

The changing timber industry of the ninth district west

The Ninth district's west contains some 16 million acres of forest. Yet, while the quantity of timber physically available for processing from this vast acreage is extremely large, much of it was by-passed as commercially unattractive during the early decades of this century, when the nation's lumber industry gradually shifted to the Pacific Northwest. In recent years the district's timber resource has taken on increased importance, as is documented by the industrial expansion that has occurred here. Factors underlying these recent changes indicate further expansion possibilities. This article examines the industrial complex built around the region's forest resource and the recent trends that have shaped it.

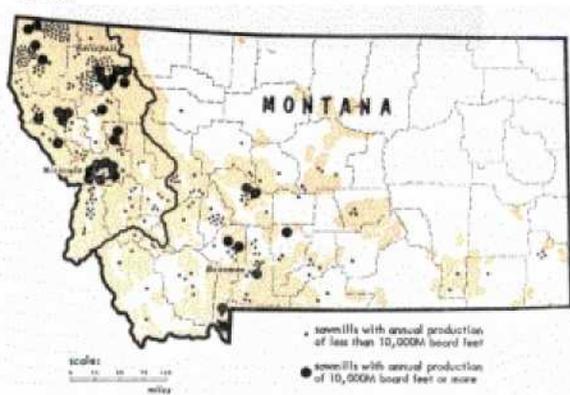
LOCATION OF THE TIMBER PROCESSING INDUSTRY

Historically, western Montana was the earliest area to be fully exploited, and some of its sectors have more mill capacity than timber production capacity on a sustainable basis. As a rough estimate, about two-thirds of the sawmill capacity in the region under study is found in Montana west of the Continental Divide. (See Chart 1.) In other parts of the region, where mill capacity has always been substantially below sustainable timber output, lumber operations have increased in the past decade.

The geographic pattern of sawmills in our region, depicted in Charts 1 and 2, has resulted from decisions by hundreds of individual firms which have been guided principally by profit expectations in locating their operations and in planning expansion. The network of dots shown on the charts

approximates the active sawmills in 1956. (At best these figures are no more accurate than a still photograph would be in representing a dynamic process.) While market prices in 1956 had reached historical highs, subsequent retrenchments have

Chart 1—Location of Montana sawmills, 1956



cut at least a hundred sawmills from the operating list. In 1962 nearly half the district's sawmills were idle. Also changing the pattern are certain longer-term trends, which will form a major part of the subject matter of this article.

CHANGES IN SAWMILL LOCATIONS AND NUMBERS

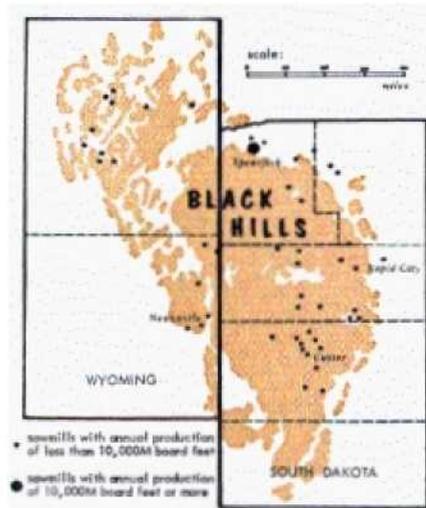
Significant changes in numbers and locations of sawmills have taken place—both long-range effects and temporary responses to traditional cyclical swings in prices and demand. Because of such volatility in the industry, the number of active

sawmills in the region at any one time is always difficult to determine. In recent years this number has ranged from about 200 to 400, with fluctuations of as much as 150 mills from year to year. A recent study of the Flathead Valley in northwestern Montana showed that the number of mills dropped from an estimated 104 in 1956 to about 60 in 1957, in response to the sharp break in the lumber market. The past decade has been characterized by cyclical fluctuations in mill numbers, frequent changes of ownership (particularly in the smaller operations), and the construction of many new mills.

NEW MILLS AND INTERREGIONAL MOVEMENT

During the 1930's and early 1940's, prices of stumpage (standing trees) in the Pacific Northwest were still relatively low, and the superior quality and lower unit costs of operation gave the timber-producing areas of the Pacific Coast a strongly preferred position. But during the post-war period competitive conditions changed. Stumpage in the Pacific coast region became increasingly scarce. A great many coastal firms, finding themselves without dependable supplies of their own, or having exhausted cutting from their own cheaply purchased timber of the past, were forced to buy timber at ever higher prices. Thus, relative to

Chart 2—Location of Black Hills sawmills, 1956



our district, the Pacific Northwest witnessed a substantial rise in stumpage prices after World War II.

Prices are, of course, a signal in a private enterprise economy. In this case the increasing prices of inputs signaled that the costs of doing business in the coastal localities were increasing relative to the costs in the interior mountain localities. As a result, developers turned to sites in Montana and the Black Hills that would not have been considered earlier.

During the 1952-1957 period some 42 new mills were constructed in Montana and the Black Hills, about a fourth of which actually transferred their operations from Pacific coast states. This relocation has touched our district at points all the way from western Montana to the Black Hills (see Chart 3). Almost twice as many of the new mills opened up east of the Continental Divide as west of it. This is because most areas west of the Divide have been exploited more fully over a longer period, and hence mill capacity approaches and, in

This article is the second of a series based on a study recently published by the Federal Reserve Bank of Minneapolis. One additional article, discussing district timber industry prospects, will appear in a later issue of the *Monthly Review*. Readers interested in obtaining copies of the original 64-page study, *The Timber Economy of the Ninth District West*, by Clarence W. Nelson, may secure them at \$1.00 per copy by writing Publications Section, Research Department, Federal Reserve Bank, Minneapolis, Minnesota (55440).

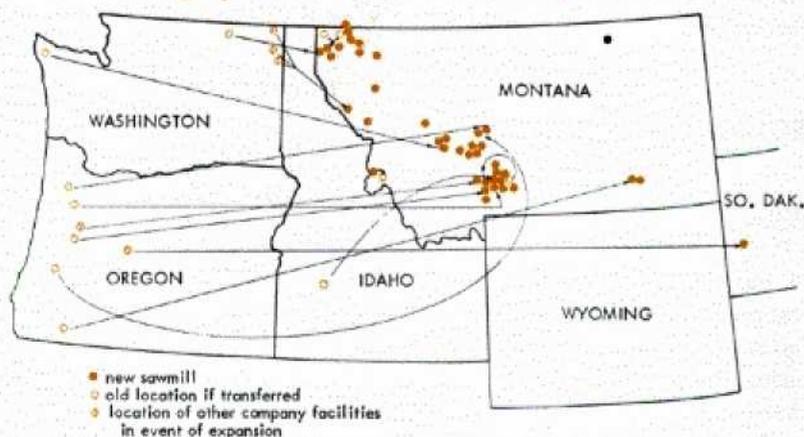
some places, exceeds the limits of current cutting possibilities.

Many coastal mills made additional inquiries about the possibilities of transferring their operations to Montana. Behind this development lay the basically economic pressures that motivate decisions about resource allocation by private profit-seeking firms. But in most such cases the Forest

Service, as the chief supplier of timber in these areas, had to be a silent partner to the move. That is, the Forest Service had to arrange individual timber sales much larger than usual so that the private operator would regard the known raw material supply under contract to each proposed mill as large enough to justify the capital investment needed to build and operate a modern sawmill. As a result of several such sales, each involving 50 to 90 million board feet, more than half a dozen long-distance transfers were effected.

essing activities. These newer types of timber-using plants have, in fact, been the most important source of the employment expansion in Montana's timber industry during the past decade (Chart 4). Not until the mid-1950's did industry find it economical to build pulp or paper-making plants within or near Montana's boundary. In spite of the large potential pulpwood harvest, Montana's first pulp mill, the Waldorf-Hoerner Paper Products plant built at Missoula in 1957, did not use the poletimber so widely available in the state's forests, but used instead, the wood residues turned out as a by-product of local sawmill operations. Some twenty Montana mills, within a hundred-mile radius of Missoula, have gone into chip production to supply chips to the Missoula pulp mill.

Chart 3—Geographic source of new sawmills, 1952-1957



OTHER NEW TIMBER-USING PLANTS

Production of other kinds of timber products has changed, too, in the last few years. While some kinds of plants, such as pole-treating plants, have shown no definite trends in output, others including pulp and veneer-making plants, have introduced to the region relatively new kinds of proc-

RECENT TRENDS IN PRODUCTION

In addition to changes in the numbers and locations of sawmills and new types of timber-using plants, marked changes in the volume and composition of lumber output have occurred over the past decade. While total United States production has remained relatively constant at about 30 billion board feet annually, the output of lumber in both South Dakota and Montana has gained significantly.* The net effect of the allocation decisions in the national economy thus has been to draw increasing quantities of wood from our region.

In the Black Hills, the expanded output has come from ponderosa pine stands. In Montana some rather broad changes in species composition

*During the last two to three years, however, South Dakota production actually declined. The drop was due to the destruction by fire in 1960 of one of the Black Hills' larger and newer sawmills and the closing of some obsolete mills.

have occurred. Among the noteworthy shifts in species cut during the postwar period (see Chart 5) are: (1) the relatively large expansion of lodgepole pine cut; and (2) the extremely rapid growth and subsequent decline in production of Engelmann spruce. We shall now examine the causes underlying these changes.

Lodgepole pine: competitive possibilities

The increased lumber production from lodgepole pine is closely related to the expansion of sawmill capacity discussed earlier. The abundant lodgepole pine has not been used much for lumber even though, in quality and wood characteristics, it resembles prized ponderosa pine. With its typical log diameters running from 6 to 12 inches, lodgepole was mainly used for pulpwood until a few years ago. But the increasing cost of larger logs of other pine species has led to construction of several substantial sawmills designed specifically to handle the smaller lodgepole sawlogs.

These lodgepole pine sawmills face marketing problems as well as technological problems. To utilize the small diameter lodgepole log efficiently, the production process may yield a number of boards in such widths as 7-inch and 5-inch, or even 4-inch and 3-inch. These odd widths and narrow boards, which form an appreciable part of the output, are not easily marketed. One approach has been to try to market these boards to dealers or large consumers as part of a package that includes the more standard 8 and 10-inch widths. Although such efforts have been partly successful, consumer resistance still remains high.

A second approach in dealing with the abundance of narrow, odd sizes has been to glue edge-to-edge to form wider boards or glue side-to-side to form laminated timbers. A number of lodgepole sawmills have installed high-speed gluing equipment which permits them to edge-glue, for example, a 3-inch and a 5-inch board to form a single 8-inch board. Such measures do not offer a universally competitive solution, however, since gluing raises production costs without yielding a

Chart 4—Average annual employment in Montana forest products industries, 1952-1961

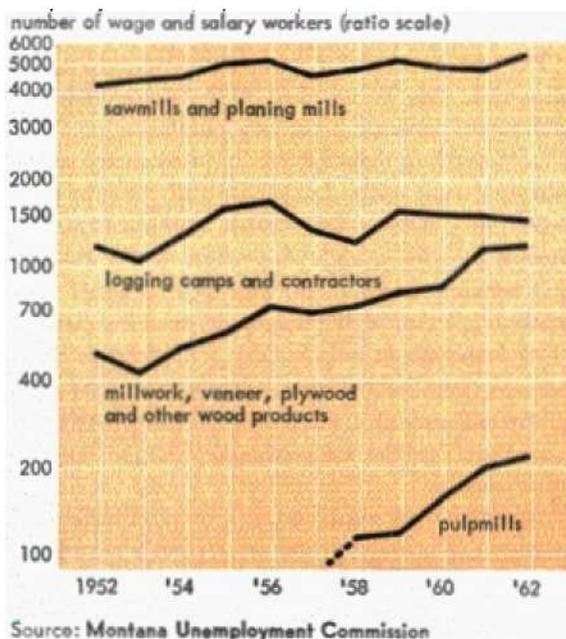
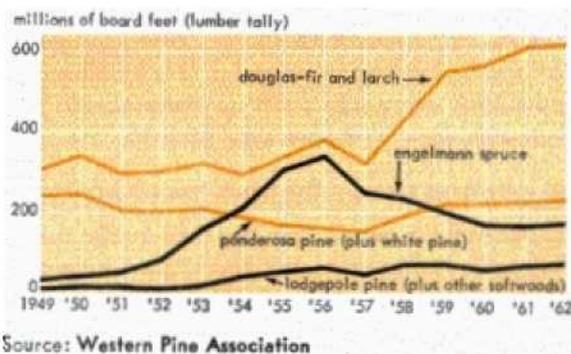


Chart 5—Montana lumber production by species, 1949-1962



compensatory increase in board price over that for an unglued board of equal width.

A third approach followed by some lodgepole mills has been to perform some secondary opera-

tion on the primary stock to increase its market value. This may include, for example, the machining of boards into various forms of interior paneling—textured, grooved, or plain—which command higher prices than do plain boards.

But the market for pine paneling, glued, or otherwise, has been taken over increasingly by prefinished plywood. Most lodgepole today goes into 2"x4" studding material produced by many small, marginal stud mills. Lodgepole still presents considerable problems for lumber manufacture. Although it yields a high proportion of #1, #2 and #3 common boards, and although its knots tend to be small and tight, lodgepole produces almost no clear boards to help build up the average realization price. Furthermore, logging costs per unit of sawmill output are much higher for lodgepole pine than for the conventionally larger logs of other species.

Disadvantages exist, too, on the price side. For many years average prices of lodgepole have been below those of ponderosa pine. Part of this price difference reflects size and grade differences in average runs of logs, but some of the discount reflects traditional buyer preference. Thus, the prospects for success of the lodgepole sawmill, in competition with the more conventional operation, depend not only on technological developments but also on consumer acceptance. Although market acceptance has been poor so far, it is gaining, and the recent expansion based on the processing of lodgepole pine, holds out some promise.

Engelmann spruce: the bark beetle epidemic

Far more dramatic than the shift in the cut of lodgepole is the substantial boost in the output of spruce. Much of this increase represents the response to a temporary emergency. The problem began when windstorms caused heavy blowdowns of spruce stands in the northwestern Montana area in 1949-1950. Great numbers of dead, fallen spruce trees became breeding grounds for the spruce bark beetle, and within a few years live stands were heavily infested. By 1954, spruce trees containing

more than two billion board feet of timber were killed by the insect's tunneling forays.

The only really effective epidemic control measure is removal of the infested trees. But removal is made difficult by the remoteness of the spruce stands, which are typically located in high, moist, inaccessible mountain basins. Nevertheless, a crash program of road building and spruce removal was launched in Montana in 1951-1952. Emergency sales of bug-killed spruce were held by the Forest Service, and roads were built to permit logging of the stands. In all, twelve million dollars of public and private funds were spent in the construction of access roads.

Logging and hauling problems were by no means the only obstacles. Equally important was the joint task of moving the unprecedented volumes of spruce onto the market and of integrating the flood of spruce into the operations of regional sawmills. Fortunately, this movement of large volumes happened to coincide with a very active lumber market. The industry, cooperatively through the Western Pine association as well as through individual firms, carried on an extensive advertising and promotion campaign. Although inventories of spruce logs had piled up rather heavily at many mills, marketing efforts were successful in moving unusually large volumes of spruce.

The efforts of public agencies and lumber companies to salvage the beetle-killed spruce are reflected in the 1956 jump of spruce to first place in log production in western Montana, where it comprised 38 per cent of all log production. More than half the cut came from dead trees, and in some forests the proportion of dead spruce to total spruce cut exceeded 80 per cent.

Perhaps one of the more interesting lessons taught by this whole experience was that a market could be found for a previously little-used species. Stumpage prices required to move infested spruce during the early part of the program were low, as

(Continued on page 10)

Current conditions . . .

Moderate optimism seems to have keynoted the district's economic trends in early 1964. Non-agricultural employment improved on a seasonally adjusted basis, unemployment was less than a year ago, bank debits and retail sales appear strong, and personal incomes advanced after some hesitation last December. Particularly noticeable was the recovery in personal incomes from farming. Many farmers evidently delayed marketings into the new year as much as possible to take advantage of the proposed tax cuts. Furthermore, both livestock and crop prices strengthened during January.

In spite of this January price improvement, however, the U.S. index of livestock prices was some six points below a year earlier. The inventory value of all cattle and calves on district farms in early January was estimated to be down 7 per cent from a year earlier, in spite of an 8 per cent over-all increase in numbers on district farms. This situation in agriculture and the uncertainty of government farm programs are of major concern to bankers, businessmen, and farmers in the region.

Judged by member bank borrowings and federal funds transactions, district member banks have not experienced any noticeable liquidity squeeze in early 1964. Loan deposit ratios remain substantially the same as a year ago and up only slightly from a recent five-year average. A moderate falloff in loan demand was observed in

January with some recovery in subsequent weeks. In the country banks, weak loan demand was associated with a bulge in farm marketings and loan repayments.

The following selected topics describe particular aspects of the district's current economic scene:

RETAIL SALES

Consumer spending held up well this winter in the commercial and industrial centers of the district. In the smaller centers serving farming regions, spending slowed down toward the end of 1963, but picked up again after the first of the year.

A strong resurgence in retail sales in district commercial and industrial centers followed a November dip.

According to preliminary information, total durable goods sales rose in December following a decline of 9 per cent in November. New car registrations in the Twin Cities were up only 2 per cent in November, but they were up a substantial 16 per cent in December as compared to corresponding months of a year earlier. During January and in the first half of February, sales as measured by registrations about equaled the high volume of early 1963. Department store sales in the four district cities of Minneapolis, St. Paul, Duluth,

and Superior have been brisk. The seasonally adjusted index of department store sales (1957-1959 = 100), which was at 117 per cent in November, rose to 126 per cent in December and held at that level in January. In the first two weeks of February, department store sales in these four cities were 9 per cent above those for the corresponding period of last year, indicating a continuing high volume.

Retail sales in small urban centers serving farm regions were down in December, reflecting the sharp drop in the marketings of farm products. Since the first of the year, according to preliminary reports, the sale of both grain and livestock has advanced. Larger cash receipts already have contributed to improved retail sales. Seasonally adjusted department store sales in the district, excluding the four cities mentioned above, rose by 2 per cent from December to January and were up 4 per cent from a year ago. These gains are not limited to farm servicing centers, since some commercial and industrial centers are included in the series.

Within the current general economic expansion, automobile sales have figured prominently in the national retail sales picture. District automobile sales, however, have not been as strong as in the early 1950's.

In the nation, car sales — both domestic and foreign — totaled 6.3 million in 1950, declined during the Korean War, and remained relatively low during the general business recession of 1953-1954. Sales in 1955 rose to a record high of 7.2 million, a volume that was not exceeded until the 7.5 million sales record of 1963.

Automobile sales in the four full district states — Minnesota, Montana, North Dakota, and South Dakota — rose to a record high of 240,000 in 1950. Sales in subsequent years declined, as in the nation, but in 1955 rose only to 202,000, substantially below the record set in 1950. Not until 1962 did sales again exceed 200,000, and in 1963 totaled 218,000, still materially below the record established in 1950.

In the district, as in the nation, car sales were strong in 1962 and 1963 in comparison with the recession year 1961. This was the first time in automotive history that the industry had two successive years of such high volume. Automobile sales may continue fairly strong this year as already indicated by consumers' acceptance of 1964 models. The replacement demand is growing steadily due to an increasing number of cars being scrapped. The impetus of the \$6.5 billion, released by the federal tax cut, that will be added to the disposable income stream, already at an all-time high, may keep new car sales up throughout the remaining three-fourths of the year.

Are consumers in a financial position to take on the additional installment obligations to support another 7 million car year? Approximately 60 per cent of the new cars are purchased with credit. Of total installment credit of \$53.7 billion outstanding in the nation at the end of 1963, \$22.2 billion was automobile paper.

Repayments made on total installment credit outstanding are now taking more of consumers' disposable income than ever before — nearly 14 per cent in the fourth quarter of 1963. However, the burden of repayments on automobile loans on the family budget remains somewhat lower than in former years. These repayments averaged 4.9 per cent of disposable income in the fourth quarter of 1963 compared to slightly over 5 per cent in the same periods of 1956 and 1957.

If the amount of repayments of \$19.4 billion made on automobile loans in 1963 are extended on new loans this year, this amount will support sales of well over 6 million new cars in 1964, according to estimates made by the First National City Bank of New York.¹ With personal income continuing to rise and with the impending federal tax cut, a 7 million car year can be financed with little rise in the burden of automobile debt.

¹ See First National City Bank, New York, Monthly Economic Letter, November 1963, p. 126.

LIVESTOCK AND POULTRY INVENTORY

The January 1 inventory of livestock and poultry reported by the U. S. Department of Agriculture indicated that "all cattle and calves" was the only category of livestock that increased in the Ninth district from the figure for January 1, 1963. The number of cattle, as shown in the table, rose about 8 per cent. In Montana, which saw the largest relative increase, all cattle numbers increased from 2.3 million head on January 1, 1963 to 2.7 million head on January 1 this year. The January 1 figure in Minnesota was just under 4.5 million head, reflecting a 2 per cent rise, and North and South Dakota accounted for 2.2 million head and 4.1 million head, respectively — a 9 per cent increase in each state.

All of the above increase is attributable to beef cattle, because the number of dairy cows actually *dropped* 2 per cent to total just over 2 million head on January 1. Dairy cow numbers in Minnesota fell 1 per cent from the earlier inventory date and totaled 1.4 million head, representing 70 per cent of all the district's milk cows on January 1.

Among the various classes of beef cattle, female animals of one year old or older increased by about 10 per cent in number; the numbers of calves and of steers one-year-old or older were up by about 11 per cent. The district beef cow herd, including one and two-year-old heifers, now numbers 5.2 million head as compared to 4.7 million head last year.

The number of swine on district farms was down about 5 per cent from the January 1, 1963 figure. Numbers in Minnesota and South Dakota, the district's hog producing centers, were down 8 and 2 per cent, respectively. Montana and North Dakota, on the other hand, each increased hog numbers by 11 per cent.

Sheep numbers in the district continued to decline, with the January 1 inventory showing a 5 per cent drop from a year earlier. The number of sheep in Montana remained virtually unchanged

at 1.6 million head. South Dakota, however, at 1.6 million head, recorded a 4 per cent drop from January 1, 1963. Declines in sheep numbers in North Dakota and Minnesota amounted to 10 per cent and 12 per cent, respectively.

All the district states recorded declines in chicken numbers as the district total fell by 7 per cent. The largest relative fall, 8 per cent, occurred in Minnesota, while the Dakotas and Montana each had identical drops of 6 per cent. Turkey numbers were almost unchanged in the annual comparison, since a 1 per cent drop in Minnesota was offset by a 5 per cent rise in North Dakota.

LIVESTOCK AND POULTRY INVENTORY— JANUARY 1, NINTH DISTRICT*

	(thousand head)		
	Average		
Number	1958-62	1963	1964
All cattle and calves	11,324	12,497	13,454
All hogs and pigs	5,362	5,665	5,384
All sheep and lambs	5,177	4,858	4,620
All chickens	32,824	27,670	25,757
All turkeys	704	781	779
Farm value	(million dollars)		
All cattle and calves	\$1,663.3	\$1,980.4	\$1,847.1
All hogs and pigs	162.5	170.4	131.7
All sheep and lambs	87.5	74.7	67.4
All poultry	38.9	32.2	29.3
Total livestock value	\$1,952.2	\$2,257.7	\$2,075.5

*Includes only four full states: Minnesota, North Dakota, South Dakota, Montana.

Because of much lower price levels on almost all classes of stock, the farm value of the total inventory fell by 8 per cent to just over \$2 billion. The inventory value was lower in all of the district states, with the largest relative decline—a 12 per cent fall—in Minnesota. Livestock inventory values were off 8 per cent in South Dakota, 6 per cent in North Dakota, and 3 per cent in Montana.

The impact of the price changes becomes more apparent when farm value is broken down by category of livestock. In spite of an 8 per cent increase

in numbers from January 1, 1963, the value of all cattle and calves on district farms was down 7 per cent. Hog and sheep valuations dropped by 23 per cent and 10 per cent, respectively, as their numbers were off by only 5 per cent.

CREDIT

After having provided substantial credit accommodation to consumers and businessmen before the Christmas holiday, Ninth district member banks reduced outstanding credit in January. Between December 25 and January 29 total credit at district member banks dropped \$58 million, about the same as last year but far more than the average for this period. The dip in outstanding loans — \$52 million — was larger than usual and accounted for the extra-seasonal decline in total credit. Security holdings, which are ordinarily reduced in order to secure additional reserves, declined only \$6 million.

At country banks the reduction in credit totaled \$12 million, similar to the average for past Janu-

arys. The composition of the change, however, was quite different: loans, which usually go up, dropped \$8 million, while investments fell only \$4 million. Higher farm marketings after the turn of the year were partially responsible for the drop in loans. In order to take advantage of the probable tax cut, many farmers held back on crop and livestock sales until after December 31, and then repaid outstanding loans with the proceeds of the sales. In addition, lower cattle prices and expectations of little improvement in such prices may have inhibited some feeders from borrowing in order to restock their lots.

At city banks during the same period total credit dropped more than usual. The decline totaled \$46 million, with loans down \$44 million and investments down \$2 million. Most of the credit change was the result of a \$28 million reduction in commercial and industrial loans (more than average for the period) and a \$4 million cut-back in "all other loans." Agricultural loans, which usually move up, held steady during the period.

(The changing timber industry of the ninth district west:

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would be expected—at most a few dollars per thousand. But later sales, even of dead spruce, were made at surprisingly high prices of \$14 or more per thousand board feet. Future volumes will not reach the levels of the 1954-1956 emergency, since growing stocks of spruce have been materially reduced. Nevertheless, spruce is now much more firmly established in the market, and its output will probably be maintained at a substantially higher level of production than that reached during the pre-epidemic years. Basically, spruce is a

sound species, and it may now have a good future in plywood.

The experience with spruce also points up the ever-present possibility that natural catastrophes may upset the best-laid operating plants and patterns in the timber industry.

INVESTMENT AND EXPANSION

Basic to the expansion in capacity and to the shifting pattern of output of recent years, is the process of capital investment—that is, the purchase

of equipment, plant, and facilities, and the assembly of these things into operating units. Actually, the full tempo of capital investment activity is considerably broader than is indicated by the number of newly created sawmills and wood-using plants cited earlier.

The constellation of firms and their capital facilities is continually changing. In the past decade, ownership changes and consolidations have occurred for large and small sawmills alike. Of greater significance are the changes in physical capital and financial investment requirements. Data in this regard are extremely scarce, but the following discussion will sketch the major patterns.

An estimated book value of capital assets in the Montana timber industry is \$220 million. But every year part of this capital wears out or becomes obsolete and must be replaced simply to maintain the industry's existing rate of production. If the industry is to *expand*, as over the past decade, then capital equipment must be purchased at an even greater rate. Assuming an average life of plant and equipment of ten years, about \$22 million is required annually for replacement alone. Data from the 1954 and 1958 censuses of manufactures indicate that *new* capital expenditures have run to about \$7 million annually—theoretically, enough to construct five to ten substantial-size new sawmills a year. Although several new mills have been added each year as part of the general expansion, much of the new capital expenditure is made at existing mills, in the form of improved equipment or modernized plant layout.

Thus, capital replacement and expansion require about \$29 million annually. This financial expenditure must come out of earnings, new financial investment funds, or borrowings. Because the larger firms have greater access to financial capital and, in particular, to longer-term funds, they can better adjust to the cyclical pattern of demand. Given the risks and instability inherent in the industry, small firms can rarely arrange to borrow necessary funds under conditions meeting commercial bank standards. For the most part,

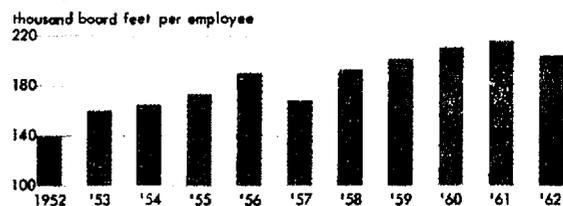
then, the owner's risk capital provides the funds for such smaller enterprises, with borrowed capital taking the form of high-interest equipment credit from equipment suppliers. In general, financial capital is hard to get and interest rates are high. Nonetheless, the resiliency of small firms under favorable market conditions shows that the owners somehow manage to scrape together enough financial capital to operate when the opportunities for reward are sufficiently attractive.

Mills in every size category have joined the scramble to promote efficiency; managers of small mills, as well as those of large mills, recognize that survival of the firm itself depends on its ability to make improvements, and they give visible evidence of their efforts to mechanize. Even the smallest mills have added materials-handling equipment for yarding and stocking, gang saws, and other improved auxiliary sawing equipment. Western Montana sawmills alone have introduced perhaps as much as \$5 million worth of de-barking and chipping machinery since 1956.

Anyone who visits logging operations in the region gets tangible evidence of these technological improvements. Newer and more rugged equipment has been added for building and maintaining roads in difficult terrain, as well as improved log-skidding and loading equipment in the woods.

Out of these improvements in methods and machinery have come increased yields. Chart 6,

Chart 6—Average lumber production per employee at Montana sawmills and planing mills, 1952-1962



Source: Annual average employment at sawmills and planing mills—Montana Unemployment Compensation Commission; annual lumber production of softwoods—Western Pine Association

showing estimated average lumber production per employee at Montana sawmills, documents an improvement in net labor productivity during a decade in which many ventures were made into more difficult processing situations.

Assessment of the quality of the capital expenditures program is difficult. Not all capital spending has equal long-term significance. Some of the spending, including the spending for reorganization of methods and activities, may affect a firm's eventual over-all productivity in ways that are great but only gradually discernible. Quantitative measure of the current dollar volume of such spending naturally fails to gauge its true worth. Yet the importance of the capital expenditure pro-

gram for the future level of the industry's operations in the region can hardly be over-estimated.

Evidence is clear that the region's industry has responded significantly to the pressures for investment and expansion during the postwar decades. Shifting into new species and new types of operations, meeting the challenge of destructive forest epidemics, expanding private investment in capital equipment to step up output and general efficiency, and opening new avenues to more complete utilization of the forest resource—these are some of the dimensions of change. A closer look at future prospects for the district's timber industry will occupy us in the next and final article of this series.

—CLARENCE W. NELSON

