SMALL SAWMILL OPERATIONS
OF COLUMBIA COUNTY

by

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A Thesis
Presented to the Faculty
of the
School of Forestry
Oregon State College

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science
June 1941

Approved:

[Signature]
Professor of Forestry
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INTRODUCTION
PURPOSE

Within certain areas throughout northwestern Oregon lie blocks, both large and small, of second-growth Douglas fir timber of size permitting their conversion into wood products. On many of these forest lands under private ownership, particularly those more accessible, an increase in activity of cutting closely follows increases in demand, and consequent increases in prices for products which such areas yield. Such products may be in the form of either sawlogs or piling, or perhaps more commonly in the form of cross-ties and rough lumber processed at the site of logging. It is with the latter type of operation that this study is concerned.

Typical second-growth sawmills in this region have in the past subsisted for only relatively short periods of time. One of the principal reasons for cessation of operations is a reversal of the market conditions which aided in bringing these mills into existence. This very drop in market value may be attributed in part to increased production and glutted markets for which the small mills themselves are responsible to some extent. Other factors, including financial difficulties due to inefficient management, also contribute toward the failure of these ventures.

Since the majority of mills of the type under consideration are inadequately financed and often poorly organized as to operation, the question arises as to whether or not operators and/or employees receive wage
returns commensurate with their time and labor expended as compared with income which they might realize from alternative employment. Such employment consists of that offered by larger logging and milling operations within the region or various other types of employment. In addition to this question, others concerning sociological aspects of the effects of second-growth mill operations present themselves.

Consideration of these questions to the extent possible here is the purpose of this study.

Although it is realized that the scope of this study is limited and highly localized, the material herein presented may acquaint the reader with some of the economic and social aspects relative to mill operations of the type represented.

**IMPORTANCE**

To the counties and communities in and near the young stands of immature timber today being harvested, such operations present aspects of a significance which few people of these localities realize.

These operations are likely to be viewed only with respect to their present function of creating values in the form of profits and wages. To the timber owner they mean the conversion of a resource into an asset which previously has been looked upon perhaps in the light of a liability or at best with but dim hopes of realization of monetary values.
Whether or not the values derived from present methods of management of these timberlands justify the resultant conditions created is a question which owners and the public in general might well consider.

PROCEDURE AND SOURCES OF DATA

A series of case studies of five mills located in northwestern Columbia County, Oregon is used as the basis of the material presented.

Through personal contact with mill owners, data concerning operating costs, stumpage values, market values and management systems were obtained. Other sources of information are listed within the bibliography of this thesis.
II

DESCRIPTION OF OPERATIONS
LOCATION OF MILLS

Two of the operations studied are located within five miles of Clatskanie, Oregon, at which point lumber and cross-ties are shipped to markets by rail. This point itself becomes the market for ties sold to the Spokane, Portland and Seattle Railroad Company. A third mill is located near Mist, Oregon, twelve miles south of Clatskanie, and two mills are located on the Fishawk Creek drainage, approximately seven miles north of Birkenfield, Oregon. Ties from the latter two mills are marketed at Buxton, Oregon, 38 miles distant, and at Clatskanie, 25 miles from the point of production. Shipments of cull ties are made to logging camps within twenty miles of the milling operations.

Three of these units are situated immediately adjacent to well-maintained county roads, while those located on the Fishawk drainage are both within one mile of a county road.

This ease of access to bodies of timber well-suited to cross-tie production, relatively low stumpage values, and favorable market prices all combine to give rise to cutting of second-growth timber in these areas.

DESCRIPTION OF TIMBER STANDS

The timber-producing capacity of these lands in general compares favorably with the best in the entire northwest. The average age of stands in which cutting is
now taking place is 60 years. In such stands the diameters range from ten inches to 28 inches (d.b.h.). At present one of the mills on the Fishawk drainage is cutting 90-year-old timber. This timber averages, roughly, 24 inches and reaches a maximum diameter of 36 inches.

The stands themselves are generally heavily stocked with thrifty, fast-growing Douglas fir. At one operation only was hemlock in evidence to any extent. Here the hemlock consisted mainly of smaller trees which had been pre-logged for use in mill construction.

In a portion of the stand being logged by one of the Fishawk operations some defect is encountered, this being possibly attributed to excessive stocking.

LOGGING METHODS

As in the past, the highlead method of yarding prevails, although a tractor is used on one show. In this case, yarding proceeds from the outer boundaries of the chance toward the mill. As the timber supply recedes from the outer boundary the tractor is supplemented by horse-skidding. In timber of this size, where the ground conditions are less favorable for the operation of the wheel-type tractor and the skidding distance is short, a single horse is used to better advantage. Maximum tractor yarding distance at this operation is 1100 feet.

Where the highlead system is used, the spar tree is ordinarily located within 100 feet of the mill.
Maximum yarding distance varies from 600 to 1000 feet. Entire tree lengths are ordinarily yarded to the landing, from which they are drawn to the cutoff saw by a winch operated by the cutoff saw motor.

Gas donkeys, adapted from 40 horsepower automobile engines, form the power for the highlead system in these operations. Such yarders are used to advantage in timber of the type encountered, since they provide adequate power, are more easily moved about, and at the same time eliminate the necessity of a water system necessary to steam donkeys.

Clear-cutting is invariably the practice followed by these operations.

**MILLING**

The mill is essentially of a portable nature, since moving the mill site to within yarding distance of blocks of timber usually entails less of an expense than transporting logs beyond yarding distances to the mill.

Milling equipment is typified by a small circular headrig powered by a 50-horsepower tractor motor. Ties are conveyed from the saw over dead rolls, whence they are piled alongside the mill until removed by trucks. In one instance, in which the amount of slab is kept at a minimum, such "waste" material is burned. In this case the ties are conveyed by a small hand-truck to platform or mill-dock where they are piled. Ordinarily the mill deck is situated high enough that the ties and slab may be
conveyed by gravity from the saw to different piles. Such a set-up facilitates ease of handling as well as saving of time.

The cutoff saw is powered by a 35-horsepower automobile motor, which also operates the log-haul drum. A line is extended from this drum to the landing 100 feet or less from the mill. The cutoff saw operator attends to the conveyance of logs from the landing to the mill, as well as sawing them into tie lengths.

The entire mill crew is commonly comprised of three men; namely, the sawyer, the offbearer and the cutoff saw operator.

The condition, as well as type of equipment employed, is highly important in the milling operation. Impaired or worn-out equipment results in frequent breakdowns and loss of time to the entire crew in addition to suspension of mill production. At one mill it is not uncommon for the crew to lose several hours per week due to breakdowns resulting from poor equipment.

The daily output in all but one of these mills per eight-hour day ranges between eight and twelve thousand board feet of cross-ties. At one operation where the crew consists of five men, the entire crew's activities alternates between logging and milling. Here the mill output averages three and one-half thousand board feet per day.
PRODUCTS

Cross-ties form the bulk of production of all five mills at present, although a limited amount of rough lumber of the common grades is sawed by two concerns. Any lumber produced by the other three mills is sold in the immediate locality or is used in construction about the mills. Five grades of cross-ties are sawed; namely, export, select, number one, number two, and culls or rejects. Cull ties are sold to logging operations within twenty miles of the mills.

In addition to the various grades and sizes of ties, a type of heavy planking is sawed for sale to larger logging operations within the county. These planks are used in construction of truck roads.

At one mill, sawdust is being sacked and hauled to Portland, 70 miles distant. The only costs incurred by the sawdust dealers in this case are those of transportation and their own time, since there is no charge made for the sawdust at the mill. As no contact could be made at the time with these sawdust dealers, no information was obtained on transportation cost and sales value of this fuel. It is doubtful, however, as to whether the margin of profit is great enough to justify the expense involved in transportation. Trips by these dealers are made only intermittently.

Slabwood is often given to fuel dealers or sold at a nominal price. Some slab is marketed at Longview, Washin-
ton as pulpwood.

**UTILIZATION**

In logging and milling methods entailed in these operations, practices followed may be highly wasteful, or, conversely, utilization may be obtained to a relatively high degree. In some instances, large slab piles may be burned or left untouched after sawing, while in other instances little mill or logging waste is evident. Slash accumulations following logging vary largely with the nature of the timber stand. According to one operator, ideal tie timber consists of trees ranging from 20 to 30 inches in diameter. The degree of utilization of mill waste is influenced to a high degree by the accessibility of the mills, both as to nature of roads and distance to fuel markets.

In a 90-year-old stand only the tree tops remained as slash, defect being practically negligible. It is a common practice to buck the tops of trees in this operation at a diameter of ten inches. In timber of this size (maximum diam. 36 inches), the percentage of slabwood volume is high. In 60-year-old stands, trees too small for sawing are either left standing or lying on the ground. Those left standing are usually lost through windthrow or slash burning.
DEPLETION

Two of the mills, one operating over a period of four years and the second mill operating over a period of three years, have consumed a total stumpage of ten million board feet. The combined yearly (based on 200 working days) output of the five mills would approximate 8,300 M. board feet. This figure represents 2.1 percent of the total volume of second-growth Douglas-fir timber (trees 12 inches d.b.h. and larger) within Columbia County. This computation is based on statistics from the U. S. Forest Service survey completed in 1937. (1)
Fig. 1 A relatively clean job of logging in small timber.

Fig. 2 Example of logging waste in young stand. (The three logs in the immediate foreground will be utilized).
Fig. 3 Tie mill operating in 60-year-old stand of Douglas-fir.

Fig. 4 Close-up of butt log, indicating nature of growth rate in 60-year-old stand.
Fig. 5 Products of a typical second-growth fir mill. From left—slabwood, planks and ties.

Fig. 6 Stovewood converted from mill slab.
Fig. 7 Milling waste resulting in small timber stands.

Fig. 8 Close-up of the above view.
Fig. 9 Close-up of headrig. (Note rough lumber in background).

Fig. 10 Mill in operation.
Fig. 11  Plank road leading from mill to county road. This plank road is 3500 feet in length and required approximately 100 M. board feet of plank in its construction.

Fig. 12  Log haul and cutoff saw. Left: Sawyer at headrig.
III
ECONOMIC CONSIDERATIONS
CASE STUDIES

Some difficulty was experienced in obtaining detailed information as to operating expenses, wage payments, and returns from products. This is due partially to the fact that in some cases operators have but a general knowledge themselves as to what these figures are, and to the fact that some operators are reluctant to impart such information to outsiders. From those mills cutting both ties and lumber, information as to the percentage of each of these products is largely an estimate. In two cases, however, a fairly detailed and reliable set of figures was obtained. Presenting the financial data for other operations briefly, a more detailed description of these first two operations mentioned follows. Initial investments in the five operations range from $2900 to $3600.

Case No. 1

This mill is operated by four men who are engaged during the summer months in truck-logging a tract of mature timber within a few miles of their mill. The old-growth timber is disposed of on the Columbia River log market. During the rainy season these loggers, with the aid of two or three hired laborers, then resort to the activity of logging and milling of second-growth timber. The mill is located within five miles of the principal market and shipping point.
The daily output averages approximately 8 M. board feet. This capacity would be increased to 10 M. per day if ties alone were sawed. Through production of "side lumber" much material is utilized which in the manufacture of ties alone becomes slabwood.

Market prices for ties range from $11 per M. for the poorer grades to $18 for certain grades of switch ties sawed by this mill.

No figures for depreciation were available in this case. Neither could an estimate of initial investment involved be obtained. The securing of such figures was complicated by the fact that some of the machinery is also employed in carrying on farm work, and must be considered as farm machinery as well as part of the sawmill equipment.

Of the average output of 8 M. per day, one-third consists of ties, the remaining two-thirds consisting of planking and lumber. The average price received for these ties is $14.50 per thousand board feet, while the average price received for lumber and planking is $12 per thousand. Following is a summary of operating costs and daily income.

**Income**

Daily output ties, 2.7 M. @ $14.50. $39.15
Daily output, lumber, 5.3 M. @ $12. $63.60
Total returns from average day's output. $102.75
Average return per thousand board feet. $12.84
Costs

<table>
<thead>
<tr>
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<tr>
<td>Stumpage</td>
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</tr>
<tr>
<td>Logging</td>
<td>2.50</td>
</tr>
<tr>
<td>Milling</td>
<td>2.50</td>
</tr>
<tr>
<td>Hauling</td>
<td>1.00</td>
</tr>
<tr>
<td>Loading</td>
<td>$0.50</td>
</tr>
</tbody>
</table>

Total costs $7.50

Average net return per M. output $5.34

From the above figure it may be seen that each of the four partners would receive an average of $1.33 per thousand board feet output as his share of the net return. For an average day's operation this would mean $10.64 per man.

A daily wage of approximately $5.00 per man is paid hired workers. This is somewhat lower than the base rate of pay prevailing in the larger logging and milling operations in this region at the present time.

Case No. 2

Income

Average returns per thousand board feet $14.00

Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stumpage</td>
<td>$1.25</td>
</tr>
<tr>
<td>Logging</td>
<td>3.75</td>
</tr>
<tr>
<td>Milling</td>
<td>4.00</td>
</tr>
<tr>
<td>Hauling and loading</td>
<td>1.75</td>
</tr>
<tr>
<td>Depreciation (estimated)</td>
<td>$0.10</td>
</tr>
</tbody>
</table>

Total costs $10.85

Net returns per M. $3.15
The average daily output of this mill is 3.5 thousand per day. At an average net return of $3.15 per M. this leaves a daily profit of $11.02 to be divided among three partners. The total cost per M. of production includes all wages of partners as well as other operating expenses. The amount allowed for individual wages could not be obtained here, but it is doubtful that such wages exceed $3.50 per day. This $3.50 plus the partner's share of the profits or net returns would equal $7.17 for an average day's operation.

Logging and milling is carried on in alternate steps by the same crew. Hauling distance is five miles (to railroad).

Case No. 3

At this operation costs were said to closely parallel those of the succeeding two mills (these three mills are owned by the same operator). The main difference lies in hauling costs, since in case number three the hauling distance is but five or six miles.

Sawing is confined largely to that of planking which is sold to a nearby logging concern. Using the same logging and milling costs as those presented in the following two cases, a margin of $2.65 is obtained for depreciation, profit and risk. According to the owner's estimate this sum is in excess of the actual amount derived through this mill. This discrepancy lies within the logging and
milling costs, which are apparently somewhat higher than those used in these computations. The operator himself could furnish no specific costs on logging and milling here, but referred to them as being comparable to costs discussed in the following case.

Case No. 4

Two mills located within one mile of one another and under the same ownership are considered in this observation. Results obtained through the study of this particular case are undoubtedly more highly significant than any of those of the preceding in answering the question of whether or not the small mill may be a paying enterprise. From this case a more reliable set of cost data was obtained. In addition, these two mills are operating under the adversity of hauling distances much greater than any of those previously discussed.

The system of management employed is in itself unique. Logging is contracted, the logger furnishing his own equipment and defraying the expenses involved in conveying logs from woods to the mill deck. This includes the cost of stumpage as well as labor and other costs. Employees are paid on a basis of mill production.

In return for his part in the entire operation the logger receives one-half of the net receipts of all shipments made from the mill for which he logs. From the remaining one-half of the net receipts of sales is de-
ducted wages of millmen, truck drivers and car loaders. These employees are also paid on a basis of mill production.

The residual sum following these deductions forms the mill owner's share or that which might be termed his margin of profit and risk.

The apportionment of these payments to various individuals is transacted through the Clatskanie bank to which the payments for sales orders are made directly by purchasers. The owner of the stumpage involved, who is paid on a per M. mill production basis, also receives his payment directly from the local bank.

Two men, sawyer and offbearer, are employed in the mill. These employees are paid on a per M. production basis. From his wages the sawyer must withstand the cost of maintenance of sawing equipment and mill machinery. The offbearer receives wages equivalent to those of the sawyer, but must defray a cost of approximately 25 cents per M. on fuel for the power unit.

Likewise, the cutoff saw operator, who is paid by the logger, must withstand a cost of approximately 15 cents per M. for upkeep of the equipment which he operates.

In logging, cold-decking of a supply sufficient for one day's sawing constitutes the day's work for the crew. The daily log supply is ordinarily produced in less than eight hours' time, occasionally requiring only five or six hours. The job of conveying logs from the cold-deck pile to the cutoff saw is greatly facilitated by limiting the number of logs to that sufficient for the day's
operation.

One set of timber fallers is sufficient for both mills. These mills are located sufficiently near one another that this set of fallers may work at both operations in any one day if necessary.

Following are data on average sales values and operating costs:

Logging

One-half of net receipts (per M.)... $6.25

Costs

<table>
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<tr>
<td>Yarder fuel</td>
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</tr>
<tr>
<td>Fallers (per set)</td>
<td>$.60</td>
</tr>
<tr>
<td>Chaser</td>
<td>$.60</td>
</tr>
<tr>
<td>Hooker</td>
<td>$.75</td>
</tr>
<tr>
<td>Donkey puncher</td>
<td>$.75</td>
</tr>
<tr>
<td>Cutoff saw operator</td>
<td>$.90</td>
</tr>
<tr>
<td><strong>Total logging cost</strong></td>
<td><strong>$3.80</strong></td>
</tr>
<tr>
<td>Stumpage cost</td>
<td>1.25</td>
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<tr>
<td>Road cost</td>
<td>.07</td>
</tr>
<tr>
<td><strong>Total cost of logs</strong></td>
<td><strong>$5.12</strong></td>
</tr>
</tbody>
</table>

Logger's margin for depreciation, profit and risk: $1.13

One-half average net receipts per M. $6.25

Milling costs

<table>
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<th>Item</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sawyer</td>
<td>$1.00</td>
</tr>
<tr>
<td>Offbearer</td>
<td>1.00</td>
</tr>
<tr>
<td>Hauling</td>
<td>2.80</td>
</tr>
<tr>
<td>Loading</td>
<td>.50</td>
</tr>
<tr>
<td>Road cost</td>
<td>.05</td>
</tr>
<tr>
<td>Depreciation (operator's estimate)</td>
<td>.05</td>
</tr>
<tr>
<td><strong>Margin of profit and risk</strong></td>
<td><strong>$ .85</strong> per M.</td>
</tr>
</tbody>
</table>

The owner of these mills stipulated a minimum average price of $12 per M. for continued operation. This would
mean a margin of profit and risk of $0.60 per M. to the operator.

Prorating of road cost:

At these operations 3,500 feet of plank road is used to service 2,000 M. board feet of tie timber. Since each man employed in the operations is paid only on a basis of mill products which are sold, part of the cost of production of plank for road construction must be borne by each individual concerned. For example, the chaser, who receives $0.60 per thousand, must withstand a loss of $60.00 in wages for 100 thousand board feet of planking necessary to complete the 3,500 feet of road. Since this road serves two million board feet of timber the cost per M. board feet would be $0.03 which would be deducted from the chaser's wages. He would then actually receive $0.57 per M. rather than $0.60.

WAGES

Following is a listing of the actual wages received by employees:

Logging Crew

Faller* ($ .30 per M., less $ .015 road cost) . . $0.285
Hooker ($ .75 per M., less $ .037 road cost) . . . 713
Chaser ($ .60 per M., less $ .03 road cost) . . . 570
Donkey puncher ($ .75 per M., less $ .037 road cost) . . . 713
Cutoff saw operator ($ .90 per M., less $ .15 saw operation cost, less $ .045 road) . 705

* One set of fallers work at both operations, and in one day will fall an amount equal to twice that of the average daily capacity of a single mill, or approximately 20 thousand board feet.
**Mill crew**

Sawyer ($1.00 per M., less $.05 machinery maintenance, less $.05 road cost)...

Offbearer ($1.00 per M., less $.25 fuel cost, less $.05 road cost)......

Car loaders ..................................

**ALTERNATIVE WAGES**

In each of the studies made, the mill operator himself has at some time been a wage-earner in either the logging or milling industry. This generally applies also to employees of the tie mill operations.

If these men were employed in larger mills or logging camps at present, they would receive wages of from $5.80 to $10 per eight-hour day (wage scale existing in the Columbia River district). At least one of the operators is adequately qualified to maintain a position in the top wage bracket. Others might obtain employment at wages ranging downward to the minimum specified. Few of the employees are of the type who either find it difficult to obtain work or to hold jobs, once obtained, with larger logging or milling concerns. A minority of those employed by the tie mills spend part of their time operating small farms in the nearby communities. One of these men stated that if he were to spend his entire time farming, his hourly wage would be approximately fourteen cents, based on a fourteen-hour day.

In general, wages compare favorably with average wages paid by larger operations in the lumber industry within this same region.
IV

SILVICULTURAL CONSIDERATIONS
One of the foremost questions arising when considering silvicultural aspects of cutting of these second-growth stands is "does the cutting permit regeneration of the stand?". As the oldest mill under consideration has been in operation less than four years, it is difficult to predict with accuracy what degree of stocking will follow logging.

As is often the case in any type of logging operation, exclusion of fire from the area following logging is the key factor toward obtaining a stand of reproduction and future forest. Operators are ordinarily required to burn slash following logging, after which there remains a fire hazard of a greater or lesser degree, depending upon such items as the amount and character of slash, topography and the intensity of the slash burn.

An examination of old cuttings by mills of this type will reveal that satisfactory restocking may usually be expected when the cutover area is left unmolested by fire and/or livestock. This is due largely to the fact that the logged areas have been relatively small, with adjacent strips or blocks of timber serving as sources of seed.

Present cutting is also characterized by small clear-cut blocks or narrow strips bordered by timber, thus it appears logical to assume that within a few years' time, precluding fire, favorable regeneration should follow logging on these areas.
SLASH BURNING

The question of desirability of slash burning after logging is one to which no definite rules may be applied. Whether or not disposal by broadcast burning should be practiced should be governed by such factors as the nature of the debris left on the ground, the amount of slash and the presence or absence of residual trees. In other words, slash burning may or may not be desirable, depending upon conditions peculiar to each individual area.

FIRE PROTECTION

Adequate protection of these lands after cutting hinges largely upon the type of fire fighting organization maintained within the district during the hazardous season. Accessibility presents no great problem, since county and private roads traverse most of this region. The responsibility of such protection now lies with either the landowners themselves or, where the problem is too great for the owner, with the district state fire warden. On previously-logged adjacent areas the chief cause of leaving lands unproductive has been due not to failure in obtaining regeneration, but rather to the failure of protecting the reproduction from ensuing fires. Adequate protection provided, provision for the future timber stand becomes virtually assured.
METHOD OF CUTTING

Present logging is characterized by clear-cutting, with occasional residual trees sometimes left standing. These trees usually consist of small sizes highly susceptible to windthrow after logging or fire-kill when slash is burned.

From a silvicultural standpoint, a light selective initial cut would undoubtedly be favorable in most cases. This is particularly true of the younger (60 to 70 year) stands in which there is usually a relatively high percentage of thrifty trees which are too small for utilization as cross-tie material. In clear-cutting such stands, these trees ordinarily represent a complete loss. The application of heavier selective cuts may be feasible from an economic standpoint, but whether or not the degree of cut economically favorable would produce favorable results silviculturally is a question whose solution requires further study.

Examples of defect in dense stands were pointed out by one mill operator. Such defect may perhaps be attributed to stagnation within the stand. Where a condition of this nature exists or appears imminent, cutting of a selective nature could greatly favor stand improvement. Existing operations must, in the operator's opinion, depend upon clear-cutting methods for economical operation.
V

SOCIological ASPECTS
PRESENT OUTLOOK

Current effects of second-growth mill operations appear generally beneficial insofar as the timber owners, wage-earners, operators themselves and others within the immediate localities are concerned.

To the timber owner the sale of his stumpage means an immediate cash income from timber on which he must pay taxes annually, and for which the small mill offers at present the only outlet. At the time of sale this cash outlay in the form of taxes is largely or totally reduced, depending upon whether or not the owner desires to retain the cutover land.

To the men who are employed in logging and milling the timber from these lands, a source of income from wages is provided. Employment in such localities is particularly advantageous to the small farm owner who ordinarily derives but a scant income from his farming efforts.

As for the mill operator, his opportunity to proceed under his own initiative is probably secondary only to receiving an income from his venture. Some operators are apparently willing to log and saw timber as long as their expenses are barely balanced by income. Whether or not any of the operators concerned in this study maintain such an attitude is questionable. Present market prices are such that these small mills have little difficulty in realizing profits to some degree.
FUTURE ASPECTS

A survey of the long-time aspects of present cutting in these stands indicate generally adverse conditions resulting. Although the present income of the localities concerned are enhanced, if the resource furnishing this income becomes depleted, an abrupt curtailment of returns will necessarily ensue. In addition, the complete removal of this immature timber crop adds a burden to the already pressing county taxation problem. Significant results of liquidation of vast stands of old-growth timber within this same region are today widely apparent.

Another adverse effect of an influx of small mills into these stands is that of adding to the instability of the markets upon which their products are thrown. (2) With ensuing decreases in market values, these same mills are then usually forced to discontinue operation.

IMPROVING THE SITUATION

Obviously the final solution of the problem confronted here lies in the inauguration of a sustained-yield management of the timber resource. How, then, can this problem be solved when ownerships are small and scattered?

Private ownership

One procedure which might be considered as a step toward the solution of this question is the consolidation of timber holding into units of size suitable for effective
management. Control of large units by private corporations should be regulated to the extent that such control may not be used in injurious ways.

Another possible means of developing privately-owned timberlands into economic sustained-yield units is through consolidation of holdings into cooperative associations. In the broad sense, a cooperative may be defined as "a voluntary association in which the people organize to supply their needs through mutual action........a producers' cooperative is primarily a marketing organization for the purpose of selling the products of its members at a fair price." (3) Practices essential to successful cooperative marketing lie in the following: 1. efficient management, 2. sufficient volume of business for economic operation, 3. loyal support of its membership, 4. sound financing, and 5. serving an economic need.

"In a forestry cooperative, forest output must be oriented from the point of view of the maintenance of the natural resource, rather than from that of maximum immediate profits from the conversion process". (4)

Experience in other countries and in other regions of our own country indicate that a high degree of success may be attained through the application of the cooperative systems of timberland management. (4) At present, one such system is in operation among farm-woodland owners in Clackamas county, Oregon. (5) Another similar system in Snohomish county, Washington, after having been in operation
for less than one year is receiving the enthusiastic support of its members. (6)

Adequate description of the various forms of cooperatives and their methods of operation embraces a field too wide in scope to be presented in this article.

Any form of operation by private ownership should permit regeneration, yield a profit, and should leave land in a productive condition.

Public Operation

Public operation of these timberlands might be handled through one of three governmental agencies, namely; county, state or federal. An outstanding advantage of government operation lies in the fact that these agencies can afford to operate without profit. Consequently they can afford to manage poorer lands than may be operated by private concerns.

Approximately seven percent of the total volume of second-growth Douglas-fir (in trees 16" and larger) in Columbia county is under the ownership of the county itself. Sales of this timber are made from time to time to loggers and sawmill operators. That the county receives full value for stumpage involved in such sales is questionable, since the present inventories on the timberlands involved can hardly be considered adequate.
Taxation Reform

In this County the timberland owner has the choice of placing his property under the general property tax or under the state forest yield tax. Opinions vary as to the relative merits of each. According to Mason "In theory, it may be proved that the general property tax and the yield tax give the same results if they are properly correlated. Nevertheless, a yield tax has two definite appeals to the forest owner. First, the tax is paid only when income is received and secondly, immature material lost through fire or other agencies pays no tax." (7)
VI
SUMMARY
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Considering the foregoing statistics, it may be seen that under the present conditions small mills operating in advantageously located second-growth Douglas-fir stands may yield relatively favorable incomes to both employees and owners of such concerns.

It may also be concluded that unregulated cutting in such second-growth stands is highly conducive toward creating conditions unfavorable to the communities in which operation of this nature is practiced.

Various methods which offer possibilities toward initiating sustained-yield practices include consolidation of private ownerships into sustained-yield units, acquisition by public agencies and consolidation of lands into similar units or some form of cooperative management of forest lands.

In the last analysis, it matters not so much who operates these timberlands, as to how they are managed.
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