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FOREST RESEARCH NOTES

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SAWMILL "WASTE" IN THE DOUGLAS FIR REGION, AMOUNT AND UTILIZATION

A recently completed study of the sawmill "waste" in the Douglas fir region of Oregon and Washington shows that in the production of the 1929 cut of green, rough-sawn lumber (10,286,554,000 board feet), 1,353,865,254 cubic feet (solid measure) of sound wood in sawlog form were used. Of this 66.61 per cent (910,810,322 cu.ft.) was converted into rough-green lumber, 19.31 per cent (261,443,668 cu.ft.) was broken down into slabs, edgings, and trimmings, and 14.08 per cent (190,611,284 cu.ft.) was reduced to sawdust. Aside from this, 167,010,205 cubic feet of bark went through the mill.

The following table shows the percentage of sawmill waste (solid wood) chargeable to the several saws in average mills of the Douglas fir region.

Percentages of Sawmill "Waste" Chargeable to the Various Saws In Average Sawmills of the Douglas Fir Region[1]

Sawing Machine	Hemlock Sawmills: Band Headsaw: Solid wood	Saw-dust	Total "waste"	Douglas Fir Sawmills: Band Headsaw: Solid wood	Saw-dust	Total "waste"	Douglas Fir Sawmills: Circular Headsaw: Solid wood	Saw-dust	Total "waste"
	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.
Headsaw	23.07	10.24	33.31	9.16	21.48	30.64	7.86	30.22	38.08
Main Edger	9.22	11.92	21.14	9.79	16.09	25.88	8.02	16.23	24.25
Trimmer	37.01	.42	37.43	35.80	.83	36.63	26.91	.91	27.82
Vertical Resaw	.27	5.91	6.18	1.62	5.00	6.62	2.03	7.27	9.30
Pony Edger	.37	1.04	1.41	--	--	--	--	--	--
Slasher	.00	.53	.53	.00	.23	.23	.00	.55	.55
Total	69.94	30.06	100.00	56.37	43.63	100.00	44.82	55.18	100.00

[1] Sawmills operating such machines as gang saws and horizontal slab resaws were not included in the averages used for this table.

Of the total sawmill "waste", including bark, 43.97 per cent was recovered and sold as by-products, 28.80 per cent was used by the sawmills as fuel, and 27.23 per cent went into the refuse burner. The by-products recovered from sawmill waste included lath, handle squares, shingle bands, pulpwood, screened pulp chips, fuelwood, hogged fuel and sawdust, with a total value of $7,154,122.

The complete report of this study is being published in "The Timberman" in four issues beginning with July.

A. H. Hodgson

CONCERNING THE REBURNING OF DOUGLAS FIR CUT-OVER LAND

A slash fire on a recent Douglas fir cutting very often overlaps adjoining areas previously burned. It spreads uncontrolled to the once burned land, it starts spot fires a thousand feet or more away, it sends out fingers in various directions. This process results in much of the logged-off land having, not one burning immediately after logging, but one or two reburns in the succeeding few years.

Observations extending over five years on three hundred one natural reproduction plots give an historic record of the actual amount of reburning on twenty-two different cut-over areas in various parts of western Oregon and Washington, both on private and on national forest lands. They show that the rate of reburning such areas is rather alarming and a serious menace to the continuous productivity of the land. Within the last five years, fifteen out of the twenty-two groups of plots were visited by a second fire, and two areas by a third fire. Of the three hundred one individual plots, seventy-one, or twenty-four per cent, have been reburned to date. This indicates that the rate of reburn is about five per cent a year. Whether this same land will continue to be subject to this same rate of reburning is conjectural. Prior to the second fire, twelve of the fifteen areas had at least a light stocking of seedlings, some as high as 2000 to the acre; now the burned portions of these areas, with one exception, are practically without seedlings.

When a slash area is burned promptly after logging, some reproduction generally starts immediately on the mineral soil, skid roads, and protected spots, and more follows from seed blown in from the near-by edge of green timber or from single trees. The second fire kills this reproduction. By that time some of the potential seed trees are dead or windfallen; the edge of green timber has been moved back year by year through cutting, and the site made more severe through destruction of humus and shade. The result is a greatly reduced rate of seeding and seedling establishment.

The above records, taken as they were on widely separated areas, give a fairly good indication of what occurs in the region as a whole. They indicate that the overlap of slash burning operations and the reburning of restocked logged-off land still are occurring to an extent that is greatly postponing, if not preventing, the establishment of a new stand of growing trees.

L. A. Isaac

DOES THE FORM OF WESTERN YELLOW PINE CHANGE AFTER RELEASE CUTTING?

This innocent question has much more significance than one is apt to realize. Its answer is related closely to the decision whether the existent volume tables which have been prepared from data gathered in the virgin forests are applicable to the selectively cut forest, and in case they are not whether an entirely new set of tables will have to be made for such stands. The form of a tree is an important matter insofar as volume estimating is concerned. For example, a tree of poor form (form class .500, a conical tree) has a volume 27 per cent below the tree of average form, while a tree of very good form (form class .850, fairly cylindrical) has a volume 20 per cent above the average.

Simple as the above question is, it is accompanied by an equivocal answer--yes and no--yes for individual trees, and no for the stand as a whole. This answer was found by analyzing in detail from stump to tip approximately 170 trees found on cuttings made 25 to 40 years ago. Each tree was reconstructed back by decades to thirty years before release and its form and volume studied at each decade. The following are the major findings:

1. Previous to cutting, all form classes are slowly improving in form, that is to say the trees are all tending towards fuller boles.

2. Directly after release there is a change; the low form classes accelerate their rates towards better form, but the high form classes become gradually poorer, while the average form classes remain about the same.

3. On the whole the general tendency is to approach a relatively narrow range in form class, which incidentally centers about the average form before cutting.

4. The reason for the varied trend is probably as follows: Trees of low form class, or in other words those for which the diameter at breast height is very large in comparison with the diameter at half height, are already well built up at the base, so that when the tree is released, benefits of added moisture and soil need not be turned into development at the base to help the tree to withstand the added wind strain, but are directed to the development of the top, nearest the source of food manufacture. On the other hand the trees of high form class need extra support at the base so that they can withstand the added wind hazard; consequently the growing energy is directed to the butt. The average formed tree is in a point of balance, and growth energy is distributed equally over the tree resulting in little or no change in form after release.

5. Since the average form tends to concentrate about the same value at every period, it is apparent that a set of volume tables based upon large numbers of trees will be applicable at any time. Not being content with this theorizing, a volume check of all the analyzed trees was actually made and confirmed the theory, since with only minor variations the actual volume and the tabular volume remained equal.

W. H. Meyer

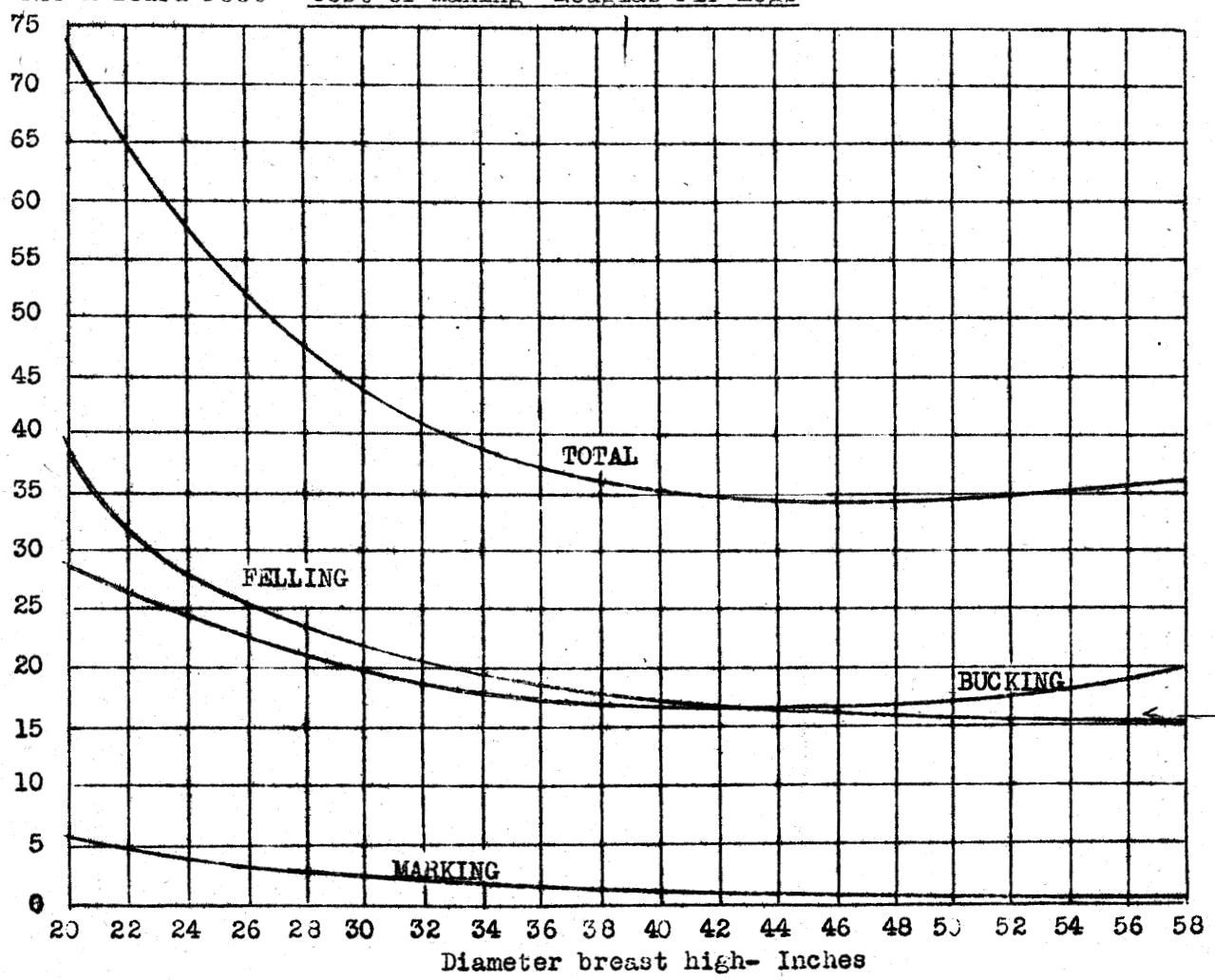
Relative Cost of Making Logs from Small and Large Trees

The Forest Service has recently completed a study of the relative cost of making logs in different sized trees. For this purpose 300 Douglas fir and 211 western hemlock, ranging in size from 14 to 54 inches, were analyzed on four representative operations located in various parts of the Douglas fir region. The following graph shows some of the results which pertain to Douglas fir. Cost is related to tree size as indicated by the diameter at breast height (4.5 feet above average ground level). The unit of scale is total gross merchantable scale in thousand board feet minus breakage.

As shown the cost of making a thousand board feet in log form from a 20-inch tree is double that from a 56-inch tree. Trees smaller than 20 inches would have a still higher production cost as evidenced by the rate of change of the curves.

The increase in bucking cost for the largest size classes is due to increased breakage, which in many cases necessitates two or three extra cuts to eliminate shattered portions; in small trees breakage is less of a factor, since it occurs more often above the merchantable top.

E. F. Rapraeger



CLASSIFYING STOCKING IN DOUGLAS FIR REPRODUCTION BY THE STOCKED QUADRAT METHOD

Realizing the inadequacy of gauging degree of stocking in reproduction stands by number of trees per acre alone, the Forest Survey has adopted the stocked quadrat method in the Douglas fir region. The disadvantage of the "number of trees per acre" method is that it disregards distribution and thus fails to indicate accurately the proportion of the land and light being utilized by tree growth. The stocked quadrat method eliminates this difficulty.

The essence of this new method is the division of the area under examination into squares of such a size that the presence of one well-established tree per square (even if there were no more) will form a fully stocked stand. The ratio of occupied squares to the total number of squares indicates the portion of the area being utilized.

Theoretically the size of the squares should vary with species, age, and site, but practically this differentiation is not feasible. In the Douglas fir region a 13.2 foot square (or 1/250 of an acre) has been adopted for established seedlings, saplings, and poles up to 8 inches in diameter.

The grades of stocking recognized are as follows:

70-100%	of	squares	stocked	equals	good	stocking
40-70%	"	"	"	"	medium	"
10-40%	"	"	"	"	poor	"
0-10%	"	"	"	"	nonstocked	

Offhand it would appear possible to have a minimum of 175 trees per acre for areas classified as well stocked, 100 trees for areas classified as medium stocked, and 25 trees per acre for areas classified as poor stocking. It is inevitable, however, that many of the stocked squares will have more than one tree. To reduce this assumption to a factual basis, an analysis was made of the number of trees per square found by actual count in extensive areas of reproduction stands.

These data were collected on a strip survey of Lewis County, Washington. The normal procedure in using the method is to call a square stocked upon the discovery of one well-established seedling. The special counts were made at each ten-chain point at which a block of four squares was counted. Results on 605 sets of four squares each scattered on burned and cut-over lands over some 186 miles of strip line show that 347 sets had one or more of the 13.2-foot squares stocked, aggregating 909 squares; the remaining 258 sets were entirely devoid of seedlings. The number of trees per square ranged from 1 to 241 trees, but to be conservative all squares containing 11 or more trees were counted as having only 11 trees. The stocked squares were divided into two groups and analyzed separately and in combination. The following table shows the results:

Table I.
Average number of trees per stocked 13.2-foot square

	Group I	Group II	Total
Number of trees	1961	2770	4731
Number of stocked squares	377	532	909
Average number of trees per stocked square	5.2	5.2	5.2
Trees per fully stocked acre 250 x 5.2 = 1300			

Each stocked square has an average of 5.2 established trees. Table II applies this value to grade of stocking in order to indicate corresponding number of trees per acre.

Table II
Grade of stocking correlated with total number of trees

Grade of stocking	Percentage of squares that are stocked	Corresponding number of trees per acre
Good	70-100	910-1300
Medium	40-70	520-910
Poor	10-40	130-520
Nonstocked	0-10	0-130

R. W. Cowlin

STATION NEWS ITEMS

The Section of Forest Products, hitherto a part of the Regional Forester's Office, has been transferred to the Forest Experiment Station with its entire personnel, in order to bring together all the research units of the Forest Service. A similar organization has recently been effected in Regions 5 and 1 of the Forest Service.

Dr. J. E. Lodewick has been appointed in the grade of silviculturist as Chief of this Section to replace W. H. Gibbons who has been transferred to the Washington, D. C. Office of the Forest Service. Dr. Lodewick is a graduate of the New York State College of Forestry with the degrees of B. S., M. S., and Ph. D., and has taught wood technology and allied subjects there and elsewhere. He will enter upon the new position in September. He is at present with the Virginia Polytechnic Institute, chiefly for research in lumber industry studies.

The Allotment for this Station for the Fiscal Year Beginning July 1 - This Forest Experiment Station budget for the Fiscal Year 1932 is larger than ever before, chiefly through an increase of $15,000 for fire control studies, an increase for the study of economics of forestry, and for the operation of the recently transferred Section of Forest Products. This budget is allocated to several distinct projects or groups of projects as follows:

For the forest survey of the Douglas fir region	$75,000
For a study of the practicability and technic of forest insurance	8,500
For studies in the economics of forest land ownership, management and exploitation	20,900
For silvicultural, mensurational and fire studies	43,680
For studies in the properties, uses and better utilization of forest products	19,220
Miscellaneous	419

Pringle Falls Experimental Forest - An area of 7520 acres in the vicinity of Pringle Falls on the Deschutes National Forest south of Bend, Oregon has been approved by the Forester as an experimental forest for the study of western yellow pine and associated tree species. This tract is admirably suited for experimental work, being accessible to rail and highway and centrally located in a large timbered region of which it is typical. It lends itself well to studies of the ecology of the types represented, of methods of cutting and slash disposal, soil problems, range management, forest biology and entomology, fire protection, reforestation technic, and so forth. A headquarters building was recently constructed containing two rooms and a garage under one roof, located about a quarter mile upstream from the Pringle Falls Bridge on the west bank of the river.