	1 (1
Total		1	2	2	-	-	5
North Central region		4	3	16	8	3	34

Lake States and 63 percent in the Central States.

Transportation

Most aspects of transporting veneer logs were covered adequately in the chapter "Patterns of Raw Material Assembly in the Wood Products Industry." It should be noted that high quality veneer logs are one of the few products frequently transported by rail, a consequence of the relatively long hauls required. Here is a classic example of a quality differentiated raw material, which can bear the cost of extensive transportation because of its relative scarcity in specific areas and because it comprises a relatively low percentage of the value in the finished or manufactured product. Quality black walnut, especially from the western part of the region, is a striking case in point. Logs of marginal species or value, especially those going to smaller local mills, and logs for container veneer, are transported much shorter distances, almost invariably by truck.

Procurement Systems

Veneer mills obtain their inputs of logs from three major sources. Independent producers are by far the most important source, but substantial volumes of logs for quality veneer mills are either self-produced or purchased from dealers. There may be some error in reported sources since some mills do not recognize distinctions between dealers and producers. Nearly half of the agents interviewed as veneer log producers own sawmills. This presents the possibility that some mills purchased logs and resorted quality logs

for resale to veneer mills. Agent sources of logs, as reported by veneer mills, are summarized in Table 48.

Several mills indicate the proportion of logs received from producers has been increasing over the past several years. Other mills report they have turned more toward self-production and, in some cases, to dealers. There is no clear-cut trend to indicate which, if any, agent source will become more prominent in the future.

Landownership sources of logs delivered to veneer mills are recorded in Table 49. Farm lands are the prime source of veneer logs, but other classes of ownership assume greater importance in the case of quality veneer logs than for container veneer logs. The indication is that all classes of landownership must be tapped to adequately supply quality veneer log requirements.

Veneer mills indicate that they assist their supplying agents only to a very limited extent with financial and business aids. The only significant aid noted is assistance by quality veneer mills to producers in the purchase of stumpage. Some mills will advance funds for stumpage provided the producer contracts to deliver the logs to the mill and provided that the amount advanced is only a minor proportion of the value of the delivered logs. Five sampled mills state this is common practice; 10 others state the practice is acceptable but not very frequent. Similar aid is extended to dealers, but to a lesser extent.

Purchase Agreements

Sampled veneer mills in the North Central region purchase about

TABLE 48--Agent source of veneer logs and number of suppliers reported by sampled veneer mills in the North Central region, 1960

Type of Veneer	Type of Agent		
	Producer	Dealer	Self-Produced(a)
Quality Veneer Mills:			
Percent of receipts	63	18	19
Number of suppliers	53	21	--
Container Veneer Mills:			
Percent of receipts	96	0	4
Number of suppliers	30	0	--

(a) Either from owned lands or purchased stumpage, usually by mill employees, but occasionally by jobbers under contract.

TABLE 49--Volume of logs delivered to veneer mills in the North
Central region from different landownership sources,
1960

Source	Container Veneer mills	Quality Veneer mills
	(percent of volume)	
Own land	0	7
Farm land	76	51
Other private	11	28
National forest	2	3
State forest	5	2
Other public	6	3
Unknown	0	6
Total	100	100

30 percent of their log supplies on a no prior agreement basis. These logs are simply purchased when an agent appears at the mill with them. Another 40 percent of the sampled log receipts are purchased under oral agreement, and the remaining 30 percent, under some type of written agreement. Many of the written agreements could be considered formal in that they outline several conditions to which both parties agree. Container veneer mills and medium and small mills rarely use written contracts; they rely heavily on oral contracts. Large mills tend to use written contracts or rely on prior agreement.

All contracts cover some type of specifications, and there is no appreciable difference between written and oral specifications. All contracts specify species or species group. In most cases, the amount of timber specified is simply an estimate of what the agent has to offer. Size of wood is usually stated in terms of minimum acceptable top log diameters. Quality is usually on the basis of mill grade or some standardized grading system. Time of delivery is usually specified--a compromise between mill needs and agent ability to deliver within a specified time. Payment is usually called for upon delivery or within one week, and usually on the basis of mill scale in thousands of bd. ft. by whatever type of log rule the mill uses. No conditions are placed by the mills on the agents' methods of harvesting, except for one mill which cautions against destructive logging practices. In general, contracts give maximum protection to the mill and a minimum to the seller.

Stumpage purchase contracts by sampled veneer mills usually indicate the species to be cut. The amount of timber is not clearly

noted in many cases. Size of timber is also not clearly noted except that several mills stipulate a minimum d.b.h. The quality of timber in most cases is understood to be "veneer grade." Time of harvest varies from a few months to several years. Method of payment and time and basis of measurement are not noted in many cases. However, mills indicate about one-half of the agreements are on a lump-sum basis paid in advance, while the remainder are cash or check payments on the basis of mill scale when the wood reaches the mill yard. Five mills indicate they operate under harvesting stipulations, notably, time limitations and promises of no damage to property. Two of these mills indicate they would accept operating under minimum "good forestry practices" if the owner insisted. Five mills report there are no harvesting stipulations they would accept.

Sampled mills report that, on the average, 50 percent of their log receipts are obtained on the basis of mill initiative, and 50 percent through the initiative of agents. On a volume basis, slightly more than half was obtained by mill initiative as several large mills favored this method. Container veneer mills almost invariably depend on supplying agents to take the initiative.

Seasonal Deliveries and Storage

Veneer mills in the region do not usually receive a continuous flow of raw material inputs. In general, receipts are lowest during July and August. Several mills prefer a minimum of inventory during the summer months because of problems with end-drying or weathering and with "spoilage" in general. Receipts increase in September and reach a peak in the months of December, January and February. By March,

receipts begin to decline, and usually continue to do so through April, May, and June. A few companies, usually under special circumstances and contrary to the general trend, buy heavily in the summer. Twenty-two sampled companies indicate they did not like seasonal fluctuations in wood receipts. Nine companies, however, indicate they prefer them. Aside from summer "spoilage" problems, some mill operators prefer slack seasons so they can devote more time to other business enterprises or because the slack period coincides with vacation plans. Most reasons given for seasonality in wood receipts are tied to weather, custom (such as winter logging), and farming activity or other seasonal work patterns.

Inventories follow a pattern somewhat similar to receipts. They are heaviest from December through March--gradually declining until a low is reached in July or August. However, even though receipts increase in the fall, inventories still remain low in September, October, and early November. Supplies are usually replenished by December. Sixteen sampled mills indicate they do not prefer seasonality in log inventories. Fourteen mills, however, prefer them. Half the sampled companies point out they have physical storage limitations. Technological limitations on holding inventories are not considered a problem by 13 of the sampled mills. Seventeen others point out problems with summer "spoilage," disease and insect damage, and end-drying or weathering.

Sawmills

The sawmilling industry in the North Central region produces a variety of products. The major types of production are shown in

Table 50. Hardwood lumber (particularly hardwood grade lumber) is the most important product in the region. Pallet material and pallets rank next. Softwood lumber and railway ties are of lesser importance, and other manufactured products and flooring stock are relatively minor in importance. Hardwood grade lumber and pallet material production are prominent in Michigan, and both hardwood grade and standard hardwood lumber production are prominent in the eastern Central States. Softwood lumber production was sampled primarily in Minnesota, while railroad tie and flooring stock production was sampled mainly in Missouri.

The sawmills sampled in the North Central region vary greatly on the basis of size class. Small mills are most numerous, but very small mills (producing less than 100,000 bd. ft. in 1960) were deliberately limited in sampling. The sampling of mills on the basis of size class follows:

<u>Size</u> (thousand bd. ft.)	<u>Number of Mills</u>
1-99	33
100-499	195
500-1,000	94
Over 1,000	128
All sizes	457

Characteristics of Sawmills

About 26 percent of the sawmills producing less than 500 thousand bd. ft. and seven percent of the larger mills are portable (Table 51). No portable mills were sampled in Illinois and Kansas, but in most parts of the region portable mills are common. About

TABLE 50--Number of sawmills sampled, by major product and study area, 1960

Product	Study area										Total
	Mich.	Wisc.	Minn.	Ind.	Ohio	Ill.	Iowa	Mo.	Kan.		
Hardwood grade	32	13	4	17	17	5	9	3	8	108	
Hardwood lumber	7	-	8	12	16	13	4	17	7	84	
Total	39	13	12	29	33	18	13	20	15	192	
Pallet material	15	4	11	6	10	6	1	8	1	62	
Pallets	22	2	1	-	8	2	2	7	2	46	
Total	37	6	12	6	18	8	3	15	3	108	
Softwood lumber	6	13	31	-	-	-	-	9	-	59	
Railroad ties	-	-	-	2	7	-	10	27	-	46	
Flooring stock	-	-	-	-	1	--	-	15	-	16	
Other Manufactured products	4	3	1	2	-	-	-	4	-	14	
Unclassified	-	7	-	2	8	-	-	-	5	22	
All Products	86	42	56	41	67	26	26	90	23	457	

TABLE 51--Numbers of sampled portable and stationary sawmills, by study area, 1960

Type of sawmill	Mich.	Wisc.	Minn.	Ind.	Ohio	Ill.	Iowa	Mo.	Kan.	Total
(Mills below 500 thousand bd. ft.)										
Stationary	21	14	19	13	23	12	8	31	15	156
Portable	7	3	7	-	17	-	-	22	-	56
Unknown	2	-	-	14	-	-	-	-	-	16
(Mills above 500 thousand bd. ft.)										
Stationary	46	24	22	5	23	14	17	31	8	190
Portable	10	1	8	2	4	-	1	5	-	31
Unknown	-	-	-	7	-	-	-	1	-	8
Total stationary	67	38	41	18	46	28	25	62	23	346
Total portable	17	4	15	2	21	-	1	27	-	87

20 percent of all reporting sawmills are portable.

Sawmills sampled in the region averaged about nine full-time employees and two part-time employees in 1960. However, as can be seen below, the variation between study area averages was considerable:

Study area	Average number of full-time employees	Average number of part-time employees
Wisconsin	33	2
Kansas	14	5
Michigan	8	2
Iowa	8	1
Indiana	7	1
Illinois	7	2
Ohio	6	2
Minnesota	5	4
Missouri	5	1
Region	9	2

The highest averages occur in Wisconsin and Kansas, while the lowest occur in Missouri. As might be expected, the average number of full- and part-time employees increases as the size of the mill increases. In general, mills producing less than 100 thousand bd. ft. per year average one full-time employee and one part-time employee; mills producing from 100 to 499 thousand bd. ft. average three full-time and two part-time employees; mills producing from 500 to 999 thousand bd. ft. average seven full-time and two part-time employees; and large mills producing over 1,000 thousand bd. ft. per year average 23 full-time and four part-time employees.

The average number of years in operation in the region is 15. Mills in Ohio and Illinois average somewhat less than 11 years, while mills in Indiana, Kansas and Wisconsin average well over 20 years.

By product, sawmills producing railroad ties or flooring stock average the least number of years in operation (about 11); at the other end of the scale, mills producing hardwood grade and manufactured products average 18 and 25 years, respectively. Size class of mill appears to make little difference in years of operation.

About 70 percent of the sawmill operators sampled obtain virtually all of their income from the production of lumber. The remaining 30 percent are part-time operators with alternate occupations. As might be expected, smaller mills tend more toward part-time operation. The alternate occupations from which part-time sawmill operators receive income are listed in Table 52. Farming is the most frequently mentioned alternate occupation in all states except Michigan and Wisconsin, where the ownership of other business enterprises and the retailing of forest products, respectively, out-rank farming.

Approximately 15 percent of the total number of firms sampled operate at least one other wood-using mill. The average number of mills, for multi-mill firms (including the sampled mills) is three.

Sampled sawmills indicate they purchased their sawlogs by the following units of measure:

Unit of measure	Number of mills
Doyle Log Rule	200
Scribner or Scribner D.C.	87
International Quarter inch	15
Standard Cord	11
Lumber Scale	85
Unknown	59
Total	457

TABLE 52--Alternate occupations of sampled part-time sawmill operators in the North Central region, 1960

Alternate occupation	Number of operators	Percent of sample
Farmer	65	49
Owner of other enterprise	19	14
Retailer or wholesaler of forest products	16	12
Salaried occupation	11	9
Producer of sawlogs or contract logger	5	4
Other	16	12
All occupations	132	100

Mills in Michigan use a variety of measures, but the Doyle Log Rule and the Standard Cord are predominant. In Wisconsin and Minnesota, the Scribner or Scribner Decimal C rules are most common. In the Central States, the Doyle rule is predominant, but in Missouri, "lumber scale" is of equal importance.

About 50 percent of the sampled sawmills have done some custom sawing, but custom sawing represented less than five percent of the total 1960 production.

Wood Procurement

Sawmills sampled in the North Central region obtain their sawlogs from several agent sources. Dealers are unimportant as suppliers of sawlogs, accounting for less than one percent by volume of the total sample. Producers supply about 50 percent of the volume, while over 40 percent is supplied by the sawmills themselves (mostly by their own employees cutting purchased stumpage). Very minor volumes are obtained from other sources.

Landownership sources of sawlogs are: own lands, 15 percent; farm ownerships, 45 percent; other private lands, 21 percent; national forests, 10 percent; and state forest lands, nine percent.

Sawmills do not as a rule offer aids or financial assistance to producers, although several of the mills offer advance payments to producers for stumpage purchasing. Usually such advances represent a percentage of the selling price to be received by the producer after harvest and delivery to the mill. Most mills do not consider this standard procedure. About three-fourths of the sawmills indicate that their sawlog supply area has not changed in size over the past several

years. Decreases in supply area are almost non-existent, but about one-quarter of the mills have expanded their timbersheds. Expansions have been most prominent in Michigan and Missouri and for manufacturers of hardwood and hardwood grade lumber.

Nearly all the sawlogs used by sawmills in the North Central region arrive at the sawmill by truck. As might be expected, the larger the sawmill the larger the timbershed supplying the mill.

Supply area radius by mill size class is as follows:

<u>Size Class</u> (thousand bd.ft.)	<u>Average Radius</u> (miles)
1-99	15
100-499	27
500-999	47
1,000 and over	63

Average radii of sawlog supply areas, by study area, are shown below:

<u>Study area</u>	<u>Average Radius</u> (miles)
Michigan	36
Wisconsin	59
Minnesota	37
Indiana	37
Ohio	30
Illinois	34
Iowa	81
Missouri	16
Kansas	121
Region	41

Variations from the regional average of 41 miles are not difficult to explain. Wisconsin, with a heavy population of long-established sawmills, is gradually increasing the size of its sawmill timbersheds

as quantities of and/or quality material becomes more scarce.

Missouri is below the regional average because of the high percentage of local farm sawmills, many of which are sawing railroad ties. Iowa and Kansas sawmills tend to saw quality hardwoods, which are more scattered and widely dispersed than sawlog volumes located in other study areas.

Sawmills tend to purchase logs from producers under oral purchase agreements or with no prior agreement. Only larger sawmills purchase a substantial volume of sawlogs from producers under written agreement, and this is limited to 15 percent of their total requirements. For all sampled mills, 10 percent of the sawlog volume is purchased under written agreement; 50 percent under oral agreement; and 40 percent under no prior agreement.

Purchase Agreements

Usually, purchase agreements are negotiated from one to 15 weeks in advance of delivery. The regional average is five weeks, and larger mills usually negotiate agreements for delivery nine or ten weeks in advance.

Oral purchasing agreements usually include specific details that are desirable for the sawmill operator. In most cases, quality specifications were not stated, but they are mutually understood. Size of sawlogs is usually specified as a minimum top diameter, frequently 10 inches. Quantities of sawlogs to be purchased are specified by about 44 percent of the mills; other mills are apparently prepared to accept all the producer can deliver. Method of payment is usually on the basis of mill-scale, and the actual payment is in the

form of check or cash usually upon receipt of the logs or within one week. In only a few cases are oral contracts considered legally binding by both parties. Most mills, however, indicate that they would not default on oral purchase agreements once made.

Sawmills supply some 40 percent of their own sawlog needs. Sampled sawmills producing less than 500 M bd. ft. annually purchased over 25 million bd. ft. of sawlogs as stumpage in 1960, while the larger sawmills, producing over 500 M bd. ft. annually, purchased some 110 million bd. ft. For all mills, 27 percent of the stumpage was purchased under written contract with a public landowner, 55 percent under written contract with a private landowner, and 18 percent under oral agreement with a private landowner. About 85 percent of the stumpage contracts or agreements refer to the kind of timber, but in the majority of cases the reference is simply to "all merchantable" timber. Only 30 percent of the agreements or contracts specify species.

Some 75 percent of the contracts or agreements mention quantity of timber, but in most cases, the reference is a vague "all merchantable." Size of timber is specified in 87 percent of the contracts or agreements. It is measured either in terms of minimum stump diameter or minimum diameter at breast height. Quality of timber purchased is usually not included in the contract or agreement; most mills assume the selection of quality in their option. Over three-quarters of the sawmills, particularly the large ones, specify a period of harvest, usually six months to two years. Method and time of payment are nearly always included in the agreement or contract. The three methods in general use, in order of importance, are:

(1) lump sum in advance; (2) payment per unit of volume after cutting on the basis of mill scale; (3) and a combination of the methods above. Only a few mills pay on the basis of scale in the woods before delivery to the mill.

Logging provisions are frequently included in contracts and agreements for stumpage. Purchasers commonly agree to: (1) repair damage to fences, gates, roads, and/or waterways, etc.; (2) clear slash from roadways and boundaries, etc.; and (3) locate roads as requested and avoid crossing fields. Less commonly, purchasers agree to exercise care in logging so as to preserve growing stock. Only one-fifth of the sawmills would be willing to accept any limitations on logging to preserve growing stock, even at the landowner's insistence. Few sawmills show any concern about good forestry practices.

About 80 percent of the sawlog volume purchased by sawmills is obtained in sales initiated by producers. Sawmills find it necessary to contact producers to obtain only 20 percent of their total raw material needs.

Seasonal Deliveries and Storage

Sawlog deliveries to mills are not uniform throughout the year, although 60 percent of the mills indicate they would prefer a continuous flow throughout the year without seasonal fluctuation. The reasons behind uneven receipts are varied and they frequently differ among geographic areas. The explanations are set out in Table 53. Figures 12 and 13 indicate the seasonal trends in deliveries and inventories by geographic areas. Sawlog timber in

TABLE 53--Reasons specified for variation in sawlog receipts, by sampled sawmills, by study area, 1960

Order of importance	Reasons by study area			
	Lake States	East Central States	Iowa and Kansas	Missouri
1.	Markets	Weather in general	Weather in general	Weather in general
2.	Spring break-up	Markets	Farm work	Markets
3.	Logging or hauling conditions	Farm work	Spring break-up	Farm work
4.	Weather in general	Summer spoilage	Prefer winter logs	
5.	Availability, supplier's convenience	Alternate occupation	Prefer fall logging	
6.	Winter logging better	Good weather-clean logs	Markets	
7.	Winter logs better	Spring-soft ground	Prefer winter logging	
8.	Road restrictions	Road restrictions	Winter logging poor	
9.	Saw in summer		Alternate occupation	
10.	Alternate occupation			
11.	Producers farming			
12.	Wet area, winter logging			
13.	Winter logging traditional			
14.	Summer spoilage			

Receipts Activity

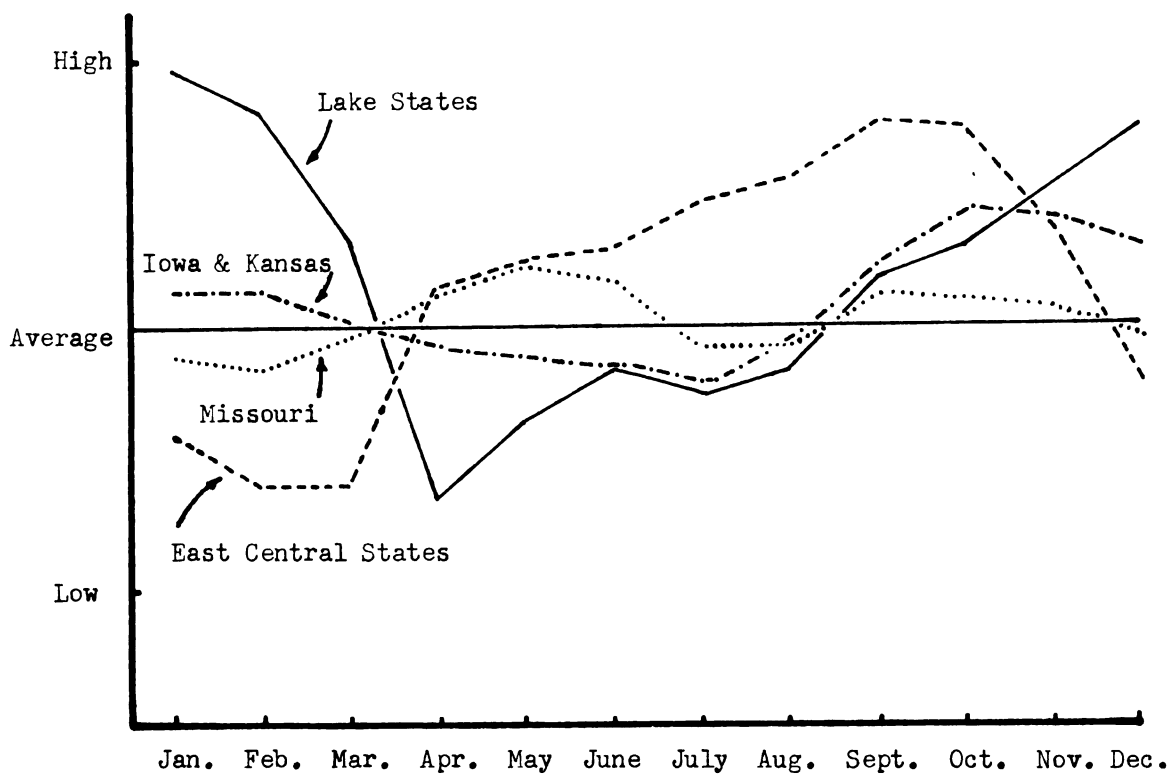


Figure 12--Monthly variations in rate of sawlog receipts at sampled sawmills, by study area, 1960. (Receipts activity based on reports by sampled firms; it is not based on the volumes received.)

Size of
Inventory

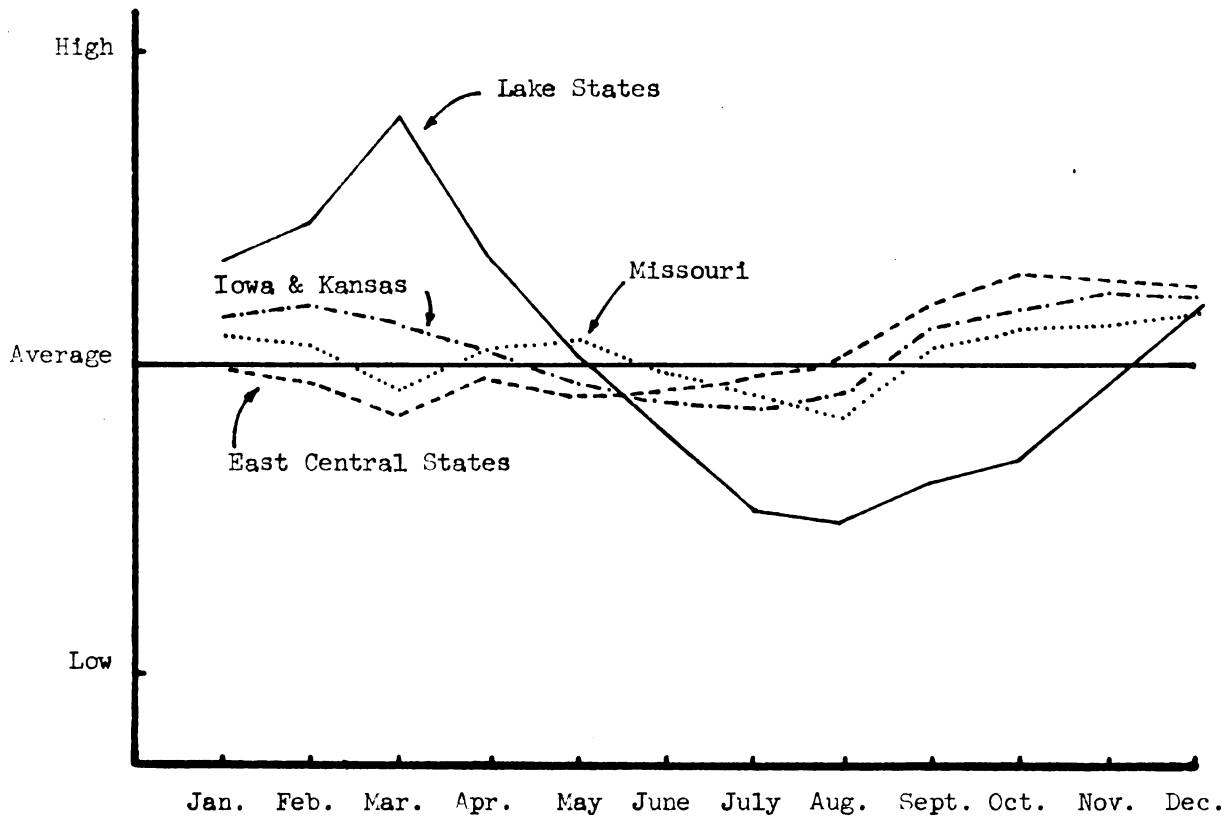


Figure 13-- Monthly variation in size of inventory of sawlogs at sampled sawmills, by study area, 1960. (Size at inventory based on reports by sampled firms; it is not based on actual volumes on hand.)

the Lake States has been traditionally harvested in the winter and this is still very much in evidence today. Most of the logging and hauling are done before the spring break-up and while receipts are lowest in April, inventories reach a maximum in March. Sales increase in the spring and continue throughout the summer. Many mills indicate their market potential is greatest at this time. Inventories are depleted by the end of the summer, but logging and hauling activity increase in the fall and increased receipts once again begin to replenish inventories.

In the East Central States receipts are low in the winter; sawmills and producers suggest weather and markets as the main causal factors. In this area winter logging lacks the advantages found in the Lake States--frozen ground and packed snow. Rain and frequent thaws interfere with winter logging. The stimulus of improved weather and market conditions lead to increased deliveries and inventories in late spring and summer. The peak in deliveries and inventories comes in the fall.

Sawmills in the western Central States follow one pattern in Missouri and another in Iowa and Kansas. In Missouri, receipts and inventories are highest in the fall and spring. Winter logging is not preferred, but inventories built up in the fall and used over the winter are replenished in the spring. Markets are best in the spring, but summer production is low because of the conflict with farm work. In Iowa and Kansas, a definite preference for hardwood logs cut in the fall or winter is noted. Logging and hauling reach a peak in October and November and continue throughout the winter until the spring break-up. Inventories then decline throughout the summer. Receipts activity is lowest in the summer; a large number of firms indicate

this is definitely linked to farming activities. Sawmills in the Iowa and Kansas area cutting hardwood lumber are the only ones indicating that seasonality in deliveries shows little relationship to seasonally fluctuating markets. In part, this may stem from dependence on national rather than local markets.

Portable sawmills usually carry little if any inventories, but stationary sawmills indicate that inventory patterns are frequently a result of receipts activity. However, some 40 percent of the sawmills do not carry as much inventory as they would like to, primarily because of limitations in log yard size and capital to invest in inventories. Smaller mills are more frequently limited by capital, whereas larger mills are more often limited by the size of their log yards. About 40 percent of the firms also report biological or climatic limitations on inventories. The most frequent problem noted is stain in hardwoods, but boring insects, log checking and other problems are troublesome.

Table 54 shows volume limitations on inventory for various types of sawmills. It should be viewed with caution as it reflects the averages for firms in widely different size classes. The table's prime importance is in indicating that a significant increase in inventories could be attained by many sawmills if they could overcome either one or the other of the two general kinds of limitations listed.

Change in Sawmill Size

Sawmills sampled in the region show variations in sawlog receipts from previous years. In general, sampled mills in Wisconsin and Indiana indicate only very minor decreases in yearly receipts, and

TABLE 54--Average volume limitation of sawlog inventories reported by sawmills, by product group, 1960

Product group	Cause of limitation	
	Capital limitations or log yard size	Biological or Climatic factors
	(average volume, thousand bd. ft.(a))	
Hardwood grade	320	220
Pallets	150	210
Pallet material	130	165
Other manufactured products	130	115
Hardwood lumber	150	175
Softwood lumber	200	160
Railroad ties	90	285
Flooring stock	90	90
Unclassified	275	165
Weighted average	195	190

(a)Based upon replies from approximately 195 firms which indicated sawlog inventory limitations. Figures rounded to nearest 5 thousand bd. ft.

there is not enough evidence to establish any trends as to change in sawmill size. Similarly, mills in Ohio and Illinois indicate only very minor increases in receipts, and again insufficient evidence is available to establish any trends in changes in sawmill size. However, 25 mills in Michigan increased receipts, and nine of these mills showed increases of over 50 percent. Only 12 mills in Michigan decreased their yearly receipts, and only two had decreases of over 50 percent. In Iowa and Kansas, 22 mills increased their yearly receipts; five mills decreased receipts. In Minnesota, 18 mills decreased their yearly receipts and nine mills increased receipts. In Missouri 29 mills decreased their yearly receipts; and seven increased receipts. A trend might be developing in the North Central region, in that sawmill size (based on receipts), is increasing in Michigan, Iowa and Kansas, and decreasing in Minnesota and Missouri.

On the basis of the sawmills sampled, it is evident, as shown by changes in yearly mill receipts, that smaller mills are decreasing in size and that larger mills are increasing in size. For mills in the 1-99 M bd. ft. class, six percent had increases and 36 percent decreases. Similarly, in the 100-499 M bd. ft. size class, 16 percent had increases and 29 percent decreases. For larger mills in the 500-999 M bd. ft. class, 23 percent increased and 17 percent decreased production. Of the mills in the 1,000 M bd. ft. or over class, 32 percent increased receipts, while 12 percent decreased receipts.

Some changes were also noted by type of sawmill. In general, receipts increased for 35 hardwood grade manufacturers and decreased for 16. Fourteen pallet manufacturers increased receipts while four decreased. However, 11 pallet-stock manufacturers decreased while

20 increased receipts. This adds support to the contention that pallet manufacturers are undergoing vertical integration to some extent in that they are supplying their own pallet stock material. Over-all, 41 mills producing softwood lumber, railroad ties, and especially flooring stock, decreased their receipts of sawlogs while only 13 mills of these types increased sawlog receipts.

Production Capability

Most sawmills reported operating at below full capacity. Average figures, by study areas, are reported below:

Study area	Percent of capacity
Lake States:	
Michigan	88
Wisconsin	58
Minnesota	60
Central States:	
Ohio	64
Illinois	66
Indiana	66
Missouri	59
Iowa	80
Kansas	54

Some input-output information is available for sawmills. In the Lake States, Michigan and Wisconsin sawmills report an over-run of about 24 percent. Minnesota sawmills have an over-run of about 16 percent. In the Central States, Ohio sawmills did not report an over-run, but Indiana mills have an over-run of 27 percent, and Illinois mills, 19 percent. Missouri mills have been omitted because many sawed ties involve volume losses rather than over-run. Also, the manufacture

of gunstock blanks by some mills precludes accurate analysis. These mills usually recover only 30 to 50 percent of their actual input volumes in the gunstock blanks.

Cooperage Stock Mills

Cooperage stock mills in the Central States manufacture staves and heading, primarily from species in the white oak group, as the main components of whiskey barrels. Many of the mills are vertically integrated with barrel-manufacturing firms and distilling firms. Of the 23 mills sampled, seven handled less than 500,000 bd. ft. of bolts in 1959; four handled from 500,000 to 999,000 bd. ft.; and 12 handled one million bd. ft. or more.

Characteristics of Mills.

Two mills had 50 or more full-time employees in 1959, and six mills had between 25 and 49 employees. The average number of full-time employees for reporting mills was 19. The mills averaged six years in operation at their present location and only six mills had operated longer than 10 years. Frequent changes in location are evident in the industry as the mills move to new locations to gain access to quality timber. The mills are highly specialized and producers rarely market logs other than cooperage timber at cooperage stock mills. A few, however, resell some sawlogs and veneer logs. All cooperage bolt receipts received at sampled mills are transported by truck. The average trucking distance to the mills in 1959 was 41 miles, and this average did not vary much either by size of mill or study area. The average radius of the mills' supply areas was 85 miles.

Agent Sources of Wood Supply

About 35 percent of the entire raw wood supply obtained by sampled mills is self-produced. It is harvested by mill employees or contractors from purchased stumpage. None of the sampled mills harvest timber on owned lands. Producers supply 62 percent of the total volume of cooperage bolts delivered to sampled mills. Recognized intermediate agents account for only three percent of the volume. The same pattern shows up in all the Central States with the exception of Illinois. Here, mills self-produce 60 percent of their raw material requirements. The average mill in the region in 1959 purchased stumpage from 39 landowners and purchased delivered bolts from 41 producers. This supports the contention that cooperage bolts come from small, scattered tracts, and that producers are also small-scale operators.

Wood Procurement Methods and Policies

Cooperage stock mills and their suppliers share the initiative in instituting wood purchases. Where the mill takes the initiative, contact is frequently made by either "scouting" or by personal contact with known producers. Producers taking the initiative frequently appear with loads of bolts at mills they know are buying.

Nearly all stumpage contracts made by the mills are written. Reference is usually made to white oak or the white oak group, and volume is indicated generally by "all," "all merchantable," or "all stave bolt material." Size of timber is usually indicated by stump diameter; minimums range from 12 to 18 inches, but 14 and 16 inches are

the most common. Quality is usually only indicated by the word "sound" or "good." Frequent methods of payment are: (1) lump sum in advance, (2) on the basis of mill log scale after harvest, and (3) a combination of the two. Several mills include "no damage" clauses in their contracts with reference to roads, fences, waterways, and other property. "No damage to young growth," or other accepted forestry practices are only an occasional feature of contracts. Many mills indicate they would not accept limitations on their logging practices even at the landowners' insistence.

Cut cooperage timber is usually purchased under loose oral agreement, or without prior agreement, and on a delivered basis. About one-half of the mills advance payments on bolts to be delivered by producers, but this is not considered to be common procedure. A few mills offer some other minor technical aids or assistance. No attempt was noted to organize supply territories for producers, but many producers frequently sell to only one mill.

Seasonal Deliveries and Storage

Seasonal deliveries are highly variable by study area. Bolt receipts in Missouri are lowest in the summer and highest in the winter. In Indiana, receipts are high in the spring and summer. Ohio receipts are heaviest in the fall, and in Illinois, receipts peak from June through August and again in November. Seasonal deliveries are considered typical but not desirable by most mills. Producer activity seems to be the controlling factor. Inventories vary with needs and the only evident policy is to increase inventories before slack delivery periods. Physical storage space is not

considered a problem by the sampled mills, but damage as a result of weather, insects, and fungi usually limit storage to not more than two months during critical periods.

Primary Manufacturers of Posts, Poles and Piling

Firms sampled here included three cedar fence companies in Michigan, three wood preservation plants in Illinois and three in Missouri which treated pine posts and poles, and four treating plants in Ohio specializing in the treatment of oak or pine highway posts. Two wood preservation plants treating piling--one in Illinois and one in Minnesota--were also included.

Michigan Fence Companies

The sampled fence companies had operated on the average for 20 years, and in 1959 purchased over a half million northern white cedar posts and over one and a half million cedar pickets. Manufacturing is on a year-round basis but both purchasing and sales are seasonal. Purchases are usually in the winter and inventories reach a peak in March and April. Sales peak in July and August. The size of wood supply areas varies from three to 11 counties in the northern Lower Peninsula. All suppliers are considered producers by the firms, and generally all receive the same prices for posts and pickets. In many cases small producers sell their posts and poles to another producer who acts as a dealer, or to a non-producing dealer. The dealers then sell larger concentrated volumes to the fence companies.

Written and oral purchase agreements are used by one company, oral agreements by another, and the third company purchases under

"no prior agreement." Agreements are usually made in October or November and specify species, quantity, quality, time or period of delivery, and method and time of payment as well as price. Delivery can often be made "at any convenient time," and payment is usually upon delivery. A retroactive price bonus is offered to suppliers, generally if they exceed 10,000 pieces. Contracts are really not enforced, and producers can vary quantities delivered; at the same time, mills reserve the right to stop purchasing. Loans are offered producers in advance of deliveries, but this is not considered a general rule.

Missouri and Illinois Pine Post and Pole Treating Plants

These firms vary greatly in size. The largest plant employs 90 full-time workers, and the smallest, seven. The average is 40. Seasonal or part-time employees are rarely used. All told these plants treated some 790,000 pine posts, 44,000 pine poles, 25,000 oak posts, 197,000 linear feet of oak piling, several hundred thousand ties, and nearly four million feet of lumber in 1959. The Missouri firms purchase unpeeled posts and poles; the Illinois firms purchase peeled wood. The Missouri firms obtain 19 percent of their posts and poles in the form of stumpage, and 81 percent is purchased from producers. The Illinois firms purchase 85 percent of their post and pole inputs from producers, eight percent from dealers, and self-produce seven percent. Seasonality in wood purchases is evident, but there is no dominant pattern except that the summer months are a low period in wood delivery activity. Two firms in Missouri reach out

50 miles for their wood supply; the third firm purchases wood 150 to 550 miles distant in Arkansas and has it shipped in by rail. Illinois firms obtain posts and poles from several surrounding states; only a small portion of their needs is obtained in-state.

No formal contracts are used by the firms in obtaining posts and poles. Two Missouri firms buy poles cut to their specifications when delivered; the third handles buying out-of-state. Illinois firms make oral agreements two weeks to one month in advance with producers who supply poles to their specifications. Two of the Missouri firms purchase stumpage. Written contracts are used, and a lump-sum payment is made for all merchantable pine. Cutting restrictions are not included. All the treating plants offer advance loans to producers if the need is urgent, but such advances are not considered standard practice.

Ohio Oak and Pine Highway Post Treating Plants

These non-pressure type plants treated about 118,000 highway posts in 1959. Some 25 percent of the posts were sawn, and purchased from sawmill operators. The rest were round; purchased from producers. Timbersheds are moderately small. One plant reaches out some 25 miles, but the other plants reach out distances up to 100 miles on occasion. Sawed posts are generally brought from greater distances as they have a higher per unit value and can absorb higher transportation costs. All the owners of the treating plants are engaged in alternate occupations which they consider more important. Only one owner has another timber-products-connected enterprise--a sawmill. The firms are

relatively new, averaging only six years in operation.

Inputs and sales are seasonal. Inventories of untreated posts reach a peak about March and April, and then decline through spring production. Procurement systems are not extensive. Treating plant needs and raw material specifications are known locally, and producers simply bring in posts for sale at offered prices payable upon delivery. Loans or aids are rarely offered producers.

Wood Preservation Plants Treating Piling

Only two plants using raw material from within the region were sampled. Thus, a description of their characteristics and activities cannot be considered typical. However, a few points of interest can be noted.

The Illinois treating plant is one of the largest producers of pressure-treated piling in Illinois. This firm processed close to 250,000 linear feet of oak piling in 1959. Orders received by this firm for specific sizes of piling are usually filled within two weeks. Since the plant does not maintain a large inventory of treated or untreated piling, wood suppliers are contacted immediately after orders are received. Due to the short notice given suppliers, oral contracts are standard.

Piling is a minor product to the firm operating within the Minnesota study area. The pine piling pressure-treated by this firm in 1959 represented an insignificant volume of wood compared with the volumes of posts, poles and lumber that were processed. Unlike the Illinois plant, this firm attempts to anticipate market needs. It treats piling before orders are received and maintains a small

inventory of preserved piling in its yard. Producers deliver untreated piling to the firm's yard during the winter months under an oral or written contract.

COSTS AND PRICES

Production costs, prices received and returns to market agents handling timber are examined in this section.

Data were obtained from over a thousand agents, but unfortunately, the information was concentrated in specific areas as to type of agent and product. Hence, for the analysis appearing in the following sections, some factors are discussed more intensively and at greater length than others.

Costs of Production

Production costs represent a composite of three more or less independent costs. These are: (1) stumpage costs; (2) logging (felling, bucking, and skidding) costs; and (3) hauling costs. In the North Central region these three types of costs are usually the concern of the producer. However, as previously noted for some products, primary manufacturers sometimes produce substantial amounts of their own raw material inputs. Thus, where the data reported by primary manufacturers are adequate, these costs are reported along with the corresponding producer costs. Because of differences in methods of operation and in computing and reporting, where variation in costs is noticeable for the same operation, the primary manufacturer figure can usually, but not always, be considered to be more applicable than the producer figure. Also, the former apply to larger volumes and broader geographic areas.

Costs of production for posts and poles could not be clearly analyzed on a composite basis. They are considered separately at the

beginning of the section.

Posts and Poles

Costs of producing cedar posts in Michigan are based on data supplied by 25 firms. Estimated costs, related to a standard, unpeeled, seven-foot post with a four-inch top diameter, are as follows:

Costs	Range (cents per post)	Average
Stumpage	3-10	6
Logging(a)	7-15	10
Hauling	2-17	5
Total	12-42	21

(a)Peeling adds seven cents to the logging costs shown.

Average costs, totaling 21 cents per unpeeled post (or 28 cents per peeled post) can be considered fairly representative.

Buyers of pine posts and poles in Missouri (frequently producer-dealers) estimate logging and hauling costs at 70 percent of the price paid to producers. Unfortunately, inadequate data preclude separation of the residual 30 percent into stumpage cost and profit margin. The price paid, combined logging and hauling cost, and combined stumpage cost and profit margin are shown in Table 55. Costs are highly variable.

Producers of locust fence posts in Ohio estimate their costs of production to be about 35 cents per post. One-third of the estimated

TABLE 55--Estimated costs of production by sampled Missouri producer-dealers, by pine post and pole size, 1959

Size of posts & poles	Price paid to independent producers	Logging and hauling costs (cents per piece)	Stumpage cost and profit margin
4" x 7'	13-25	10-17	3-8
6" x 7'	18-43	14-35	4-5
5" x 8'	20-43	15-33	5-10
6" x 8'	35-72	25-52	10-20
7" x 8'	44-92	30-67	14-25
4" x 10'	21-48	15-33	6-15
6" x 10'	42-88	30-55	12-33
6" x 12'	52-134	40-79	12-55
6" x 14'	66-160	50-95	16-65
6" x 16'	93-145	65-95	28-50
6" x 18'	122-200	85-125	37-75
6" x 20'	167-255	115-175	52-80

costs applies to stumpage, the other two-thirds to logging and hauling. Costs of production for pine highway posts could not be estimated. Highway posts are usually a sideline in the production of sawlogs and veneer logs. Producers estimate their costs per M bd. ft. for their major products, but they do not have a clear idea of how much of their costs of operation apply to the posts they produce.

Producer Stumpage Costs

This cost item appears to be very susceptible to the buyers' influence. In many situations where forest ownership is dispersed among numerous holders of small tracts, where owners sell stumpage relatively infrequently and with inadequate knowledge of the volumes and values involved, and especially where more timber is available for sale than can be sold, buyers usually hold the initiative and the market power. Some owners, however, are better informed and better located geographically to permit bargaining with buyers on more equal terms. But in general, stumpage buyers in the region have a bargaining position superior to that of stumpage sellers.

Stumpage is frequently considered a natural asset, or volunteer growth, and as such, it is established without cash outlay on the part of the landowner. Costs usually do not influence the timber owner's decisions concerning stumpage sales. This is particularly true for private landowners, but is also applicable to public owners. Stumpage value is derived from "conversion return" (the residual between the selling price of the harvested timber and the costs of logging and hauling). The return includes both a profit allowance and the stumpage value for producer agents.

Imperfect knowledge on the part of buyers and sellers results in widely varying estimates of conversion return. Also, unequal bargaining abilities and local precedent result in different apportionments of conversion return into stumpage value and profit allowance. Stumpage price is influenced further by variation in forest conditions (species composition, volume per acre, size and quality of trees, size of tract, location, accessibility, topography, and the costs of conversion) and by personal and community relationships which exist in small geographic areas. The formalities usually inherent in a business venture, for example, are frequently lacking when small producers purchase stumpage from their landowning neighbors. On the other hand, larger stumpage purchases by the large producers or primary manufacturers, especially if they are not locally situated, tend to be more formal.

This latter situation has some bearing on the wide range of stumpage prices. Small, locally known, part-time producers tend to purchase stumpage "lump sum" (i.e., any or all timber on a specified tract for a set sum, usually paid in advance)⁶ in small amounts from neighbors at lower cost than other agents can. Larger, full-time producers and primary manufacturers, especially those who are non-local, tend to pay more for stumpage.

The small, local, part-time producer tends to avoid public stumpage. Reasons involved here are not entirely clear, but much of the reasoning involves lack of funds to back public bids on timber and

⁶Regardless of type of agent or product, lump-sum purchases usually prevail for private stumpage purchases. Some exceptions occur where high quality products like white oak cooperage timber or white oak and walnut veneer logs are involved.

the size of the tracts involved. In many cases, it was found that where small, part-time producers were harvesting public timber, they were, in effect, subcontractors to larger producers or entrepreneurs who had actually purchased the stumpage. Larger, full-time producers or primary manufacturers introduce higher upward variation in stumpage prices because they place more emphasis on selecting tracts with specific combinations of quality and species.

In general, much of the variation in stumpage price results from the following: (1) the buyer's connections and relationships within the local community; (2) the degree to which profit must be made in purchasing and harvesting, or can be foregone to be made up at another point in the productive process (i.e., primary manufacture); (3) the degree to which specific species and quality combinations are desired and the ease with which they can be found; (4) imperfect knowledge on both the part of the buyer and seller (including the previously mentioned variation in forest conditions, as well as imperfect knowledge of operational costs and prices being offered for harvested products); and (5) the confounding effect of the "lump-sum" purchase, especially where the buyer, and more rarely the seller, has an advantage in knowledge.

Average prices are shown by product. This is not entirely realistic as any one agent frequently harvests several products, especially where "lump-sum" purchases of stumpage are involved. Moreover, it cannot be assumed that conversions of price to a unit volume basis are always accurate. Finally, many agents break even or even sustain losses on some products in order to profit on others. Thus, conclusions concerning the purchase of stumpage (as well as logging

and hauling) must be viewed cautiously when based on a per unit basis for individual products.

Pulpwood:

Stumpage costs applicable to producers of pulpwood are shown in Table 56. These prices reflect from 10 to 30 percent or more of the price of delivered pulpwood. The percentage represented by stumpage is usually higher in the more expensive and/or desirable species. In aspen, stumpage price averages 10 to 12 percent of the delivered wood price; in mixed hardwoods, about 15; in pine and balsam fir, about 17; and in spruce, about 25.

Stumpage price for pulpwood in the Lake States tends to reflect the residual-value approach used by the U. S. Forest Service, the largest seller of stumpage in the region. In this approach, logging and hauling costs are deducted from the sale price of delivered pulpwood, then part of the resulting margin is set aside for profit and risk; the remainder is considered the value of stumpage. If production costs change (i.e., logging and hauling), stumpage acts as a cushion which absorbs these cost changes.

Sawlogs:

Stumpage costs applicable to sawlog producers in the Lake States and Central States are shown in Tables 57 and 58, respectively. The costs shown may appear too low to some readers, but it should be remembered that they are heavily weighted with lump-sum purchases. While conversion errors from mill tallies, stem counts, and other measurement criteria are inherent in the estimates, every effort was

TABLE 56--Averages and range in pulpwood stumpage prices(a) paid for major species by sampled producers, by study area, 1959

	Mixed			Balsam	
	Aspen	hardwoods	Pine	fir	Spruce
	(dollars per cord)				
Michigan:					
Average	1.34		3.46	3.79	4.69
Range	1.00 - 1.70		2.00 - 4.00	3.20 - 4.25	3.50 - 5.35
Wisconsin:					
Average	2.57	2.30	5.06	5.79	8.53
Range	1.00 - 3.00	0.75 - 3.00	3.65 - 5.75	4.50 - 7.00	7.00 - 10.00
Minnesota:					
Average	1.05		2.89	2.57	4.41
Range	0.90 - 1.50		1.75 - 3.00	2.00 - 3.00	3.25 - 5.00
Central States:					
Average		2.03			
Range		0.80 - 3.75			

(a) For peeled wood, prices should be increased 15 percent.

TABLE 57--Average cost of stumpage for sampled sawlog producers in the Lake States, 1960

Species	Mich.	Wisc.	Minn.	Lake States
(dollars per thousand bd. ft.)				
Hard maple	37.50	26.00		
Mixed hardwood		19.00		
Birch, white(a)	8.00	35.00	6.00	
Cherry	27.00			
Basswood	23.00	20.00	8.00	
Pine	18.00	26.00	18.00	
Aspen				
(logs)	8.00			
(bolts)(b)	4.00	6.00		
(logs & bolts)	6.50		5.00	
Hemlock	12.50	19.00		
Oak	11.00			
Elm				
(logs)	12.00	17.00		
(bolts)	7.00			
(logs & bolts)	11.00			
Beech	13.00			
Soft Maple				
(logs)	13.00			
(bolts)	7.00			
(logs & bolts)	11.00			
Hardwood (except aspen)				18.00
All Hardwood				15.00
Softwood				19.25

(a)Some yellow birch included in Wisconsin.

(b)Smaller material purchased by the cord.

TABLE 58--Average cost of stumpage for sampled sawlog producers
in the Central States, 1960

Species	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	All states
(dollars per thousand bd. ft.)							
Mixed Maple	12.00						
Soft Maple			15.00		17.00		
Mixed Oak	13.00		12.00	10.00	14.00	17.00	
Poplar and Cottonwood	11.00		13.00	7.00	9.00	8.50	
Cherry	18.00						
Ash					9.00		
Sycamore			13.00	7.00			
Elm			11.00		10.00	9.00	
Pine				17.00			
Basswood					13.00		
Walnut	31.00				42.00	51.00	
Mixed Hardwood	11.00	23.00					
All Hardwood (except Walnut)							12.00
All sawlogs							15.00

made to eliminate false and non-pertinent information in the compilation of averages. Some attempt was made to eliminate such imperfectly known influences as "free" stumpage involved in land clearing operations in Ohio and Illinois, but supply and price implications are immediately evident.

Two species produce wide variation in the over-all averages. Aspen bolts and small sawlogs in the Lake States are frequently obtained at the same cost as pulpwood stumpage. This has a lowering effect both on the average cost of aspen sawlogs and on the average cost of hardwood stumpage. The reverse is true in the Central States where walnut included in lump-sum purchases has a marked tendency to increase stumpage prices. The costs for walnut stumpage shown in Table 58 are averages for walnut paid where it was a minor component of stands to be harvested. The more a tract has to offer in quantities of desirable quality and species, the higher the average price paid; the less attractive the total stand is, the lower the average price paid--regardless of the size and quality of minor stand components.

Tables 59 and 60 indicate stumpage costs of primary manufacturers. These stumpage costs agree, in general, with costs reported by producers, but some differences are apparent. These differences reflect more attention given by sawmillers to species and/or quality in stumpage purchases. It is also likely that sawmillers have an advantage over producers, in general, in estimating and understanding costs as well as some advantages in capital availability for acquiring stumpage (especially the larger tracts). Moreover, it is likely that sawmillers can better recognize the technical qualities of standing timber. All

TABLE 59--Average price paid for stumpage by sampled sawmills in
the Lake States, 1960

Species	Mich.	Wisc.	Minn.	Lake States
	(dollars per thousand bd. ft.)			
Hard maple	38.00	39.50		
Soft maple	34.00	26.00		
Birch, white(a)	16.00	39.00	7.75	
Basswood	29.00	41.00	10.50	
Cherry	44.00			
Elm	13.00	16.00		
Ash	27.50	25.00	4.25	
Beech	14.50			
Oak	15.00	28.00	10.15	
Aspen	9.00	7.00	4.25	
Jack Pine	8.50		15.60	
White & red pine	31.25	33.75	24.10	
Hemlock	16.50	24.00		
Hardwood (except aspen)				24.65
All hardwood				19.45
Softwood				22.20

(a)Some yellow birch included in Wisconsin.

TABLE 60--Average price paid for stumpage by sampled sawmills in the Central States, 1960

Species	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	All States
(dollars per thousand bd. ft.)							
Mixed maple			16.00			15.50	
Hard maple	38.00	47.00					
Soft maple	14.00		19.00		19.00		
Mixed oak	15.00	33.00	19.00	10.00	18.00		
White oak						19.00	
Black & red oak						11.00	
Poplar and cottonwood	19.00		12.00		13.00	8.25	
Cherry	65.00	65.00				42.50	
Ash						10.00	
Sycamore			13.50			9.00	
Elm			11.00		12.00	8.00	
Pine				18.00			
Basswood					16.00	11.25	
Walnut						67.00	
Beech		18.00					
Mixed hardwood	14.50	25.00		10.00			
Soft hardwood			12.00	7.00			
All hardwood (except walnut)							16.00
All sawlogs							20.00

these factors would support the slightly higher price paid for stumpage by primary manufacturers.

Veneer Logs:

Average costs of veneer log stumpage bought by producers are shown in Table 61. These figures vary widely by study area, and are influenced by predominant purchase policies. In some areas, veneer log stumpage is purchased along with sawlog stumpage at relatively lower prices. In other study areas, such as Illinois, Iowa, and Kansas, veneer log producers are more often specialists who seek out high quality timber which they selectively cut (no reference implied regarding the forest management usage of the term) on an "all merchantable basis" lump-sum purchase; average prices are consequently relatively high. One additional cost should be noted at this point. Several producers report a "scouting" or locating cost for finding quality timber. In general, this is about \$3.50 per M bd. ft. With producers specializing in walnut, this cost may run up to \$30 or \$40 per M bd. ft. In many cases, it is considered as part of the stumpage cost.

Cooperage Timber:

Stumpage prices reported by sampled producers for white oak cooperage timber are shown in Table 62. Divergent averages by study areas are clearly apparent. Four cooperage stock mills purchasing stumpage reported costs averaging slightly more than \$50 per M bd. ft. The reason for such higher stumpage prices is not entirely clear, but there is a probability that the mills limited their purchases to higher quality white oak stands.

TABLE 61--Average cost of stumpage for sampled veneer log producers, 1960

Species	Lake states	Central States					All Central
		Ohio	Ind.	Ill.	Iowa	Kan.	
(dollars per thousand bd. ft.)							
<u>Quality veneer(a)</u>							
Maple	43.00				41.00		
Birch	38.00(b)						
Basswood	31.00				43.00		
White oak		66.00	) 45.00	) 50.00	43.00		
Red oak		29.00					
Poplar		29.00					
Cherry		33.00					
Walnut		74.00	93.00	153.00	175.00	180.00	
Hardwood (except walnut)	38.00						
Hardwood (except walnut)							44.00
All hardwood							79.00

(a) Container veneer stumpage is lower. Elm, beech, and soft maple in Michigan and Wisconsin average \$22 per M bd. ft. Soft hardwoods in Illinois average \$17 per M bd. ft.

(b) Mainly white birch.

TABLE 62--White oak stumpage prices reported by sampled cooperage
timber producers, by study area, 1959

Study area	Stumpage prices	
	Range	Average
	(dollars per M bd. ft.)	
Ohio	20-60	28.08
Indiana	30-50	43.30
Illinois	10-80	48.33
Iowa	12-50	31.33
Missouri	20-60	36.64
Kansas	12-50	25.00
All study areas		35.72

Producer Logging Costs

Pulpwood

Logging for pulpwood includes felling, limbing, and bucking, bark peeling (when this is done), and skidding to roadside. Producers were able to report estimates of their total logging costs, but they were not often able to specify costs attributable to the above components. As shown in Table 63, spruce-fir has a slightly higher logging cost than other species, and aspen, the lowest cost. Variations in logging costs reflect differences in stands, working conditions, types of equipment used, topography, and payments of workmen's compensation insurance.

Sawlogs

Logging for sawlogs includes the operations described above for pulpwood, and similar variations in logging costs apply. Tables 64 and 65 show average costs reported by sampled producers in the Lake States and the Central States. Table 66 shows average costs reported by sawmills logging their own stumpage.

Logging costs reported by producers and primary manufacturers harvesting their own stumpage in the Lake States are about the same. Producers were able to indicate that aspen logging is slightly cheaper than logging for other species in the Lake States. Logging costs in the Central States show more variation, both between states, and between producers and primary manufacturers. Missouri producers and primary manufacturers show their costs to be substantially lower than in other states. While there is always some doubt as to how well

TABLE 63--Logging costs(a) reported by sampled pulpwood producers, by study area, 1959

	Aspen	Mixed hardwoods	Pine	Balsam fir	Spruce
	(dollars per cord)				
Michigan:					
Average	5.81		6.22	8.55	8.55
Range	4.75 - 6.50		5.00 - 7.50	7.00 - 10.00	7.00 - 10.00
Wisconsin:					
Average	6.22	7.00		9.11	9.30
Range	3.00 - 7.00	6.00 - 7.00		7.00 - 11.00	7.00 - 11.00
Minnesota:					
Average	6.83		6.75	7.52	8.24
Range	5.00 - 8.00		5.00 - 11.50	7.00 - 11.50	7.00 - 11.50
Central States:					
Average		5.05			
Range		2.50 - 8.00			

(a)Bark peeling, when done, is an additional cost item not shown in the table. It averages about \$3.50 per cord in aspen, and \$4.50 in spruce and fir.

TABLE 64--Average logging costs for sampled sawlog producers in the Lake States, 1960

Species	Michigan	Wisconsin	Minnesota	Lake States
(dollars per thousand bd. ft.)				
All Species	14.50	14.25	13.00	14.25
Aspen	12.50	--	12.25	12.50

TABLE 65--Average logging costs for sampled sawlog producers in the Central States, 1960

Species	East Central States	Missouri	Kansas and Iowa	Central States
(dollars per thousand bd. ft.)				
All Species	11.50	9.00	11.00	10.75
Walnut	20.00	--	25.00	20.25

TABLE 66--Average logging costs for sampled sawmills purchasing their own stumpage in the North Central region, 1960

Species	Mich.	Wisc.	Minn.	Lake States	East Central States	Mo.	Iowa Kansas	Central States
(dollars per thousand bd. ft.)								
All species	13.10	14.75	13.85	13.75	15.75(a)	8.50	14.15	12.95
Walnut	--	--	--	--	--	--	26.00	--

(a) This figure is noticeably higher because many sawmills in Ohio, Indiana, and Illinois are portable mills; the figure shown includes a greater cost for skidding longer than average distances directly to the mill.

producers and harvesters understand the nature of logging costs and their compilation, it is entirely possible that logging costs are less in Missouri than elsewhere in the region. Loggings costs reported by producers and primary manufacturers in both the eastern part of the Central States and the western part show a noticeable difference. This may be due to a better understanding of the nature of the costs involved and a more accurate estimate by primary manufacturers. Few species differences were noted, with the striking exception of walnut; logging costs for walnut are reported to be almost double average logging costs.

Veneer Logs

The cost of logging quality veneer timber seems to be relatively uniform throughout the entire region. Few costs were reported by primary manufacturers, but nearly 100 producers of quality veneer logs indicated all species (with the exception of walnut) cost about \$16.25 per M bd. ft. to log. Producers of walnut reported their logging costs between \$25 and \$27 per M bd. ft. In comparing quality veneer log logging with sawlog logging, it is evident that the former is some two to three dollars more expensive (two to five dollars in the case of walnut).

Container veneer logs have logging costs similar to those for sawlogs--about \$12.25 per M bd. ft. for soft hardwoods in Illinois and \$14.50 per M bd. ft. for elm, beech, and soft maple in Michigan and Wisconsin.

Cooperage Timber

Average logging costs for white oak cooperage timber are shown in Table 67. Producers report lower costs than primary manufacturers. The probability is that producers do not calculate their costs as accurately as the primary manufacturers. This supposition is reinforced by the fact that recognized subcontractors to producers report logging costs of nearly \$23 per M bd. ft. (the figure reported by primary manufacturers).

In comparison with sawlogs, logging for cooperage timber is costly. This is not surprising since logging for cooperage timber is usually a highly selective operation (i.e., individual trees or clumps of trees of only the white oak group, frequently some distance apart, are involved); also, there is an added cost in splitting logs into cooperage bolts.

Producer Hauling Costs

Pulpwood

Hauling cost for pulpwood refers to truck haul from roadside loading points to pulp mills or to railroad reloading points. Railroad transportation is not considered here because the cost does not comprise part of the suppliers' costs of production--usually pulpwood is purchased by mills at railroad loading points with the pulp company paying the freight.

Truck hauling distances are highly variable. In Wisconsin and the Central States, hauls of over 50 miles are usually avoided. In Minnesota, the median truck haul ranges from 55 miles where producers

TABLE 67--Average logging costs for white oak cooperage timber reported
by producers and primary manufacturers, by study area, 1959

Study area	Producer logging	Primary manufacturer logging
	(dollars per thousand bd. ft.)	
Ohio	18.75	--
Indiana	17.60	13.25
Illinois	15.62	23.36
Iowa	21.28	28.75
Missouri	17.88	25.85
Kansas	23.67	20.00
All study areas	18.31	23.00

market their pulpwood in Wisconsin to about 30 miles for pulpwood marketed in-state. In Lower Michigan, where longer truck hauls are encouraged by sliding price scales, the median distance ranges from 70 miles for aspen up to 200 miles for a small amount of spruce and fir.

Again, reported costs may reflect differences in the understanding of costs by producers. No costs are available from primary manufacturers on truck hauling for comparison purposes. However, James and Lewis (1961) have established formula costs for hauling in Lower Michigan. These costs are shown in Table 68 along with reported producer costs. It is believed that the formula rates have a higher degree of accuracy than those reported by sampled producers.

Hauling costs commonly represent from 12 to 35 percent of the delivered price of pulpwood. Because of their magnitude, these costs are frequently a determining influence on the decision to produce pulpwood in a given locality or stand of timber.

Sawlogs and Veneer Logs

Average hauling costs reported by sampled sawlog producers are shown in Tables 69 and 70. Since sawmills are frequently active in hauling large volumes of sawlog inputs, their reported average hauling costs are shown separately in Tables 71 and 72. Hauling costs were not available from primary manufacturers of veneer logs, but sampled veneer log producers indicated the average hauling costs shown in Table 73.

In the Lake States, sawmills report somewhat lower hauling costs than producers. This can be explained by the shorter average hauls

TABLE 68--Average truck-hauling costs for varying distances of haul reported by sampled pulpwood producers, by study area, and costs established by formula in Lower Michigan, 1959

Distance in miles	Formula costs in Lower Michigan(a)	Hauling costs reported by producers(b)			
		Michigan	Wisconsin	Minnesota	Central States
(dollars per cord)					
10	3.00		3.75		
20	4.00	4.00	3.85	4.25	5.60
30	4.50	4.04		6.50	4.86
40	5.00		4.88		
50	5.00	5.33	4.91	5.00	4.79
60	5.00	6.20			
70	5.50	6.13	4.16	7.00	
80	5.50	6.01			
90	6.00	7.25		7.00	
100	6.25	7.01			
110	6.25				
120	6.60				
130	7.20				
140	7.70	9.00			

(a)When hauling is to railroad reloading points rather than to pulp mills, an average of \$1 should be added to the charges shown to cover the additional costs of loading and unloading necessary to place pulpwood on rail cars (27).

(b)Average hauling cost figures shown represent averages of reports by at least three producers. Michigan data based on reports of 51 producers; Wisconsin, 45; Minnesota, 38; and Central States, 18.

TABLE 69--Average hauling costs for sampled sawlog producers in the Lake States, by distance zones, 1960

Zone (Miles)	Self-hauled		Subcontracted
	All Sawlogs	Aspen Sawlogs	All Sawlogs
	(dollars per thousand bd. ft.)		
1-10	8.10	7.30	8.45
11-20	10.60	8.50	10.85
21-30	11.90	10.15	13.45
Over 30	--	10.75	16.40
Average cost	10.30	8.85	12.15
Average distance	17.8 mi.	21.0 mi	25.4 mi.

TABLE 70--Average hauling costs for sampled sawlog producers in the Central States, by zones, 1960(a)

Zone (Miles)	Ill. Ohio Ind.	Mo.	Kansas Iowa	Central States
	(dollars per thousand bd. ft.)			
1-10	8.00	7.50		
11-21	11.25	8.25	10.00	
21-30	13.00	9.00	11.00	
31-50	14.50		12.00	
Average Cost	11.75	7.90	11.15	10.40
Average Distance	23 mi.	13 mi.	25 mi.	19.8 mi.

(a)Hauling costs for walnut average 25 to 50 percent more than for other species.

TABLE 71--Average hauling costs in the Lake States for sampled saw-mills purchasing their own stumpage, by distance zones, 1960

Zone (miles)	Michigan	Wisconsin	Minnesota	Lake States
	(dollars per thousand bd. ft.)			
1-10	9.60	7.10	6.40	7.50
11-21	10.80	8.40	8.80	9.70
21-31	11.00	8.80	--	--
Average cost	10.50	8.40	7.55	8.90
Average distance	15 mi.	19 mi.	13 mi.	16 mi.

TABLE 72--Average hauling costs in the Central States for sampled saw-mills purchasing their own stumpage, by distance zones, 1960(a)

Zone (miles)	Ohio(b) Illinois Indiana	Missouri	Iowa Kansas	Central States
	(dollars per thousand bd. ft.)			
1-10	8.40	7.40	10.00	
11-20	11.60	9.30	10.50	
21-30	11.65	10.00	12.00	
31-50	--	--	15.00	
Average cost	10.50	8.25	11.40	9.75
Average distance	15 mi.	8.6 mi.	17.5 mi.	12.9 mi.

(a)Hauling costs for walnut average 25 to 50 percent more than for other species.

(b)Figures for these three states based only on mills hauling sawlogs; portable mills using direct-to-mill skidding are not considered here.

TABLE 73--Average hauling costs for sampled quality-veneer log
producers in the North Central region, 1960

Species	Illinois	Kansas	Central	Lake
	Ohio Indiana	Iowa	States	States
(dollars per thousand bd. ft.)				
All species:				
Average cost	21.00	19.00	20.75	12.25
Average distance	73 mi.	45 mi.	65 mi.	28 mi.
Walnut:				
Average cost	24.75	20.50	23.75	
Average distance	73 mi.	47 mi.	65 mi.	

reported by sawmills and the fact that sawmills frequently do not report separate costs for hauling aspen sawlogs (which reportedly cost less to haul). Subcontracted hauling figures in the Lake States are slightly higher. Some variation is noticeable in hauling costs in the Central States between producer-reported costs and primary manufacturer-reported costs. Part of this can be explained by the fact that sawmills generally do not haul harvested sawlogs as far as producers. Other minor variations in hauling costs may be due to either inaccurate estimations of costs or to inadequacies in the data to correctly interpret the zone-cost relationships.

As might be expected, veneer logs are hauled substantially greater distances than sawlogs. The longer distance, and to a lesser degree, quality, are the major factors in higher hauling costs. Hauling distance in the Central States is usually three to four times greater for veneer logs than sawlogs. Container veneer logs appear to have hauling costs similar to those for sawlogs. In Michigan and Wisconsin, the average hauling cost for container veneer logs is \$10 for an average haul of 19.7 miles; in Illinois, the cost is \$18 for an average haul of 36.6 miles.

Cooperage Timber

Cooperage timber producers haul cooperage bolts an average distance of 34 miles in the Central States. Both the distance they haul and the costs they incur are between sawlog and veneer log distances and costs. Hauling costs reported by producers in 1959 can be summarized by distance zones as follows:

<u>Distance zone</u> (miles)	<u>Cost per</u> <u>M bd. ft.</u> (dollars)
0-19	9.00
20-39	13.20
40-59	15.45
<u>60 & over</u>	<u>20.00</u>
Average 34	14.00

Several producers subcontract their hauling; these agents indicate an average haul of about 35 miles and an average cost of \$15 per M bd. ft.

Intermediate Agents' Costs and Prices

Dealers who are agents of pulpmills pay producers the prices offered by the pulpmills. As payment for their services they receive a commission of \$0.50 to \$1.50 per cord handled. Merchant middlemen not affiliated with pulpmills perform essentially the same function, but their services are not recognized by the pulpmills--essentially the mill recognizes them as large producers and they receive the same price for their wood as other large producers. In turn, these agents act independently of the price policies of pulp companies; they buy from producers at prices determined by their own negotiations.

Recognized dealers who handle sawlogs were not sampled, although several large producers assume an intermediate agent function in buying sawlogs from other small producers in their areas and delivering these logs along with their own production to sawmills. The price paid the small producer can be assumed to be the price for delivered sawlogs less hauling costs and a small margin for profit and risk. The margin for profit and risk might be large where small producers have weak

bargaining power due to a lack of capital and access to hauling equipment.

Two types of intermediate agents can be recognized for veneer logs. One consists of agents who buy veneer logs from producers, usually at designated points (i.e., wood-using mill, railhead, concentration yard, etc.), and sell to veneer mills or their buyers. Prices received are those established by the buyer veneer mills; in turn, producers are paid a lower price covering the cost of their productive services and a margin for profit and risk. Frequently, but not always, this price is very close to the price paid for high grade sawlogs which are not actually bought on a grade basis. To a lesser extent, some agents purchase logs on a grade basis at published prices.

The other type of veneer log agent is the sawmiller who sorts or separates quality logs from stocks of sawlogs. These agents rarely pay producers more than average sawlog prices for the timber delivered to them unless the material is obviously veneer-log quality. Sawmillers, in turn, sell at delivered prices established by veneer mills, or at prices negotiated by veneer mill buyers or other agents. Comparing veneer log prices with sawlog prices and average stumpage costs (especially if the timber is purchased for sawlogs) leaves little doubt as to the profitability of sorting sawlogs for salable veneer-log material.

Sawmills in the Central States, especially Ohio, sometimes act as intermediate agents for white oak cooperage bolts. Usually they sort and split sawlogs that are more profitable to sell as cooperage stock material, but sometimes they purchase bolts delivered to their

sawmill. Prices received by producers for bolts can be assumed to be the price paid by cooperage stock mills less the cost of handling and additional transportation, plus a margin for profit and risk. Sawmills sorting and splitting white oak logs usually pay sawlog prices to producers supplying the material. They, in turn, receive cooperage-stock-mill delivered prices when they sell.

Dealers in posts in Michigan usually pay less than fence companies --from one-half to one cent less for small posts and five cents or more less for large posts. In Missouri and Illinois, dealers usually pay substantially less for pine posts and poles than treating companies. Dealers' margins for various sized posts and poles are shown in Table 74. Dealers in locust fence posts in Ohio indicate they pay very little more than the posts cost to produce. The average cost of production reported by producers is about 35 cents, and dealers pay in a price range from 30 to 40 cents. Producers in this situation obviously have very little market power.

Prices Paid and Received

Prices paid by primary manufacturers and prices received by producers are the topic of this section.

Pulpwood

Most North Central mills purchase pulpwood either delivered to the mill by truck, delivered on board rail cars at designated loading points, or at both of these locations. The prices paid are summarized in Table 75. These may be considered base prices in that they do not include special bonuses paid to large producers or bonuses

TABLE 74--Margins between prices paid and prices received by Central States' dealers in pine posts and poles, 1959

Size of posts and poles	Prices paid by treating plants	Prices paid by dealers (cents per piece)	Dealers' margins
4" x 7'	18-33	13-25	5-19
6" x 7'	30-60	18-42	19-35
5" x 8'	28-50	20-43	10-29
6" x 8'	45-90	35-72	10-65
7" x 8'	60-90	44-92	35-45
4" x 10'	50-60	21-48	25-30
6" x 10'	85-100	42-88	33-47
6" x 12'	105-115	52-134	55-62
6" x 14'	135-155	66-160	60-70
6" x 16'	155-190	93-145	45-95
6" x 18'	210-230	122-200	90-105
6" x 20'	290-310	167-255	130-175

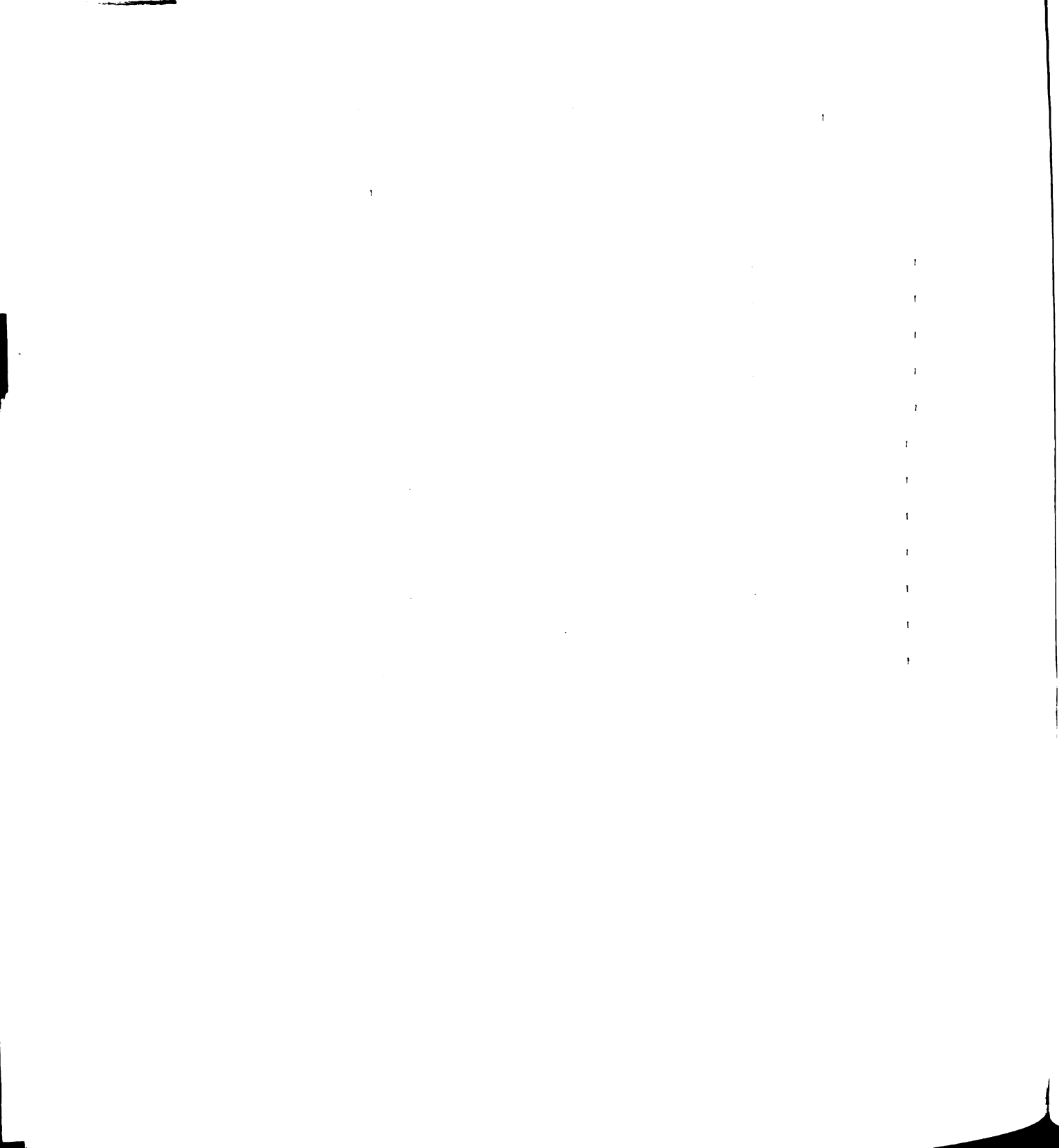


TABLE 75--Base prices paid for pulpwood in the North Central region by species and method of delivery, 1959

Area and species	Rough		Peeled	
	Truck to mill	F.O.B. rail (dollars per cord)	Truck to mill	F.O.B. rail
Michigan				
Aspen	12.00-12.50	12.50	17.00-21.00	17.00-18.00
Misc. hardwood	12.00-13.00			
Pine	16.00-20.00	18.00		
Spruce	32.00	25.00		
Balsam Fir	28.00	21.00		
Wisconsin				
Aspen	12.00-17.50	13.00-16.00	16.00-21.00	18.00-21.00
Misc. hardwood	14.50-15.50	14.00	16.50-21.00	19.50-21.00
Spruce	26.50-29.00	25.00-27.50	31.00-35.00	31.00-33.50
Balsam fir	21.50-24.00	21.00-22.50	26.50-30.00	26.00-28.50
Hemlock	18.00-20.00	17.00-19.00	23.00-25.00	22.00-23.00
Pine	17.50-18.00	17.50	23.00	22.50-24.00
Minnesota				
Aspen	9.00-14.00	16.00	17.50-18.00	
Pine	17.50		18.50	
Spruce	21.00	23.00-24.00		
Balsam fir	16.00	18.00-19.00		
Central States				
Mixed hardwood	12.00-14.75			
Pine	14.75-17.50			

which most mills pay suppliers for wood trucked from specified distance zones. Mills using recognized agents also pay these men bonuses of from \$0.50 to \$1.50 per cord for their services. Bonuses for distance hauled vary greatly between mills, but in general, they range in amount from \$0.50 to \$1.50 per cord for distances over 20 to 30 miles and under 100 miles, to \$2.00 and \$3.00 for distances greater than 100 miles.

Sawlogs

Average prices received for sawlogs, as reported by sampled producers, are shown in Tables 76 and 77. Tables 78 and 79 indicate average prices paid by reporting mills. Very little variation is noticeable in the Lake States and almost no variation in the Central States. For this reason, prices shown can be assumed to be quite representative of the prices in effect in the study areas in 1960.

Insufficient data were reported to allow presentation of sawlog prices by grade. Nearly all the sawlogs sold in the sampled study areas in 1960 were sold on a woods-run basis. Most prices reported are average prices for average quality logs.

Volume measurement of logs as a basis for payment is unstandardized (although several mills frequently used the same log rule). Invariably, the prevailing mill method in force is used as a basis for producer payment. The Doyle log rule is very popular, but frequent use is made of other log rules or other criteria such as the cord or mill lumber tally. Payment to sawlog producers on the basis of lumber tally raises an interesting point about sawmill efficiency. In effect, the mill can be wasteful with its raw material inputs since the producer is paid only on the basis of

TABLE 76--Average prices received by sampled producers in the Lake States for sawlogs delivered to the mill, 1960

Species	Mich.	Wisc.	Minn.	Lake States
(dollars per thousand bd. ft.)				
Hard Maple	65.00	56.00		
Mixed hardwood		44.00		
Birch, white(a)	33.00	62.00		
Cherry	62.00			
Ash	40.00			
Basswood	54.00	48.00	33.00	
Pine	46.00	58.00	48.00	
Aspen				
(logs)	35.00		28.00	
(bolts)(b)	30.00			
(logs & bolts)	33.00			
Hemlock	43.00	42.00		
Oak	41.00			
Elm				
(logs)	36.50	38.00		
(bolts)	31.00			
(logs & bolts)	35.00			
Beech	37.00			
Soft maple				
(logs)	41.00			
(bolts)	31.00			
(logs & bolts)	37.00			
Hardwood (except aspen)				48.00
All hardwood				46.00
Softwood				49.00

(a)Some yellow birch included in Wisconsin.

(b)Smaller material purchased by the cord.

TABLE 77--Average prices received by sampled producers in the Central States for sawlogs delivered to the mill, 1960

Species	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	Central States
(dollars per thousand bd. ft.)							
Mixed maple	65.00						
Soft maple			48.00		56.00	57.00	
Mixed oak	48.00		38.00	29.00	47.00	49.00	
Poplar and cottonwood	50.00		43.00		34.00	33.00	
Cherry	82.00						
Ash	70.00				42.00		
Sycamore	39.00		43.00				
Elm					35.00	34.00	
Pine				37.00			
Basswood					42.00		
Walnut	98.00				93.00	104.00	
Secondary hardwood	39.00						
Mixed hardwood		54.00					
Soft hardwood				24.00			
All hardwood (except walnut)							45.00
All sawlogs							50.00

TABLE 78--Average prices paid for sawlogs delivered to sampled saw-mills in the Lake States, 1960

Species	Mich.	Wisc.	Minn.	Lake States
(dollars per thousand bd. ft.)				
Hard maple	65.00	58.00		
Soft maple	56.00	52.00		
Birch(a)		74.00	39.00	
Basswood	47.00	55.00	36.00	
Cherry	73.00			
Elm	35.00	38.00		
Ash	50.00	45.50	31.00	
Beech	39.00	38.00		
Oak	45.00	49.00	36.00	
Aspen	34.00	34.50	28.00	
Pallet material(b)	36.00	35.00		
Jack pine	40.00		41.00	
White pine			52.00	
Red & White pine	46.00	46.00	51.00	
Hemlock	42.00	46.00		
Hardwood (except aspen)				47.60
All hardwood				44.10
Softwood				48.10

(a) White and yellow birch

(b) Lower quality soft maple, oak, beech, elm, and some aspen.

TABLE 79--Average prices paid for sawlogs delivered to sampled saw-mills in the Central States, 1960

Species	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.	Central States
(dollars per thousand bd. ft.)							
Mixed maple	65.00		52.00			55.00	
Hard maple	66.00	71.00					
Soft maple	62.00		48.00		53.00		
Mixed oak	51.00	53.00	41.00	28.00	44.00		
White oak						55.00	
Black & red oak						34.00	
Poplar and cottonwood	55.00	65.00	36.00		34.00	33.00	
Cherry	94.00	93.00				85.00	
Ash						40.00	
Sycamore			37.00			36.00	
Elm			37.00		37.00	34.00	
Pine				35.00			
Basswood					45.00	46.00	
Walnut	105.00				96.00	125.00	
Beech		49.00					
Mixed hardwood	44.00	53.00		23.00			
Soft hardwood			32.00	24.00			
Hardwood (except walnut)							45.00
All sawlogs							50.00

output. On the other hand, if the mill is efficient and produces an over-run, it must pay the producer correspondingly.

Veneer Logs

Average prices received by producers of veneer logs are shown in Table 80. These are essentially the same as prices reported by veneer mills. Price comparisons between species and regions should be made cautiously since many of the averages in Table 80 were compiled from widely varying prices strongly influenced by variable quality. For example, the average walnut veneer log is of higher quality in Iowa and Kansas than in the eastern portion of the Central States; prices are different, but if similar qualities could be compared, prices might also be similar.

Producers in Michigan and Wisconsin indicate they received an average of \$52 per thousand bd. ft. in 1960 for elm, beech, and soft maple container veneer logs. In Illinois, producers received an average price of \$50 for soft hardwood container veneer logs.

Cooperage Timber

Prices for delivered white oak stave bolts are shown in Tables 81 and 82. Producer-reported prices received agree fairly well with primary manufacturer prices paid. This is especially true when considered on the basis of grade. For ungraded material, producer prices are reported somewhat higher. Comparisons are difficult to draw as many mills have different grading systems and there is a wide range in prices. Ungraded material appears to sell for less in the western than in the eastern portion of the Central States. On a

TABLE 80--Average prices received by sampled producers for quality veneer logs delivered to shipping point or mill, 1960

Species	Lake	Central States					All
	States	Ohio	Ind.	Ill.	Iowa	Kan.	Central
(dollars per thousand bd. ft.)							
Maple	113				99		
Birch	113						
Basswood	85				91		
White Oak		225	)	)			
Red Oak		108	)165	)136			
			)	)	89		
Poplar		114					
Cherry		168					
Walnut		234	309	286	323	326	
Hardwood (except walnut)							133
All hardwood	105						198

TABLE 81--Average prices received by sampled producers for white oak stave bolts delivered to the mills, by bolt grade(a), 1959

Study area	Premium	Grade	Grade	Ungraded	
	grade	No. 1	No. 2	Average	Range
(dollars per M bd.ft.)					
Ohio	--	--	--	118.86	85-145
Indiana	--	--	--	123.00	100-130
Illinois	150.00	125.00	72.00	106.50	50-150
Iowa	150.00	110.00	71.25	109.44	80-125
Missouri	150.00	112.50	77.50	88.42	60-125
Kansas	150.00	100.00	65.00	85.00	--
All study areas	150.00	115.00	72.00	108.85	50-150

(a)A low grade of bolt is sometimes differentiated by cooperage stock mills. Sampled producers received an average of \$30 per M bd. ft. for this grade of material.

TABLE 82--Average prices paid by sampled primary manufacturers for white oak stave bolts delivered to the mill, by bolt grade(a), 1959

Study area	Premium grade	Grade No. 1	Grade No. 2	Ungraded	
				Average	Range
(dollars per M bd. ft.)					
Ohio	--	123.00	97.00	85.00	75-100
Indiana	--	--	--	100.00	80-120
Illinois	150.00	101.25	60.00	115.00	100-125
Iowa	--	--	--	--	--
Missouri	135.00	105.00	72.50	87.00	78-100
Kansas	150.00	100.00	65.00	85.00	--
All study areas	140.00	106.00	74.00	95.00	75-125

(a) A low grade of cooperage bolt is sometimes differentiated by cooperage stock mills. An average of \$34 per M bd. ft. was reported for this grade.

grade basis, the geographic difference seems to diminish.

Cedar Fence Posts

Prices paid for delivered fence posts are shown in Table 83. These are fairly well standardized by sizes with a consistent differential between peeled and unpeeled posts. It can also be noted that dealer prices are close to fence company prices, particularly in small post sizes. When dealers sell to fence companies, their profit margin is very small.

Comparisons of Costs and Prices

Costs of production are compared with delivered wood prices. The margins and profit ratios shown in the tables in this section should be interpreted with caution. Prices received and costs are averages; also, many producers use their own stumpage or labor and equipment in logging and hauling. Such producers often impute lower costs to their operations than if stumpage had to be purchased or logging and hauling contracted. Relatively few producers are specialists; they usually produce a mix of products--and substantial margins for any one product are frequently offset by very narrow margins for another product. Since a mix of species as well as products is often involved, wide or narrow margins or profit ratios for any one species do not necessarily indicate profitability for the average producer.

Size of producer operations would also have to be considered in determining whether producers are receiving adequate returns. While margins and profit ratios may appear to be adequate, size of

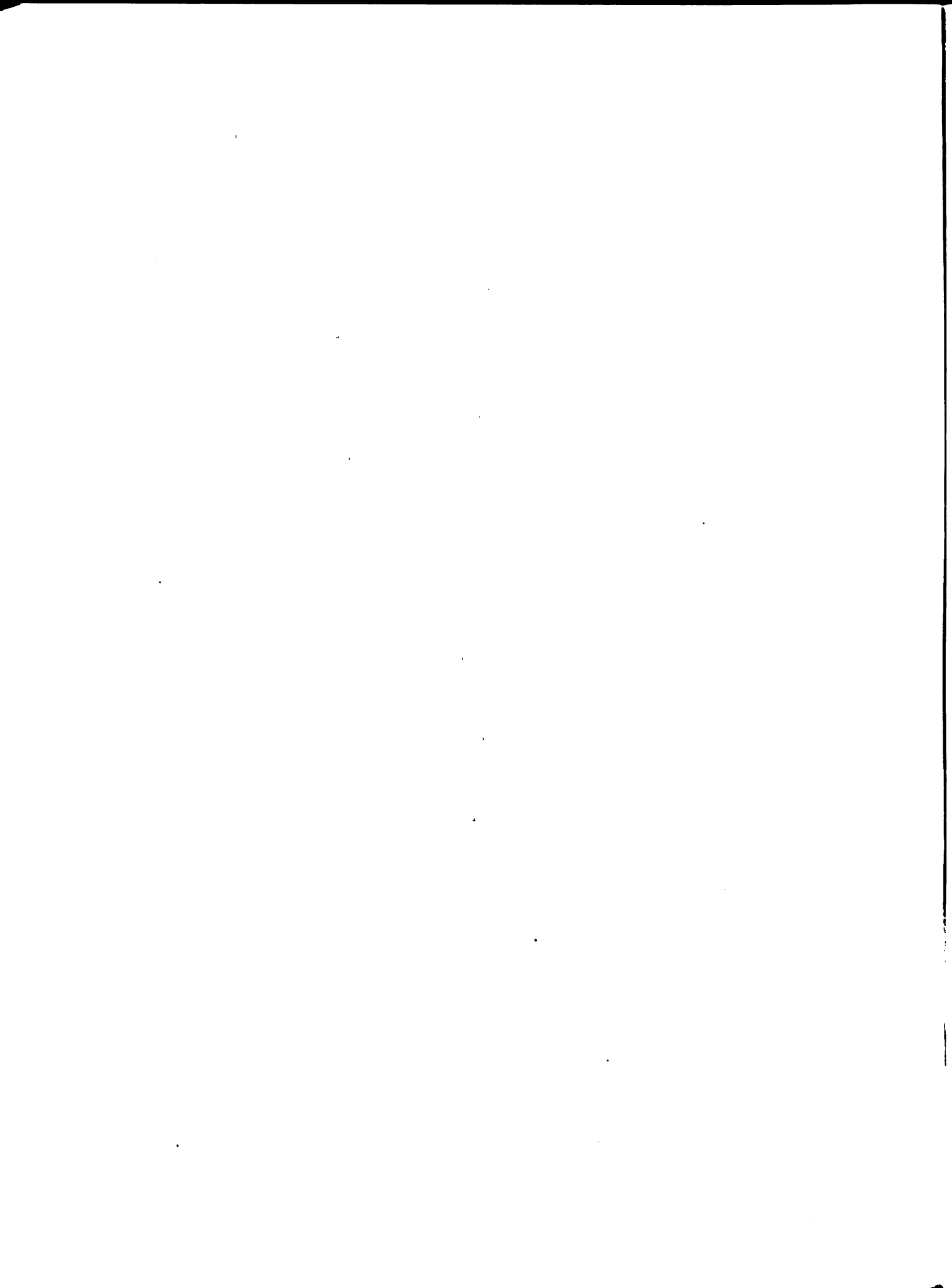


TABLE 83--Typical price list of Michigan dealers and fence companies
for delivered cedar fence posts, 1959

Post size	Dealer prices for unpeeled posts	Fence company prices	
		Peeled posts	Unpeeled posts
(cents per post)			
3" x 7'	12		11½(a)
3" x 8'	14		14½(a)
4" x 7'	21	27	20
5" x 7'	24	32	25
6" x 7'	24	32	25
4" x 8'	25	35	27
5" x 8'	30	39	31
6" x 8'	40	55	45
7" x 8'	50	60	55
4" x 10'	45	60(b)	50(b)
5" x 10'	50	65(b)	55(b)

(a)One-half cent more when quantity is 10,000 posts or more.

(b)Three cents more when quantity is 10,000 posts or more.

operations may limit a majority of producers to several hundred dollars of profits for a season's work. Without supporting research and more adequate experience, one cannot judge how satisfactory the various margins and profit ratios are. What can be done, however, is to draw comparisons of relative profitability.

Pulpwood

Tables 84 and 85 indicate the margins and profit ratios for various pulpwood species delivered to pulp mills and f.o.b. rail-cars. The last column in the tables expresses the profit margin as a percentage of the price received. This measure of profitability --termed profit ratio--is often considered a more revealing measure of profits than is the absolute margin.

Some reservations apply to negative margins. Inadequacies in the data may not reflect average conditions. Nevertheless, comparisons seem warranted. For truck-delivered wood, the margins are consistently highest for spruce, followed in descending order by balsam fir, pine, peeled aspen, mixed hardwoods, and rough aspen. For pulpwood delivered to railroad, the margin relationships for different species are roughly similar except for a few deviations. Spruce usually yields the highest profit ratio in the Lake States, followed in descending order by balsam fir, pine, peeled aspen, and rough aspen. The striking exception is in rail deliveries in Wisconsin where profit ratios for aspen are relatively high. By method of delivery, profit ratios are generally higher for truck deliveries, again with the notable exception of aspen in Wisconsin. By study areas, no meaningful comparisons can be drawn.

TABLE 84--Margin and profit ratios for the production of pulpwood in the North Central region delivered to mills by trucks, by study area, 1959

Species	Price received(a)	Stumpage cost	Logging cost	Hauling cost	Margin	Profit ratio(b)
		(dollars per cord)				(percent)
<u>Michigan</u>						
Aspen						
rough	13.50	1.34	5.81	5.50	0.85	6
peeled	19.75	1.50	9.31	5.50	3.44	17
Pine	18.75	3.46	6.22	5.50	3.57	19
Spruce	32.00	4.69	8.55	9.80	8.96	28
Balsam fir	28.00	3.79	8.55	9.80	5.86	21
Mixed hdwds.	13.75					
<u>Wisconsin</u>						
Aspen						
rough	13.00	2.57	6.22	4.75	-0.54	
peeled	19.50	2.95	9.77	4.75	2.03	10
Pine	18.75	5.06	6.48(c)	5.00	2.21	12
Spruce	27.75	8.53	9.30	4.50	5.42	20
Balsam fir	22.50	5.79	9.11	4.50	3.10	13
Mixed Hdwds.	13.50	2.30	7.00	4.25(d)	-0.05	
<u>Minnesota</u>						
Aspen						
rough	12.25	1.05	6.83	5.00	-0.63	
peeled	17.75	1.21	10.38	5.00	1.16	6
Pine	17.50	2.89	6.75	5.50	2.36	14
Spruce	23.25	4.41	8.24	5.00	5.60	24
Balsam fir	19.00	2.57	7.52	5.00	3.91	21
<u>Central States</u>						
Mixed hdwds.	13.11	1.87	5.05	4.50	1.69	13

(a)Unless otherwise noted, prices and costs are for unpeeled wood.

(b)Profit ratio is the ratio of the margin to price received.

(c)Sample data inadequate. Assume Michigan-Wisconsin average of \$6.48.

(d)Sample data inadequate. Assume average hauling distance of 25 miles at a cost of \$4.25.

TABLE 85--Margins and profit ratios for the production of pulpwood in the North Central region delivered to railroad sidings, f.o.b., by study area, 1959

Species	Price received(a)	Stumpage cost (dollars per cord)	Logging cost (dollars per cord)	Hauling cost (dollars per cord)	Margin	Profit ratio(b) (percent)
<u>Michigan</u>						
Aspen						
rough	12.50	1.34	5.81	4.50	0.85	7
peeled	17.50	1.50	9.31	4.50	2.19	12
Pine	18.00	3.46	6.22	4.50	3.82	21
Spruce	25.00	4.69	8.55	5.25	6.51	26
Balsam fir	21.00	3.79	8.55	5.25	3.41	16
<u>Wisconsin</u>						
Aspen						
rough	15.50	2.57	6.22	4.00	2.71	18
peeled	19.40	2.95	9.77	4.00	2.68	14
Pine	17.33	5.06	6.48(c)	5.00	0.79	5
Spruce	26.80	8.53	9.30	5.00	3.97	15
Balsam fir	21.75	5.79	9.11	5.00	1.85	8
<u>Minnesota</u>						
Aspen						
rough	10.75	1.05	6.83	5.00	-2.13	
peeled	16.25	1.21	10.38	5.00	-0.34	
Pine	16.00	2.89	6.75	5.00	1.36	8
Spruce	21.75	4.41	8.24	5.00	4.10	19
Balsam fir	17.50	2.57	7.52	5.00	2.41	14

(a)Unless otherwise noted, prices and costs are for unpeeled wood.

(b)Profit ratio is the ratio of the margin to price received.

(c)Sample data inadequate. Assume Michigan-Wisconsin average of \$6.48.

Sawlogs

Margins and profit ratios for sampled producers, by species, are shown in Tables 86 and 87. In general, more substantial margins and profit ratios exist in the Central States than in the Lake States. Reported logging costs in the Central States are lower, but hauling is slightly more expensive. The larger profit ratios in the Central States are usually the result of relatively low stumpage costs.

Profit ratios appear satisfactory in the Central States for most study areas and most species. There are some notable exceptions. Profit ratios are unattractive for all species in Missouri, for poplar, cottonwood and elm in Iowa and Kansas, and mixed oak in Illinois.

Profit ratios average considerably lower in the Lake States than in the Central States. No species stands out as very profitable in Michigan, Wisconsin, or Minnesota, but several instances of low profitability stand out--hard and soft maples in Michigan, birch in Wisconsin and aspen in Minnesota. Even more striking is the evidence of several negative margins of profit--elm in Michigan and Wisconsin, and hemlock in Michigan.

Veneer Logs

Quality veneer log production (Table 88) results in larger margins and profit ratios than sawlog production. Veneer log stumpage is costlier than sawlog stumpage, but the differential between the selling price of veneer logs and that of sawlogs is even greater. Lake States quality veneer log producers show a fairly consistent one-third profit ratio. Variation in the Central States is greater, but the average

TABLE 86--Margins and profit ratios for the production of sawlogs by sampled producers under assumptions of average costs and average prices, Central States, 1960

Region and species	Price received	Stumpage cost	Logging cost	Hauling cost	Margin(a)	Profit ratio(b) (percent)
		(dollars per thousand bd. ft.)				
		<u>Ohio</u>				
Mixed maple	65.00	12.00	11.50	11.75	29.75	46
Mixed oak	48.00	13.00	11.50	11.75	11.75	24
Poplar and cottonwood	50.00	11.00	11.50	11.75	15.75	32
Cherry	82.00	18.00	11.50	11.75	40.75	50
Walnut	98.00	31.00	20.00	14.75	32.25	33
		<u>Indiana</u>				
Mixed hardwood	54.00	23.00	11.50	11.75	7.75	14
		<u>Illinois</u>				
Soft maple	48.00	15.00	11.50	11.75	9.75	20
Mixed oak	38.00	12.00	11.50	11.75	2.75	7
Poplar and cottonwood	43.00	13.00	11.50	11.75	6.75	16
Sycamore	43.00	13.00	11.50	11.75	6.75	16
		<u>Missouri</u>				
Mixed oak	29.00	10.00	9.00	7.90	2.10	7
Pine	37.00	17.00	9.00	7.90	3.10	8

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TABLE 86--(Continued)

Region and species	Price received	Stumpage cost	Logging cost	Hauling cost	Margin(a)	Profit ratio(b) (percent)
(dollars per thousand bd. ft.)						
<u>Iowa</u>						
Soft maple	56.00	17.00	11.00	11.15	16.85	30
Mixed oak	47.00	14.00	11.00	11.15	10.85	23
Poplar and cottonwood	34.00	9.00	11.00	11.15	2.85	8
Ash	42.00	9.00	11.00	11.15	10.85	26
Elm	35.00	10.00	11.00	11.15	2.85	8
Basswood	42.00	13.00	11.00	11.15	6.85	16
Walnut	93.00	42.00	25.00	13.80	12.20	13
<u>Kansas</u>						
Mixed oak	49.00	17.00	11.00	11.15	9.85	20
Poplar and cottonwood	33.00	8.50	11.00	11.15	2.35	7
Elm	34.00	9.00	11.00	11.15	2.85	8
Walnut	104.00	51.00	25.00	13.80	14.20	14
<u>Central States</u>						
Hardwood (except walnut)	45.00	12.00	10.75	10.40	11.85	26
Walnut	103.00	42.00	20.25	14.25	26.50	26

(a) Difference between price received and costs of production.

(b) Profit ratio is the ratio of the margin to price received.

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TABLE 87--Margins and profit ratios for the production of sawlogs by sampled producers under assumptions of average costs and average prices, Lake States, 1960

Region and species	Price received	Stumpage cost	Logging cost	Hauling cost	Margin(a)	Profit ratio(b) (percent)
(dollars per thousand bd. ft.)						
<u>Michigan</u>						
Hard maple	65.00	37.50	14.50	10.30	2.70	4.2
Soft maple	37.00	11.00	14.50	10.30	1.20	3.2
Aspen	33.00	6.50	12.50	8.85	5.15	15.6
Elm	35.00	11.00	14.50	10.30	-0.80	
Oak	41.00	11.00	14.50	10.30	5.20	12.7
Basswood	54.00	23.00	14.50	10.30	6.20	11.5
<u>Wisconsin</u>						
Hard maple	56.00	26.00	14.25	10.30	5.45	9.7
Birch	62.00	35.00	14.25	10.30	2.45	4.0
Mixed hardwood	44.00	19.00	14.25	10.30	0.45	1.0
Elm	38.00	17.00	14.25	10.30	-3.55	
Hemlock	42.00	19.00	14.25	10.30	-1.55	
Pine	58.00	26.00	14.25	10.30	7.45	12.8
<u>Minnesota</u>						
Pine	48.00	18.00	13.00	10.30	6.70	14.0
Aspen	28.00	5.00	12.25	8.85	1.90	6.8

TABLE 88--Margins and profit ratios for the production of veneer logs by sampled producers under assumptions of average costs and average prices, 1960

Species	Price received	Stumpage cost	Logging cost	Hauling cost	Margin(s)	Profit ratio(b) (percent)
(dollars per thousand bd. ft.)						
<u>Quality veneer</u>						
<u>Lake States</u>						
Maple	113.00	43.00	16.25	12.25	41.50	37
Birch	113.00	38.00	16.25	12.25	46.50	41
Basswood	85.00	31.00	16.25	12.25	25.50	30
All Northern Hardwood	105.00	38.00	16.25	12.25	38.50	37
<u>Ohio</u>						
White oak	225.00	66.00	16.25	21.00	121.75	54
Red oak	108.00	29.00	16.25	21.00	41.75	39
Poplar	114.00	29.00	16.25	21.00	47.75	42
Cherry	168.00	33.00	16.25	21.00	97.75	58
Walnut	234.00	74.00	25.50	24.75	109.65	47
<u>Indiana</u>						
Oak	165.00	45.00	16.25	21.00	82.75	50
Walnut	309.00	93.00	25.50	24.75	165.75	54
<u>Illinois</u>						
Oak	136.00	50.00	16.25	21.00	48.75	36
Walnut	286.00	153.00	25.50	24.75	82.75	29

TABLE 88--(Continued)

Species	Price received	Stumpage cost (dollars per thousand bd. ft.)	Logging cost	Hauling cost	Margin(a)	Profit ratio(b) (percent)
		Iowa				
Maple	99.00	41.00	16.50	19.00	22.50	23
Basswood	9.00	43.00	16.50	19.00	12.50	14
Red oak	89.00	43.00	16.50	19.00	10.50	12
Walnut	323.00	175.00	27.25	20.50	100.00	31
		Kansas				
Walnut	326.00	180.00	27.25	20.50	98.25	30
		Central States				
Oak	145.00	48.00	16.25	20.75	60.00	41
Walnut	285.00	126.00	27.00	23.75	108.25	38
Hardwood (except walnut)	133.00	44.00	16.25	20.75	52.00	39
Container veneer						
		Michigan and Wisconsin				
Elm, Beech, and Soft Maple	52.00	22.00	14.50	10.00	5.50	11
		Illinois				
Soft hardwoods	50.00	17.00	12.25	18.00	2.75	6

(a) Difference between price received and costs of production.

(b) Profit ratio is the ratio of the margin to price received.

profit ratio is as high as it is in the Lake States. Container veneer log production, based on a somewhat limited sample, shows much lower profit ratios.

Cooperage Timber

Profit ratios for white oak stave bolt production (Table 89) are higher in the eastern part of the region than in the western part, but they can be considered satisfactory in all study areas. In general, the ratios appear to be similar to those for quality veneer logs.

Primary Manufacturer Prices

Limited data are available that can be presented in tabular form on primary manufacturer prices. Limited price reporting by larger firms precludes the detailed reporting of veneer and pulp prices. However, some product prices are available for cooperage staves and heading. Also, excellent data were obtained concerning prices for rough lumber, f.o.b. mill, in both the Lake States and the Central States.

Most of the sampled cooperage stave and heading manufacturers reported price information. They indicate that their staves sold in 1959 for \$600 per thousand staves at the mill. Slightly higher prices apply when staves are sold on a delivered basis. Data supplied also indicate that the output of staves per M bd. ft. of stave bolts is usually 300 to 400, averaging 350. Thus, it can be stated that 1,000 bd. ft. of stave bolts yielded staves selling for about \$210 in 1959. Heading bolt prices averaged \$60 per M bd. ft.,

TABLE 89--Margins and profit ratios for the production of stave bolts by producers under assumptions of average costs and average prices, by study area, 1959

Study area	Price received	Stumpage cost	Logging cost	Hauling cost	Margin(a)	Profit ratio(b)
	(dollars per M bd. ft.)					(percent)
Ohio	118.86	28.08	18.75	15.00	57.03	48
Indiana	123.00	43.30	17.60	(c)	48.10	39
Illinois	106.50	48.33	15.62	14.00	28.55	27
Iowa	109.44	31.38	21.28	17.00	39.78	36
Missouri	88.42	36.64	17.88	13.50	20.40	23
Kansas	85.00	25.00	23.67	(c)	22.33	26
All study areas	108.85	35.72	18.31	14.00	40.82	37

(a) Difference between price received and costs of production.

(b) Profit ratio is the ratio of the margin to price received.

(c) Sample data inadequate. Assume the regional average of \$14 applies here.

and the average output of heading per thousand bd. ft. of bolts is 100 sets. Mill price for heading is reported fairly consistently at \$3.00 per set. This would indicate that 1,000 bd. ft. of heading bolts yield heading having a sales value in the vicinity of \$300.

Lumber prices are shown in Tables 90 and 91. Prices for the Lake States include grade lumber and other types of lumber. Prices for the Central States include grade lumber, dimension lumber, mill-run lumber and speciality products. In general, grade lumber brings slightly more in the Central States than in the Lake States for comparable species. Other types of lumber, depending on species and study area, show considerable variation in price. Illinois prices for lumber, unlike stumpage prices or delivered sawlog prices which are the lowest in the eastern Central States, are at least as high as those prevailing in the region.

Value Added by Primary Manufacture

Sufficient data are available for some products to relate raw wood costs to value added by manufacture. These relationships can be drawn for pulpwood in the Lake States, treated posts in Missouri and Ohio, and sawlogs in both the Lake States and Central States.

Pulpwood price is related to value added by manufacture in Table 92. Other things being equal, the higher the value of the final product, the higher the price which can be paid for pulpwood. Thus, as might be expected, high prices for spruce and fir pulpwood are related to the high prices of the manufactured products. Conversely, lower-value aspen pulpwood is generally used in the manufacture of lower-value pulp products. Even though spruce users pay twice as much

TABLE 90--Average price received by sampled Lake States sawmills
for rough lumber, f.o.b. mill(a), 1960

Species or type of lumber	Michigan	Wisconsin	Minnesota
	(dollars per thousand bd. ft.)		
<u>Grade</u>			
Hard maple	122.25	124.25	
Basswood	104.25		
Beech	71.75		
Cherry	126.00		
Oak	87.30		
All hardwood grade	105.00	122.00	
Hardwood mill-run		73.70	66.65
Aspen	59.70	52.00	48.75
Pallet material	49.60		
Hemlock	76.70	92.70	
Jack pine	71.50		
Red and white pine	89.55	95.00	
Mixed pine	85.70		64.90
Pine (planed)			86.10

(a)Some mills reported costs for delivering lumber. In Michigan the average cost per M bd. ft. for delivering pallet material was \$6; for pine, \$7; and for hardwood \$9. In Minnesota average delivery costs were \$3 for aspen and \$8 for pine.

TABLE 91--Average price received by sampled Central States sawmills for rough lumber, f.o.b. mill, 1960

Species or type of lumber	Ohio	Indiana	Illinois	Missouri	Iowa	Kansas
	(dollars per thousand bd. ft.)					
<u>Grade</u>						
Mixed maple			112.00			
Hard maple	127.00					
Soft maple	101.00		106.00		106.00	
Poplar or cottonwood	92.00		91.00		89.00	
Oak	99.00	102.00	103.00	57.00	100.00	
Cherry	144.00					
Mixed grade	99.00	110.00	100.00			
<u>Dimension</u>						
Oak	69.00		72.00	47.00	72.00	
Poplar or cottonwood	66.00				67.00	
Mixed dimension	63.00	72.00	78.00			
<u>Mill-run</u>						
Oak				44.00		75.00
White oak						103.00
Ash						73.00
Hackberry						72.00
Elm					73.00	67.00
Cottonwood						71.00
Pine				57.00		
Maple						85.00
Sycamore						67.00
<u>Specialty products</u>						
Ties	56.00			41.00	61.00	
Blocking				37.00		
Flooring				54.00		
Crating lumber	57.00	59.00				
Pallet lumber	56.00			39.00		
Pine pavin blocks				56.00		
Walnut lumber	173.00				190.00	198.00

TABLE 92--Value added by manufacture per cord of wood received and pulpwood price as a percent of value added by manufacture for sampled pulp mills, by study area, 1959

Mill number and study area	Principal species consumed	Value added by manufacture (dollars per cord)	Pulpwood price as a percent of value added by manufacture(a)
Michigan			
1	Aspen	126	9-10
2	Aspen	260	12-14
3	Aspen	99	13-14
4	Pine	329	5-6
5	Aspen	124	11-15
6	Spruce-fir	271	11-12
7	Aspen	95	21-23
Wisconsin			
1	Spruce-fir	392	7-8
2	Aspen	208	11-12
3	Aspen	74	27-30
4	Aspen	120	18-21
5	Aspen	207	7-8
6	Spruce-fir	257	11-12
7	Aspen	150	15-18
8	Aspen	136	15-16
9	Aspen-spruce	289	7-10
10	Pine	125	19-24
11	Pine	210	9-10
12	Aspen	187	10-11
13	Aspen	110	17-18
Minnesota			
1	Aspen	76	11-12
2	Spruce-fir	218	10-11
Iowa			
1	Hardwoods	119	13-16

(a)Weighted average pulpwood prices calculated based on prices paid for wood trucked-to-mill, water-borne to mill, or delivered to railroad loading points. Where rail delivery is significant, especially to many Wisconsin mills, pulpwood costs to mills are higher than the prices used in these calculations.

per cord of pulpwood as hardwood users--in relation to value added by manufacture, the price may be similar.

Values added by treating posts in Missouri and in Ohio are shown in Tables 93 and 94. At least for reporting firms, the value added by processing is large. The cost of delivered, untreated round posts represents only a small portion of the sale value of the treated posts.

Values added by manufacture for lumber (Tables 95 and 96) indicate that the cost of sawlogs is a major item in the sale price of the product. In general, value added is somewhat less than the cost of the raw material, although considerable variation can be noted by species, type of lumber, and study area. In the Lake States, grade lumber has the highest value added by manufacture, especially in Wisconsin. Value added for aspen, pallet material, and pine are generally lower, depending on the study area. In the Central States, similarly, grade lumber shows the highest values added by manufacture, especially in Illinois and Iowa. Other types of lumber in this sub-region generally show lesser values added by manufacture.

Price Negotiation

Limited information was obtained concerning price negotiation when agents bought and sold products. Both pulpmills and cooperage stock mills purchase on a mill-established delivered price basis; negotiated prices apply to only very minor volumes of wood. A few cooperage stock mills purchase stumpage, and these mills report that the landowner usually accepts the mill-offered price.

More information is available concerning price negotiations by

TABLE 93--Value added per pine post and post price as a percent of value added by manufacture by sampled wood preservation plants in Missouri, 1959

Size of post	Value added by manufacture (cents per piece)	Post price as a percent of value added by manufacture
3" x 7'	51	27
4" x 7'	82	29
5" x 7'	162	22
5" x 8'	109	26
6" x 8'	257	18
7" x 8'	333	18

TABLE 94--Value added per pine and oak highway post and post price as a percent of value added by manufacture by sampled wood preservation plants in Ohio, 1959

Size of post	Value added by manufacture (dollars per post)	Post price as a percent of value added by manufacture
Sawed posts(a):		
4" x 6" x 6'	1.30	77
6" x 6" x 6'	1.20	108
8" x 6" x 6'	1.10	127
Round posts(b):		
7" x 9" x 6'	1.70	32
6" x 8" x 6½'	1.75	29
7" x 9" x 9'	1.85	49

(a) Mostly oak.

(b) Oak and pine.

TABLE 95--Value added by manufacture of lumber and sawlog price as a percent of value added by manufacture for sampled sawmills in the Lake States, 1960

Study area and Type of lumber (f.o.b. mill, rough)	Value added by manufacture (dollars per thousand bd. ft.)	Sawlog price as a percent of value added by manufacture
<u>Michigan</u>		
Grade lumber species		
Hard maple	57	114
Basswood	47	121
Cherry	53	138
Oak	42	107
Beech	33	118
All grade species	51	106
Pallet material	14	257
Aspen lumber	26	131
Pine lumber	42	105
<u>Wisconsin</u>		
Grade lumber species		
Hard maple	66	88
All grade species	64	91
Aspen lumber	18	189
Pine lumber	39	143
<u>Minnesota</u>		
Hardwood mill-run	30	120
Aspen lumber	21	133
Pine lumber	19	242

TABLE 96--Value added by manufacture of lumber and sawlog price as a percent of value added by manufacture for sampled sawmills in the Central States, 1960

Study area and type of lumber (f.o.b. mill, rough)	Value added by manufacture (dollars per thousand bd. ft.)	Sawlog price as a percent of value added by manufacture
<u>Ohio</u>		
Grade		
Hard maple	61	108
Soft maple	39	159
Poplar or cottonwood	37	149
Oak	48	106
Cherry	50	188
Dimension		
Oak	18	283
Hardwood	19	231
Walnut	68	154
Ties	12	367
Crating lumber	13	338
Pallet material	12	367
<u>Indiana</u>		
Grade		
Oak	49	108
Mixed grade	52	111
Dimension, hardwood	22	227
<u>Illinois</u>		
Grade		
Mixed maple	60	87
Soft maple	58	83
Mixed oak	62	66
Poplar or cottonwood	55	65
Dimension		
Oak	31	132
Mixed hardwood	36	117

TABLE 96--(Continued)

Study area and type of lumber (f.o.b. mill, rough)	Value added by manufacture (dollars per thousand bd. ft.)	Sawlog price as a percent of value added by manufacture
<u>Missouri</u>		
Grade oak	29	97
Dimension oak	19	147
Mill-run		
Oak	16	175
Pine	22	159
Ties	18	128
Blocking	14	164
Pallet lumber	16	145
Flooring	26	108
Pine pavine blocks	21	167
<u>Iowa</u>		
Grade		
Soft maple	53	100
Oak	56	79
Poplar or cottonwood	55	62
Dimension		
Oak	28	157
Poplar or cottonwood	33	103
Mill-run, elm	36	103
Ties	22	177
Walnut lumber	94	102
<u>Kansas</u>		
Mill-run		
White oak	48	115
Red and black oak	41	83
Ash	33	121
Cottonwood	38	87
Maple	30	183
Sycamore	31	116
Walnut	73	171

sawmills and veneer mills. The results are shown in Tables 97 and 98. In Minnesota, sawmills report that they often accept the landowner's price for stumpage. There is little evidence of landowner market power in any other state except where public lands and large private landholdings are involved. These exceptions are much more prevalent in the Minnesota lumber market than elsewhere in the region.

For sawlogs, it is obvious that producers exert little control over price at sawmills. Minor volumes are sold at negotiated prices, but such negotiation is more likely to concern agreement about average log quality for woods-run logs rather than unit prices. Usually the mill-offered price is accepted by the producer.

Lumber price negotiations (Table 97) take variable form. Usually, but not always, the buyer's price is accepted. The most likely explanation for the high percentage of mill-set prices in Wisconsin, Illinois, and Kansas is that a great deal of the lumber is sold directly to local consumers. A considerable volume of lumber is sold at negotiated prices, especially in Ohio and Kansas. Lumber manufacturers wield most of their considerable market power in buying log inputs, but they indicate some power in selling lumber outputs.

Veneer mills indicate that supplying agents exercise very little market power in setting prices. Such agents can, however, exert some influence through price negotiation, especially where high-quality logs are involved. Veneer mills usually set the price at which their veneer is sold, but the buyer's price or price negotiation apply to a substantial portion of veneer sales.

TABLE 97--Price determination for sawlog stumpage, sawlogs, and lumber, by study area, 1960

Product and price determination	Mich.	Wisc.	Minn.	Ohio	Ind.	Ill.	Mo.	Iowa	Kan.
	(percent)								
<u>Stumpage</u>									
Landowner's price	4	0	62	3	0	0	2	0	0
Mill buyer's price	69	91	27	62	88	61	50	57	88
Price by negotiation	27	9	11	35	12	39	48	43	12
<u>Delivered logs</u>									
Supplier's price	2	0	3	0	0	0	0	0	0
Mill price	92	92	84	89	86	95	100	91	96
Price by negotiation	6	8	13	11	14	5	0	9	4
<u>Lumber</u>									
Mill price	8	48	19	11	20	43	6	21	36
Buyer's price	68	43	70	27	55	47	88	65	12
Price by negotiation	24	9	11	62	25	10	8	14	52

TABLE 98--Price determination for veneer logs and veneer, North
Central region, 1960

Product and price determination	Quality veneer		Container veneer	
	Lake States	Central States	Lake States	Central States
(percent)				
<u>Delivered logs</u>				
Supplier's price	0	0	0	0
Mill price	64	42	100	80
Price by negotiation	36	58	0	20
<u>Veneer</u>				
Mill price	57	44	75	67
Buyer's price	7	19	25	33
Price by negotiation	36	37	0	0

SUMMARY AND CONCLUSIONS

The Forest Resource

In the North Central region the heaviest concentrations of forest land are in the northern part of the Lake States and in the more southerly portions of the Central States. Between 1953 and 1963, the region lost about two million acres of commercial forests to other land uses, but there have been net additions to both capital growing stock and sawtimber reserves except in Missouri and Illinois. Kansas and Iowa in the western sector of the region were noticeable for contributing a larger share of the regional timber products output than in previous years.

About 70 percent of the resource base is in private ownership, and 30 percent in public ownership. Private ownership supplies most of the timber products produced, and farm owned forest lands are still very significant contributors. The small, scattered, private forest lands producing much of the region's timber products output, as evidenced by this report, are still not to any degree under any form of intensive forest management. Pulpwood, especially in the Lake States, is being produced in increasing volumes from public lands. These lands are now major producers of pulpwood, and under continued forest management can be expected to contribute an even larger share of the region's pulpwood production in the future.

Patterns of Raw Material Assembly

The use of direct woods-to-mill trucking of raw timber products has increased significantly. This trend is partially the result

of improved technology, roads, and hauling equipment, and partially the result of the concern of some agents and firms over supplies of timber and the quality and availability of both present and future supplies in their areas. Water borne and rail shipments of pulpwood are decreasing except where there is a heavy spatial concentration of pulp mills as in Wisconsin and long hauls are necessary. Veneer logs are shipped long distances by rail as quality veneer logs continue to decline in availability in areas adjacent to the mills.

Timbersheds are increasing in size for pulp mills and veneer mills. Pulp mills in the Lake States frequently receive wood by truck up to distances of 100 miles or more. Many Wisconsin mills now bring a portion of their raw material supplies by rail from distances of nearly 500 miles. Veneer mills have an average timbershed radius of over 300 miles, and inter-state rail shipments of supplies of veneer logs have become increasingly more common.

Veneer mills are relying more on their own log-producing operations or on increased purchases from intermediate agents. Other primary manufacturers, especially pulp mills, are turning more to local producers for supplies of wood. Relatively small sawlog producers continue to supply local saw mills with some 60 percent of their needs by truck; average hauls are 15 miles. Cooperage bolts from farm woodlands in the Central States are usually trucked some 40 miles to cooperage stock mills by small producers. The intermediate agent or dealer function does not occur with sawlogs and is relatively minor in the handling of cooperage bolts. Some dealers handle posts, poles and piling.

Primary Manufacturers of Forest Products

The forest products industries in the North Central region have not kept pace with national production trends. While pulp and paper mills have expanded production, this production is proportionately less of the national output than in former years. Other industries, in general, show decreases in production. Pulp and paper mills have added increased machine capital, and some small firms, as exemplified by several sawmill-pallet plants, are making progress in utilizing the resource base more fully. However, many other firms seem to be lacking in progress. The small, poorly equipped, intermittently operating sawmill is still prevalent in the region, and in many cases indicates inefficient utilization of the forest resource.

Pulp and Paper Mills

The pulp and paper companies in the region show some concern over dependable supplies of wood. They have directed more attention to setting up their own procurement systems and establishing direct contact with local producers and landowners. In this connection, the dealer system has decreased in relative importance and direct producer-to-mill delivery has been encouraged. This in turn has resulted in reduced inventories, although most mills still maintain up to a six months' supply of wood to insure production stability. The use of more and smaller producers (Lake States mills sampled in this study received delivered wood from some 9,800 producers, averaging 150 cords per contract in 1959) is not without adverse effects to the marketing system and its agents, regardless of benefits to be had at the primary

point of manufacture. Conclusions drawn concerning the many small producers of raw forest products point up this fact.

Veneer Mills

This industry is characterized by old established firms that are now reaching farther for raw material supplies. Wisconsin is still the nation's leading state in hardwood plywood production and Indiana the nation's leading state in face veneer production. Supplies of veneer logs being shipped to firms in these states are coming by rail and truck from more distant areas. A prime example is the sharp increase in volumes of walnut veneer logs shipped from Kansas and Iowa to Indiana mills. Due to the high relative value of veneer logs, an increasing amount of the raw material is being supplied by sawmills sorting their inputs of sawlogs and reselling veneer quality material. Seasonality of supply and the increasing scarcity of quality material have encouraged most veneer mills to store large inventories of logs--at least up to the point where "weathering" or "spoilage" negate the advantages gained.

Sawmills

Sawmilling firms in the region are sawing more hardwood lumber and less coniferous lumber as a consequence of the changing sawtimber resource base. Hardwood lumber, and hardwood grade lumber, followed by pallet lumber are the most important products.

The sawmill industry is still characterized by widely scattered, relatively small firms. Some 20 percent of the mills sampled are portable. Several of these are small, modern, efficient mills

operating on scattered tracts not economically accessible to stationary mills. However, many are poorly equipped, inefficient, hastily assembled mills operating where an advantage had been gained in access to stumpage. These mills, and also small stationary mills, tend to operate intermittently. Fully 55 percent of the smaller sawmills sampled in this study do not operate full-time, whereas some 85 percent of the larger sawmills sampled operate full-time.

Sawmills operating in the region frequently run at less than full capacity. On a state basis, the range in averages is from 54 percent to 88 percent of full capacity. Limited evidence indicates a slight trend to increasing size in the larger mills and decreasing size in the smaller mills.

Sawmills receive their inputs of sawlogs mainly from small, local, timbersheds. Minor increases in the size of timbersheds are thought to be the result of better roads and hauling equipment rather than competition for wood. Stumpage is obtained locally from known land-owners in many cases. There is some evidence that a sawmill and/or its supplying agents would be at a disadvantage in acquiring stumpage in a non-local area. Informal, loose agreements are common in both delivered log and stumpage purchases. Receipts, size of inventory, and production tend to be highly seasonal. Small sawmill owners frequently have alternate occupations, dividing their time between two or more activities. Sawmills rarely obtain sawlogs from intermediate agents. Possibly, larger mills drawing inputs from areas with large public and/or private forest ownerships might find intermediate agents useful in the future. The Doyle log rule is by far the most prevalent means of measuring logs sold delivered to the mill.

Unfortunately, insufficient information was obtained to confirm whether supplying agents knew the disadvantages inherent in selling on the basis of this log rule.

Cooperage Stock Mills

Cooperage stock mills depend on supplies of quality white oak timber. Their material is obtained from small scattered tracts, and frequent changes in location accompanied by intensive "scouting" by both mills and supplying producers are necessary to maintain production. Purchases are small and frequent, and deliveries to the mills tend to be somewhat seasonal depending on the alternate occupations of supplying producers. Vertical integration with barrel firms is common, and mills, like their supplying producers, tend to ship or sell their output to one firm. The very specific nature of this industry has tended to place a severe strain on a limited forest resource. Supplies of quality white oak in the Central States available to both this and other industries can be expected to be severely limited in the near future.

The Post, Pole and Piling Industry

This forest products industry varies widely as to specific type of product and is highly specialized depending on geographic area. White cedar posts and pickets are the primary products in Michigan. Fence and post companies frequently draw supplies of raw materials from timbersheds several counties in size. Dealers are fairly prominent in concentrating and delivering the raw product. In Illinois and Missouri, pine posts and poles are the major concern

of treating plants. Local supplies of raw material are frequently supplemented by supplies shipped in from more southerly states. In Ohio, oak and pine highway posts are treated by small non-pressure wood preserving firms. These firms generally supply local needs, are small in size, and many have just recently moved into operation. The piling industry in the region is highly specialized. Some inventories are maintained by firms, but a considerable amount is produced after orders are received. Hence, a close liason is maintained with supplying producers who intermittently deliver the raw timber at the firm's request.

Intermediate Market Agents

The most common type of intermediate agent in the region is the pulpwood dealer. There are two kinds of pulpwood dealers--the agent middleman and the merchant middleman. Agent middlemen act as commission agents for the mills, do not take title to the wood, and receive from \$0.50 to \$1.50 per cord handled. Merchant middlemen are not recognized by the mills (frequently they are considered as large producers by mills), they take title to the wood, and do not receive mill "bonuses" for handling wood. They exist because of services rendered the producer rather than the mill.

On the basis of agents sampled in this study, it is evident that dealers are fairly prominent in the Lake States and Ohio. While the function seems to be decreasing in importance in the Lake States, it is gaining momentum in Ohio. There, several dealers moved into operation for the first time in the late 1950's. In general, pulpwood dealers tend to be specialists, but some 40 percent of the dealers

sampled, and especially the smaller ones, also operate part-time as producers. Many dealers have alternate occupations to the production or handling of pulpwood. Small dealers are usually contacted by producers, whereas large dealers spend considerable time contacting producers. Dealers tend to operate under loose purchase agreements, but are more likely to assist producers with financial aid, technical assistance, and advice than many primary manufacturers. Possibly, these additional services are the reason that many small producers who lack capital and credit still act through dealers rather than directly with the pulpmills. Also, for mills regulating their inputs of pulpwood through the use of "tickets," some producers not receiving tickets consider dealers as an alternate market.

Dealers in cedar posts are common in Michigan, and many also produce pulpwood as well as posts. In Ohio, locust post dealers are mainly store or sawmill operators handling small "on-the-spot" purchases from local producers. Pine, post and pole dealers in Illinois and Missouri tend to be full-time handlers of these products. They purchase unpeeled wood and deliver peeled wood to treating plants. The localized and specific nature of the services of post and pole dealers would seem to indicate that they will play a continuing role in the handling of timber products in many areas.

One type of intermediate agent action that has recently come into prominence, and that is not widely recognized, is the sawmill firm acting as a dealer in veneer logs. Some mills buy veneer logs as well as sawlogs from producers and resell concentrated volumes of the former to veneer mills or their agents. However, a much more prevalent practice is to buy woods-run logs from producers, and sort the material

for quality or potential veneer logs. Many sawmillers indicate that the re-sale of veneer quality material is far more profitable than using these logs as inputs for the sawmill. It is evident that while some producers receive added compensation for "extra" quality, the vast majority of producers do not receive a proportionate share of the added revenues. Of course, for many small producers supplying small volumes, no alternate courses of action are available. Several companies, frequently engaged in other business activities, act openly as agent or merchant middlemen for walnut veneer logs in Kansas and Iowa. These agents provide handling and concentration services and pay producers on a grade basis for walnut logs.

Producers of Raw Forest Products

Producers exhibit very diverse characteristics. They range from highly specialized agents to agents involved in handling several products and having several occupations. Some consider raw forest products production as a sideline, or "off-season" employment. Others consider it a full-time, highly profitable, business and are organized, efficient, and highly competitive. In general, each individual producer tends to specialize in a product or products, and at a level of production where he has an advantage over producers not local to his geographic area or situation. This advantage can take many forms. Some producers indicate they have easier access to stumpage in their community because of social and business ties; others have capital availability advantages; still others have a highly developed skill in logging combined with very detailed knowledge concerning local terrain and timber.

The North Central region, as evidenced by sampled producers, has many small producers and few large ones. Production tends to be highly seasonal. Bad logging weather, traditional seasonal patterns of operation, and farming tend to be the main causes of intermittent production. Producers frequently move to and from production depending on local market activity or the attainment of a production advantage (i.e., frequently the location and acquisition of a "block" of stumpage). Producers tend to avidly scout for stumpage, frequently locally; they often purchase any or all merchantable timber for a lump-sum fee through personal contact and with as little publicity as possible. Frequently, but not always, they have a market for the harvested products before purchasing stumpage. If not, a general check is usually made to confirm that local mills are buying. Considerable volumes are sold to a local mill or mills at the mill offered delivered price.

No evidence was found to indicate that producers are expanding their operations or timbersheds to any significant extent; in fact, many smaller producers indicate they are concentrating production more heavily on their "home ground." They are cutting more products from their own lands or their neighbors' where they meet less competition and have greater bargaining power for stumpage. Large producers frequently contract (i.e. sub-contract) production to smaller producers.

Many primary manufacturers show a tendency to favor the small producer as a direct supplier of delivered wood. This lessens mill dependency on any one source of supply and is thought to spread harvesting of the resource into smaller tracts more evenly spaced

over geographic areas. However, this practice also lessens the market power of producers. Small producers frequently do not use organized woods crews, are exempt from workman's compensation, frequently lack necessary equipment, and in many cases where their production is seasonal and in support of an alternate occupation, earn revenues which, on an hourly basis, would barely meet minimum wage laws. During periods of excess wood supply, competition between producers becomes excessive, and orderly marketing deteriorates. Sometimes the producers who cannot obtain markets for their products, and who move out of operation, are not the most inefficient producers. Some evidence obtained in this study indicates more receptiveness by some producers to the idea of organized forest labor and to cooperative marketing and bargaining. It was impossible to determine the strength of these tendencies, but it is noticeable that a lack of leadership and co-ordination, together with producers' traditional liking for independent initiative, are restraining organization.

The Forest Landowner

The public forest landowner and the large forest landowner do exercise some market power. Small private owners are not as fortunate. They exercise little market power beyond some limited price negotiation for stumpage. Most owners either lack information or interest in selling the timber they own, and in most cases, they are uninterested in long-term forestry practices requiring capital outlays. If their ownership includes stands of timber they are often induced to sell, frequently with little or no knowledge of values or volumes or

existing markets. Some owners sampled are holding and improving timber on their land, but even here the attempts at forest management are minor. Most small forest landowners are interested in short-term gains; long-term gains, requiring decades for realization, are of little interest.

Usually, forest landowners sell to neighbors or local acquaintances who are engaged in timber production. Sales are frequently for a lump-sum of cash paid in advance granting the producer the right to cut "any or all merchantable" timber within a specified time. Contracts usually take the form of a bill of sale. Sampled questionnaires indicate that the volumes realized from "lump-sum" stumpage purchases for the region as a whole average out to slightly more than \$1.50 per cord for pulpwood, and slightly more than \$10 per M bd. ft. for sawlogs. Landowners usually do not place cutting restrictions on producers, and only minor restrictions apply to logging damage to roads, fences, waterways, and other property. Fewer than five percent of the producers sampled indicate they are held responsible for any damage to young growth. Fully 85 percent indicate they would accept no responsibility for damage to young growing stock, even at the landowners' insistence. Producers as well as landowners are not interested in silvicultural or forest management practices; in most cases producers oppose any requirements that hamper their methods of operation.

Small scattered private ownerships throughout the region appear to be poorly managed. Many are being overcut, if not on a volume basis, at least on a quality basis. The present prospect is that future increases in supplies of timber will come increasingly from large private holdings or from public holdings.

Costs of Production

Producers usually accept mill offered prices for timber products they produce. Hence, increased returns depend on lowered stumpage costs and production costs. Considerable market power resides on the side of the producer in purchasing stumpage and, in general, stumpage costs to the producer (especially when lump-sum purchases are considered) can be assumed to be relatively low. For pulpwood stumpage, producers usually pay 10 to 25 percent of the delivered wood price. Public stumpage usually costs more than private stumpage. Variation in cost by species is important, but in general, the average producer paid less than \$2 per cord for stumpage in 1959. Sampled sawlog producers in the region reported an average of \$15 per M bd. ft. for sawlog stumpage, but many producers who did not report complete cost information indicated that they paid even less. Veneer log producers indicated average stumpage costs in the vicinity of \$40 per M bd. ft.; cooperage timber was slightly lower at about \$35 per M bd. ft. Walnut saw and veneer logs brought considerably higher prices. Quality stumpage, especially for veneer logs, frequently cost producers some \$3 more in "scouting" costs. For quality walnut, "scouting" costs range up to \$30 per M bd. ft.

Logging and hauling costs incurred by the producers, given a set selling price and a relatively low stumpage cost, are the real key to producer profits. Many producers indicate they do not understand the nature of fixed and variable costs. Furthermore, the average producer frequently lacks adequate or proper equipment for the job at hand. All too frequently hand labor is substituted for machine capital and

highly efficient tools. Many producers lack capital and/or credit, technical training and understanding, and the desire to invest in a seasonal, part-time, and unstable productive enterprise. Producers commonly consider their own labor as the only significant variable input.

Producers reported that pulpwood in general cost some \$4 to \$7 per cord to log, sawlogs some \$11 to \$14 per M bd. ft., veneer logs about \$16 per M bd. ft. (with walnut ranging upward to about \$26), and cooperage bolts about \$23 per M bd. ft. Hauling costs were harder to estimate and can only be really meaningful when related to distances. However, considering average hauling distances by truck, pulpwood hauling cost in the vicinity of \$4 or \$5 per cord; sawlogs, \$9 to \$12 per M bd. ft.; veneer logs, \$12 per M bd. ft. in the Lake States and \$20 per M bd. ft. in the Central States⁷ (with walnut ranging up to \$25); and cooperage bolts, \$19 per M bd. ft.

Prices Received by Producers

The prices received by sampled producers in the region based on averages, by species groupings and/or state groupings are summarized briefly below. Further comments are reserved for the following section where returns to landowners, agents, and primary manufacturing firms are discussed.

- (1) Pulpwood
 - (trucked to mill, rough)
 - Aspen and hardwood.....\$10 to \$16 per cord
 - Softwoods\$15 to \$30 per cord

⁷The average hauling distance in the Central States is more than twice the Lake States distance.

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.....

- (2) Sawlogs
 (trucked to mill)
 Hardwood (not including walnut).....\$44 to \$50 per MBF
 Softwood\$48 to \$49 per MBF
- (3) Veneer logs
 (delivered to shipping point or mill)
 Lake States.....\$105 per MBF
 Central States
 Walnut\$234 to \$326 per MBF
 Hardwood (except walnut).....\$133 per MBF
- (4) Cooperage bolts
 (trucked to mill)
 White oak.....\$95 to \$109 per MBF

Returns to Agents

Gross returns to landowners can be adequately estimated by the stumpage costs reported by producers. In general, on a per unit basis, landowners received an average of \$1.60 per cord for pulpwood stumpage; \$10 to \$15 per M bd. ft. for sawtimber, \$40 per M bd. ft. for veneer timber, and \$35 per M bd. ft. for cooperage timber.

The average minimum harvesting operation for pulpwood is considered to be about 80 cords in Minnesota and 160 cords in Michigan. On this basis, the owner of a minimum-sized sale tract would receive about \$125 in Minnesota and \$250 in Michigan. Minimum sawlog and cooperage-bolt harvesting operations average about 20 M bd. ft. per tract. Landowners, in these instances, would receive between \$200 and \$300 for sawlog stumpage and about \$700 for cooperage stumpage.

Producers' margins and profit ratios have been presented in this report in numerous tables under "Comparisons of Costs and Prices" along with appropriate reservations. In general, on a per unit basis, where a mix of species is considered, producers receive a profit ratio⁸

⁸Profit ratio is the ratio of the margin (selling price minus stumpage, logging and hauling costs) to the price received.

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of about 12 to 17 percent for pulpwood, 10 to 25 percent for sawlogs, nearly 40 percent for veneer logs and cooperage bolts. These profit ratios, although seemingly adequate, are more meaningful when translated into net revenue. On the basis of average volumes handled, a pulpwood producer received some \$3,000 in net revenue from pulpwood-handling activities in 1959; a sawlog producer, \$1,040; a veneer-log producer, \$4,350; and a cooperage-bolt producer, \$2,000. Actual returns are higher since many producers handle more than one product. Considering the more pertinent product combinations (i.e., pulpwood-sawlog, sawlog-veneer log, and sawlog-cooperage bolts) average producer net incomes would seem to be in the vicinity of from \$3,040 to \$5,390.

Since many producers have alternate occupations, the above figures cannot be considered a full estimate of net income. However, in view of the fact that nearly one-third of the producers do not have other sources of income and that many producers are smaller than those for whom income was calculated, it can be assumed that many producers in the North Central region received low net incomes in 1959. This is further substantiated by reports from sampled producers concerning gross sales values of timber products handled and information on total gross income from all sources. Some 150 small producers sampled indicated average gross sales value for timber products sold came to slightly less than \$4,000 and total gross income of all kinds averaged about \$10,000. Even under the assumption of excellent profit margins, net income could not have been very high.

Conclusions could not be drawn concerning returns to intermediate

agents in general. Limited evidence indicates most dealers operate on adequate margins to allow for their profit and risk. By product, on a per unit basis, it was noted that dealer margins on pulpwood ranged from \$0.50 to \$1.50 per cord, and for cedar posts in Michigan, from one-half to five cents per post depending on the size.

Returns to primary manufacturers were not investigated in this study, but wood costs in relation to product values were noted. Value added by manufacture in the pulp industry is frequently 10 times, and sometimes even 15 to 20 times the original cost of the wood. Other things being equal, the higher the value of the final product, the higher the price which can be paid for pulpwood. Thus, as might be expected, species that produce high final values frequently command much higher prices than other species. Relative value added by manufacture is considerably lower in the lumber industry. In general, value added in lumber is slightly less than the cost of the raw material, although there is considerable variation by species, grade of lumber, and geographic area.

Inadequacies and Needs in Timber Products Marketing

These brief comments in conclusion are limited to the lower end of the marketing chain and are primarily centered around the producer function. The upper end of the chain, from the point of primary manufacture, is well established in methods and means of operation. It maintains considerable market power which is dictated by well established market channels and/or integrated firms downward to the producer level.

Downward pressures on the producer include mill-established prices; inaccurate and unstandardized measurement of timber products

offered for sale; lack of recognition of quality coupled with a lack of adequate compensation for quality material; lack of credit, capital assistance, and technical aid and market information, and a general neglect of understanding. Upward pressures include an increasing scarcity of stumpage, on a quality, if not volume, basis; dissipation of the producer's existing market power in establishing stumpage prices by public and large private landowners; seasonal employment and/or conflicts with alternate employment; and pressures for producer harvesting operations to comply with accepted forest management practices which frequently place additional limitations on the profitability of his operations.

Producers, in many cases, shift the incidence of their problems to others. Two examples are very prominent. First, producers with sufficient capital purchase large tracts of timber, supply a minimum of their own labor and machine capital to the productive process but adequate amounts of management, and by hiring other small producers in the role of sub-contractors, realize profits primarily from the gain inherent in large volumes of relatively cheap stumpage. The smaller, now sub-contracted, producers do not realize any benefit from the stumpage purchase; essentially, their returns accrue only from their own physical labor. Secondly, producers generally exert downward market power on small private landowners and follow methods of operation which are profitable to them but detrimental to the landowner and his forest resource. Timber is purchased by the lump-sum, and all timber considered merchantable by the producer is removed. Logging is often wasteful and destructive of young growth. Contracts for harvesting run for long periods of time, in many cases over one year, and on some of the larger tracts, up to two years.

Producers with long term contracts sometimes re-cut areas should additional markets for timber not taken in the first cutting develop.

How these conflicts of interest and deficiencies centered around the producer function can be solved, and solved to benefit all concerned, is both a pressing and complicated problem. Undoubtedly considerable research will be needed. Three broad avenues of approach are suggested. One concerns the reconciliation of the producer to existing measures benefiting the landowner and the resource but presently opposed by him. The second would be to assist producers to achieve more efficient, profitable operations. The third would be ways and means of making adjustments in degrees of market power held by different agents and firms in the marketing system to attain a more equitable balance.

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APPENDIX

Appendix A -- Lumber production tables for the states in the North
Central region for selected years.

Appendix B -- Producer Interview Schedule

APPENDIX A

TABLE 99--Lumber production in Michigan for selected years, 1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	144.3	259.8	404.1
1940	138.6	288.5	427.1
1941	183.6	370.4	554.0
1942	171.1	360.0	531.1
1943	133.1	273.9	407.0
1944	165.9	386.9	552.8
1945	122.5	298.3	420.8
1946	172.1	347.6	519.7
1947	200.0	380.1	580.1
----	----	----	----
1952	89.0	316.0	405.0
1953	55.0	238.0	293.0
1954	89.1	272.6	361.7
1955	56.0	309.0	365.0
1956	(a)	284.0	(a)
1957	156.0	412.0	568.0
1958	58.7	236.6	295.3
1959	114.0	245.0	359.0
1960	43.0	250.0	293.0
1961	51.0	222.0	273.0

(a) Not available.

Source: Same as for Table 26, p. 63.

TABLE 100-Lumber production in Wisconsin for selected years, 1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	170.8	234.8	405.6
1940	193.0	243.1	436.1
1941	218.1	255.5	473.6
1942	190.3	293.6	483.9
1943	150.7	240.8	391.5
1944	142.0	291.2	433.2
1945	105.5	210.6	316.1
1946	127.8	264.0	391.8
1947	158.0	327.8	485.8
----	----	----	----
1954	77.5	248.1	325.6
1955	68.0	229.0	297.0
1956	61.0	249.0	310.0
1957	81.0	264.0	345.0
1958	75.2	197.0	272.2
1959	74.0	252.0	326.0
1960	40.0	197.0	237.0
1961	39.0	189.0	228.0

Source: Same as for Table 26, p. 63.

TABLE 101--Lumber production in Minnesota for selected years,
1939-1960

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	89.2	55.1	144.3
1940	94.5	57.5	152.0
1941	125.4	72.8	198.2
1942	139.1	92.7	231.8
1943	125.9	69.8	195.7
1944	141.7	100.4	242.1
1945	100.7	85.4	186.1
1946	102.8	102.6	205.4
1947	118.4	126.0	244.4
----	----	----	----
1954	104.4	73.1	177.5
----	----	----	----
1958	98.6	45.9	144.5
----	----	----	----
1960	70.5	90.8	161.3

Source: Same as for Table 26, p. 63.

TABLE 102--Lumber production in Illinois for selected years,
1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	1.13	77.2	78.3
1940	.36	88.7	89.1
1941	.29	94.9	95.2
1942	.29	100.8	101.1
1943	.01	91.6	91.6
1944	.59	101.6	102.2
1945	.32	65.5	65.8
1946	.33	92.3	92.6
1947	.56	99.2	99.8
----	----	----	----
1954	6.83	94.3	101.1
----	----	----	----
1958	12.89	97.9	110.8
----	----	----	----
1960	5.00	116.0	121.0
1961	9.00	113.0	122.0

Source: Same as for Table 26, p. 63.

TABLE 103--Lumber production in Indiana for selected years,
1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	.22	165.3	165.5
1940	.20	185.8	186.0
1941	.38	201.9	202.3
1942	.26	169.4	169.7
1943	.11	156.0	156.1
1944	.12	176.2	176.3
1945	.52	146.5	147.0
1946	.07	163.3	163.4
1947	.45	179.8	180.3
----	----	----	----
1954	8.82	150.8	159.6
----	----	----	----
1958	30.26	125.1	155.4
----	----	----	----
1960	7.00	123.0	130.0
1961	7.00	118.0	125.0

Source: Same as for Table 26, p. 63.

TABLE 104--Lumber production in Missouri for selected years,
1939-1958

Years	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	71.7	224.2	295.9
1940	48.3	229.1	277.4
1941	54.9	263.4	318.3
1942	30.9	243.8	274.7
1943	31.6	259.4	291.0
1944	31.8	303.5	335.2
1945	26.5	214.0	240.5
1946	31.8	225.2	257.0
1947	39.2	220.1	259.3
----	----	----	----
1949	(a)	(a)	163.0
1950	(a)	(a)	166.0
----	----	----	----
1954	51.2	221.1	272.3
----	----	----	----
1958	26.9	287.2	314.1

(a)Not available.

Source: Same as for Table 26, p. 63.

TABLE--105--Lumber production in Ohio for selected years, 1939-1961

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	2.3	267.0	269.3
1940	1.9	248.1	250.0
1941	2.6	303.7	306.3
1942	2.7	268.2	270.9
1943	2.7	273.6	276.3
1944	2.0	260.7	262.7
1945	1.7	254.9	256.6
1946	1.9	244.9	246.8
1947	2.9	262.6	265.5
----	----	----	----
1954	9.1	205.2	214.3
----	----	----	----
1958	34.0	167.4	201.4
----	----	-----	----
1960	11.0	187.0	198.0
1961	14.0	173.0	187.0

Source: Same as for Table 26, p. 63.

TABLE 106--Lumber production in Iowa for selected years, 1939-1958

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939	0.10	29.5	29.6
1940	----	43.4	43.4
1941	0.14	55.0	55.1
1942	0.38	55.7	56.1
1943	0.51	53.4	53.9
1944	0.45	56.7	57.1
1945(a)	2.38	84.3	86.7
1946	1.09	46.1	47.2
1947	0.68	44.4	45.1
----	----	----	----
1954	1.70	40.8	42.5
----	----	----	----
1958	9.69	39.5	49.2

(a) 1945 figures include Kansas and Nebraska

Source: Same as for Table 26, p. 63.

TABLE 107--Lumber production in Kansas for selected years, 1939-1958

Year	Softwood	Hardwood	Total
	(millions of bd. ft.)		
1939(a)	0.06	20.8	20.9
1940(a)	0.39	17.6	18.0
1941	0.08	19.6	19.7
1942	0.07	14.9	15.0
1943	0.08	20.9	21.0
1944(a)	0.46	15.8	16.3
1945(b)	2.38	84.3	86.7
1946(a)	0.30	10.5	10.8
1947(a)	0.94	19.9	20.8
----	----	----	----
1954(c)	0.14	9.1	9.2
----	----	----	----
1958	4.00	10.2	14.2

(a)Includes Nebraska

(b)Includes all prairie states (negl. vol. in N. D. and S.D.);
Nebraska, Iowa, and Kansas.

(c)Minimum estimates

Source: Same as for Table 26, p. 63.

APPENDIX B

PRODUCER INTERVIEW SCHEDULE

CONFIDENTIAL

Date _____
 Recorder _____
 State _____

NCM-27 Project

TIMBER PRODUCER

Name of timber producer _____

Address _____

A. General:

1. How many years have you been operating as a timber producer at your present location? _____ Years.

2. Are you a full-time timber producer? Yes ___ No ___

If NO, what other business or occupation are you engaged in?

- | | |
|---|--------------------------|
| a. Sawmill operator _____ | d. Farmer _____ |
| b. Operator of other _____
wood-using mill | e. Wage Earner _____ |
| (specify) _____ | f. Other (specify) _____ |
| c. Store operator _____ | |

If NO, what percentage of your gross revenues in 1959 was realized from your business as a timber producer?
 _____ Percent.

3. What were the principal raw timber products you handled in 1959?

- | | |
|----------|----------|
| a. _____ | d. _____ |
| b. _____ | e. _____ |
| c. _____ | f. _____ |

4. Is your timber-producing business typically a year-round business? Yes ___ No ___

If NO, what are the typical months of operation? _____

5. How many full-time employees in your timber-producing business did you have in 1959? _____ employees.

How many are members of your family? _____ employees.

6. How many seasonal employees in your timber-producing business did you have in 1959? _____ employees.

How many are members of your family? _____ employees.

B. Quantities of timber purchases: (volume by _____ log rule)

1. Did you purchase any timber as a basis for your timber-producing business in 1959? Yes ____ No ____

If YES, what volume, by product and unit of measure, was purchased as stumpage in 1959?

	Product	Volume		Product	Volume
a.	_____	_____	d.	_____	_____
b.	_____	_____	e.	_____	_____
c.	_____	_____	f.	_____	_____

Was 1959 a typical year? Yes ____ No ____

If NO, why not? _____

If YES, what volume, by product and unit of measure, was purchased as cut wood in 1959?

	Product	Volume		Product	Volume
a.	_____	_____	d.	_____	_____
b.	_____	_____	e.	_____	_____
c.	_____	_____	f.	_____	_____

Was 1959 a typical year? Yes ____ No ____

If NO, why not? _____

IF NO, SKIP TO C. SOURCES OF WOOD SUPPLY.

2. What changes in the annual volume of your timber purchases took place in the years 1950-59? (List by products)

Year	All products				
1959	_____	_____	_____	_____	_____
1958	_____	_____	_____	_____	_____
1957	_____	_____	_____	_____	_____
1956	_____	_____	_____	_____	_____
1955	_____	_____	_____	_____	_____
1954	_____	_____	_____	_____	_____
1953	_____	_____	_____	_____	_____
1952	_____	_____	_____	_____	_____
1951	_____	_____	_____	_____	_____
1950	_____	_____	_____	_____	_____

C. Sources of wood supply:

1. Where is your 1959 wood supply area located? (List counties if only a few are involved. State radius of operations in miles.)

a. Counties _____

b. Radius of operations _____

2. Have there been any significant changes in your wood supply area over the period 1950-59? Yes ___ No ___

If YES, what were the changes? _____

3. What is the ownership of the forest land from which your 1959 wood supply was obtained? (Estimate % of total volume each source.)

a. Own land _____ %

b. Farmer _____

c. Other private _____

d. Nat. Forest _____ %

e. State forest _____

f. Other public _____

4. Have there been any significant changes in your wood supply from different forest landownership sources over the period 1950-59? Yes ___ No ___

If YES, what were the changes? _____

If YES, what explanations can you give for these changes? _____

5. From what agent sources was your 1959 wood supply obtained? (Estimate % of total volume obtained from each source.)

a. Own employees: _____ %

(1) From own lands _____

(2) From other lands _____

b. Other producer _____ %

c. Other agent (specify) _____

6. Have there been any significant changes in the agent sources of your wood supply over the period 1950-59? Yes ___ No ___

If YES, what were the changes? _____

If YES, what explanations can you give for these changes? _____

D. Wood procurement methods and policies:

1. What percentages of your 1959 wood supply were obtained by the following stumpage acquisition methods?

	<u>%</u>
a. Stumpage from own lands	_____
b. Stumpage purchased by producer	_____
c. Stumpage purchased in producer's name by product buyer	_____
d. Stumpage provided by product buyer	_____

QUESTIONS 2 TO 15 APPLY ONLY TO STUMPAGE PURCHASES BY PRODUCER.
IF NO STUMPAGE PURCHASES WERE MADE, SKIP TO QUESTION 16.

2. What percentages of your 1959 stumpage purchases (in terms of volume) were obtained under the following types of agreements?

	<u>%</u>
a. Written contract with public landowners	_____
b. Written contract with private landowners	_____
c. Oral contract	_____

3. What are the details of your standard contracts for stumpage purchases from private landowners? (Check the following items which are included in agreements; then describe as much as possible.)

a. _____	Species	_____
b. _____	Amount of timber	_____
c. _____	Size of timber	_____
d. _____	Quality of timber	_____
e. _____	Time or period of harvest	_____
f. _____	Method of payment	_____
g. _____	Time and basis of measurement	_____

4. If the standard contract for stumpage purchases from private landowners is a written contract, and if oral contracts are also made, how does the oral contract differ in its provisions from the written contract?

5. Does your standard contract for stumpage purchases from private landowners specify any conditions under which timber is to be harvested? Yes ____ No ____

If YES, to what percentage of your 1959 purchases do these specifications apply? _____ Percent.

If YES, what are the specifications? _____

If NO, are there any harvest conditions your firm will accept in contracts for stumpage purchase upon a private landowner's insistence? Yes ____ No ____

If YES, what are the conditions? _____

6. How binding are your contracts for stumpage purchase (i.e., how much leeway do you allow yourself in terminating contracts)?

7. How far in advance of the beginning of harvest operations are stumpage purchase contracts usually negotiated? _____

8. Do you buy stumpage only when you hold a contract for the sale of products? Yes ____ No ____

If NO, explain your policy of stumpage purchases in advance of contracts for the sale of products. _____

9. What percentages of your 1959 stumpage purchases were obtained through negotiations initiated by you or initiated by land-owners?

	<u>%</u>
a. Producer	_____
b. Landowner	_____
c. Indefinite	_____

10. When you take the initiative in negotiating stumpage purchases, what are the methods you use in contacting potential suppliers?

11. How many stumpage purchase contracts did you make in 1959? _____ contracts.

Was 1959 a typical year? Yes _____ No _____

If NO, why not? _____

12. From how many different persons or agencies did you obtain your stumpage purchases in 1959? _____ persons or agencies.

Was 1959 a typical year? Yes _____ No _____

If NO, why not? _____

13. Is there a minimum volume per acre below which you will not consider stumpage purchase? Yes _____ No _____

If YES, what is this minimum? _____

14. Is there a minimum volume per tract below which you will not consider stumpage purchase? Yes _____ No _____

If YES, what is this minimum? _____

15. Is there a minimum value of timber per tract below which you will not consider stumpage purchase? Yes _____ No _____

If YES, what is this minimum? _____

16. Did you receive funds from any of your product buyers for stumpage purchases in 1959? Yes _____ No _____

If YES, which buyers? _____

If YES, what portion of your total stumpage purchases in 1959 did these funds cover? _____

17. Did you subcontract some or all of the logging operations in your timber-producing business in 1959? Yes _____ No _____

If YES, what percentage of the volume handled was subcontracted? _____ percent.

If YES, did subcontracting apply to

- a. Felling and bucking? Yes _____ No _____
b. Skidding? Yes _____ No _____

If YES, why didn't you handle all the logging operations yourself? (Check. If more than one reason, number in order of importance.)

- (a) _____ Lacked necessary equipment
(b) _____ Lacked logging experience
(c) _____ Inadequate family or hired labor available
(d) _____ Believed subcontracting to be the cheaper method
(e) _____ Producer's time more valuable for other purposes
(f) _____ Other demands on producer's time
(g) _____ Other (specify) _____

18. Did you subcontract some or all of the hauling operations in your timber-producing business in 1959? Yes _____ No _____

If YES, what percentage of the volume handled was subcontracted? _____ percent.

If YES, why didn't you handle all of the hauling operations yourself? (Check. If more than one reason, number in order of importance.)

- (a) _____ Lacked necessary equipment
(b) _____ Lacked hauling experience
(c) _____ Inadequate family or hired labor available
(d) _____ Believed subcontracting to be the cheaper method
(e) _____ Producer's time more valuable for other purposes
(f) _____ Other (specify) _____

19. Did you receive in 1959 funds from any product buyers in advance of time of payment specified in a standard contract to facilitate your logging or hauling responsibilities?

Yes _____ No _____

If YES, which buyers? _____

If YES, for what purposes? _____

20. Did you receive in 1959 any other business aids from any product buyers to facilitate your logging or hauling responsibilities? Yes ____ No ____

If YES, which buyers? _____

If YES, what aids? _____

E. Prices Received:

1. What prices did you receive per unit of volume for wood products you sold in 1959? (Fill in as many items as possible, by products and/or species.)

	Products and/or species				
a. Roadside					
b. Delivered to rr.					
c. F.O.B. rr.					
d. Trucked to mill					
e. Rr. to mill					

2. To which agents did you sell the products and/or species listed above? (Check appropriate cells.)

	Products and/or species				
a. Dealer					
b. Concentration yard					
c. Other intermediate agent					
d. Wood-using mill					
e. Other producer					
f. Other (specify)					

3. Did you have any difficulty in obtaining sufficient market price information as a basis for your business decisions?

- a. On the products you have to buy? Yes ____ No ____
 b. On the products you have to sell? Yes ____ No ____

If YES, to a. or b., explain. _____

F. Cost:

1. What stumpage costs per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you used your own stumpage.)

[illegible]

2. What logging costs (felling and bucking and skidding) per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you performed your own logging.)

[illegible]

3. What truck-hauling costs per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you performed your own hauling.)

[illegible]

G. Sales of timber products:

1. What was the gross sales value of timber products sold by you in 1959? _____
2. What was the total volume, by product and unit measure, of your timber products sales in 1959? (List only timber handled as part of your business as a timber producer.)

Product	Volume
a.	
b.	
c.	
d.	
e.	
f.	

3. What were the seasonal variations by product, in your timber products deliveries in 1959?

	Product				
a. Peak months and amounts (aver.)					
b. Lowest months and amounts (aver.)					
c. Other months and amounts (aver.)					

4. Do you consider the timing in your timber products deliveries in 1959 to be a typical pattern? Yes _____ No _____

If NO, why not? _____

5. Was the timing in your timber products deliveries in 1959 required by your product buyers? Yes _____ No _____

If YES, would you have preferred a different timing of deliveries? Yes _____ No _____

If YES, what is your preferred timing of deliveries? _____

If NO, how do you explain the timing of your deliveries? _____

6. What changes in the annual volume of your timber products sales took place in the years 1950-59? (List separately by products.)

Year	All products					
1959						
1958						
1957						
1956						
1955						
1954						
1953						
1952						
1951						
1950						

7. What explanations can you give for annual fluctuations in your timber product sales? _____
- _____
- _____
- _____
- _____

8. To which types of buyers did sales of your principal products in 1959 go? (Estimate by % of total volume.)

a. Manufacturer	<u> </u> %	d. Other interme-	<u> </u> %
b. Concentration	<u> </u>	diat agent (specify)	
yard			
c. Dealer	<u> </u>	e. Other (specify)	<u> </u>
			<u> </u>

9. Have there been any significant changes in the volumes of your products going to different types of buyers over the period 1950-59? Yes No

If YES, what were the changes? _____

If YES, what explanations can you give for these changes? _____

10. How many different buyers of your timber products did you sell to in 1959?

	<u>No.</u>		<u>No.</u>
a. Manufacturer	_____	d. Other intermediate	
b. Concentration	_____	agent (specify)	
yard			
c. Dealer	_____	e. Other (specify)	_____

11. Have there been any significant changes in the numbers of buyers of your principal products over the period 1950-59?

Yes _____ No _____

If YES, what were the changes? _____

If YES, what explanations can you give for these changes? _____

12. Did you have a contract(s) to sell prior to your harvesting of wood in 1959?

Yes _____ No _____

13. What is the typical time interval between date of a purchase contract with a buyer and product delivery? _____

a. How much variation from the typical time interval occurs? _____

b. What are the causes of variations from the typical time intervals? _____

H. Other producers of raw wood products, 1959:

Name

Address

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____