Measuring TREES AND LOGS

P.N. GOODMONSON

Federal Cooperative Extension Service
Oregon State College
Corvallis

Cooperative Extension Work in Agriculture and Home Economics, F. E. Price, Director. Oregon State College and the United States Department of Agriculture cooperating. Printed and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914.

Extension Bulletin 716 May 1951

Cordwood Volume Table for Second Growth Douglas-Fir Trees

Inches DBH	Total height of tree in feet												
	30	40	50	60	70	80	90	100	110	120	130	140	150
	Cords per tree												
4	.01	.02	.03	.03	.04	.05							
6	.02	.03	.04	.05	.06	.07							
8	.05	.07	.08	.10	.12	.14	.15						
10	.08	.11	.13	.16	.19	.21	.23	.26	.29	.31			
12	.12	.16	.19	.23	.26	.30	.33	.36	.41	.44			
14	.16	.20	.25	.30	.35	.40	.45	.49	.54	.59	.64	.70	
16		.26	.32	.38	.45	.51	.57	.62	.67	.74	.80	.88	.95
18			.40	.48	.55	.62	.70	.77	.83	.90	.98	1.07	1.17
20			.48	.57	.66	.75	.83	.92	.98	1.07	1.17	1.28	1.39
22			.57	.66	.76	.86	.96	1.05	1.13	1.24	1.35	1.46	1.60
24				.76	.87	.98	1.08	1.17	1.27	1.39	1.50	1.63	1.79

Note: Volume of unpeeled stem between stump height (DBH) and a 4-inch top diameter inside bark; cordwood assumed to be cut in 8-foot lengths. By Staebler and Shaw, Pacific Northwest Forest and Range Experiment Station, February, 1949.

Board Foot Volume Table for Second Growth Douglas-Fir Trees

Inches DBH	Total height of trees in feet																	
	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
	Volume in tens of board feet (add 0 for true volume)																	
12	3	5	7	9	10	12	14	16	18	20	22							
14	5	7	10	13	16	18	20	22	25	28	32	35						
16		10	14	17	20	24	26	30	33	37	41	47						
18			17	22	26	29	33	37	41	46	51	58	64					
20			21	26	31	36	40	44	49	56	62	69	77	85	94			
22				31	37	42	47	52	58	66	73	82	91	101	111			
24					43	49	54	61	68	76	85	95	106	117	130	142	155	
26					49	56	63	69	77	87	97	109	121	135	150	164	179	
28						64	71	78	87	98	110	123	137	154	170	187	205	
30						71	79	88	97	109	123	138	154	172	191	210	231	
32							88	97	108	121	137	153	171	191	210	234	257	278
34							96	106	118	133	151	169	188	209	233	258	283	308
36								116	129	145	163	182	205	228	254	281	310	337
38								126	140	158	175	196	221	246	276	305	336	366
40											187	211	236	265	297	328	362	394

Stump height 2 feet. (Trees scaled in 16-foot logs, with 0.3 foot trimming allowance, to 8 inches diameter inside bark at top, Scribner rule. Volume shown in this table as full scale. No allowance made for defect.) From U. S. Department of Agriculture Technical Bulletin 201.

Measuring TREES and LOGS*

By PAUL N. GOODMONSON
Farm Woodlot Products Marketing Specialist

"Just how much money is my woodlot worth now?" This is a question more and more farmers are asking these days. The best way to answer this question is to go out and find out for yourself what products and what value there is in your woodlot.

The demand for woodlot products is good now and promises to remain so for some time. The demand is so big that practically all woodlot owners have received many offers to buy their entire timber tract. Most of these woodlot owners have expressed surprise at the amount of variation in these offers.

There's good money in timber if it is sold by the board foot, the cord, or the individual tree. Farmers who sell their entire woodlot for one lump sum are very often dissatisfied. Selling the entire woodlot without measuring it is like selling a herd of beef without counting the number of animals. Each individual tree is worth a certain amount of money. Each woodlot contains a variety of products.

Farmers have been dealing with bushels of grain or tons of hay per acre for many years, but seldom do you find a farmer who knows how to estimate or measure the volume and value of the various wood products contained in his farm woods. Only when he investigates the value of the various wood products does he realize the true value from his harvest.

Leroy Radford of Clackamas County is one farmer who knew what forest products his woodlot contained. To even out his berry field and pasture, Mr. Radford needed to clear 2½ acres of timber. This timber was 50-year-old Douglas-fir, growing on good agricultural land. Here is his record:

Saw logs

All merchantable sawlogs to an 8" diameter yielded 55,622 board feet sawlogs.

Stumpage returns at $10 per thousand yielded $556.22 or $222.48 per acre.

The sawlogs were removed by a D-4 Caterpillar. Mr. Radford supervised and assisted in the falling and yarding so that the smaller, remaining trees were not damaged as is usual in most logging opera-

* This bulleting is made available through Extension work partly financed by funds from the Research and Marketing Act of 1946.

tions. From the remaining stand (which usually is left on the ground to rot) Mr. Radford will remove, with his small, farm tractor, these products:

Poles

82 35′ barkie poles

Total value at pole yard ..... $330.05 or $132.02 per acre

Owner's gross value at loading point ..... $229.60 or $ 91.84 per acre

Pulpwood

50 cords of pulpwood

Total value at pulp mill ..... $850.00 or $340.00 per acre

Owner's gross value at loading point ..... $600.00 or $240.00 per acre

By knowing what products his woodlot contained, and by not selling his timber without an inventory, Mr. Radford increased his gross return $930 on just 2½ acres of young timber.

To determine the volume and the products contained in your woodland, a cruise or inventory should be made. This cruise should show the volume in board feet of sawlogs, or in cords of pulpwood and any poles or special products contained. By knowing the size and quality requirements for the various products and the prices, the owner can determine which of these items gives him the greatest cash return. Usually it is best to sell the larger trees as sawlogs and the tops of these trees plus the small trees as pulpwood or poles.

In addition to knowing the volume and the value of his woodlot, a farmer should know something about farming his timber. Timber is just another plant which is growing out of the soil in the very same manner as all the other agricultural crops. By working with nature and the soil, a farmer grows an annual crop of wood. This type of timber management returns much greater income over a period of years. A good inventory, which is kept up to date, is a must in timber farming. As a grocer keeps an inventory of goods on the shelf, so must the timber farmer keep an inventory of trees.

This bulletin is to assist farm woodland owners in learning simple methods of estimating and measuring tree and log volumes. With a little practice, the farm woodland owner can determine the approximate volume of forest products in his woodland, recognize the special products, and measure the logs he has cut for market.

Measuring Volume of Standing Trees

Timber products have usually three methods of measurement. These are the board foot, the cord, and by the piece. A board foot is a piece of board 1 inch thick, 12 inches wide, and 12 inches long.

A cord of wood is the amount of wood that can be put into a pile 4 feet wide, 4 feet high, and 8 feet long. In some limited areas pulpwood is being purchased by weight. This type of measurement, however, is checked against the cubic content of the wood in a normal cord.

To determine the volume of any individual tree requires measuring the diameter and the height of the tree. Volume tables have been constructed showing the volume in either board feet or cords for trees of different diameter and height measurements.

Measuring diameter of standing trees

The diameter of the standing trees is measured to the nearest even-numbered inch outside the bark at a point 4½ feet above the ground. This point, 4½ feet above the average ground line, is referred to as DBH (diameter breast high).

There are a number of different instruments used in measuring diameter but perhaps the most practical one is the steel measuring tape. These special steel tapes for measuring tree diameters are available at most hardware and logging supply stores and are called tree diameter tapes. One alternative is to use a simple device known as a tree caliper for measuring diameters.

Ordinary measuring tapes may be used to measure the circumference of the tree. The measurement of circumference can be converted into tree diameters with the help of this table:

Circumference *Inches*	Diameter *Inches*	Circumference *Inches*	Diameter *Inches*
19	6	75	24
26	8	82	26
31	10	88	28
38	12	94	30
44	14	101	32
50	16	107	34
57	18	113	36
63	20	119	38
69	22	126	40

Care should be taken in putting the tape around the tree to avoid any abnormal diameter readings. If there are branch whorls or any other projections from the bark at 4½ feet (DBH), the measuring tape should be put above them so that the actual average diameter of the tree will be recorded.

Another very rapid method of measuring or estimating the diameter of the standing tree is with the Biltmore Stick.

Measuring heights of standing trees

Seldom is it necessary to measure the total height of a tree. Sawmills do not purchase logs smaller than 6 to 12 inches in diameter at the top end. Pulpmills buy wood with a 4-inch minimum top diameter. Therefore, height measurements should be made to the utilization limit which your particular market allows. Height measurements are sometimes figured on the basis of the number of 16.3-foot logs that can be cut rather than in actual feet and inches.

Making and using a Biltmore Stick

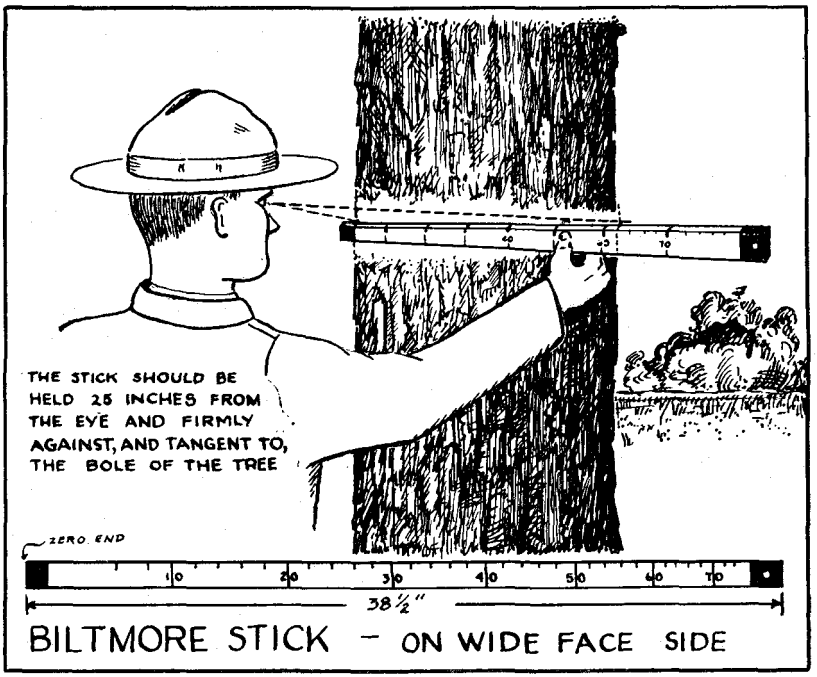
There are a variety of instruments that can be purchased which give very accurate height and diameter measurements. Because of their limited use for other purposes, we will discuss the use of the Biltmore Stick only.

A Biltmore Stick is a scale which helps us to measure tree height and diameters more accurately. It takes very little time or effort to construct one of these very useful tools. Select a straight, sound stick 32 inches long, 1 inch wide and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick. Mark with indelible pencil or ink, one side for diameter measurements and the other side for height measurement.

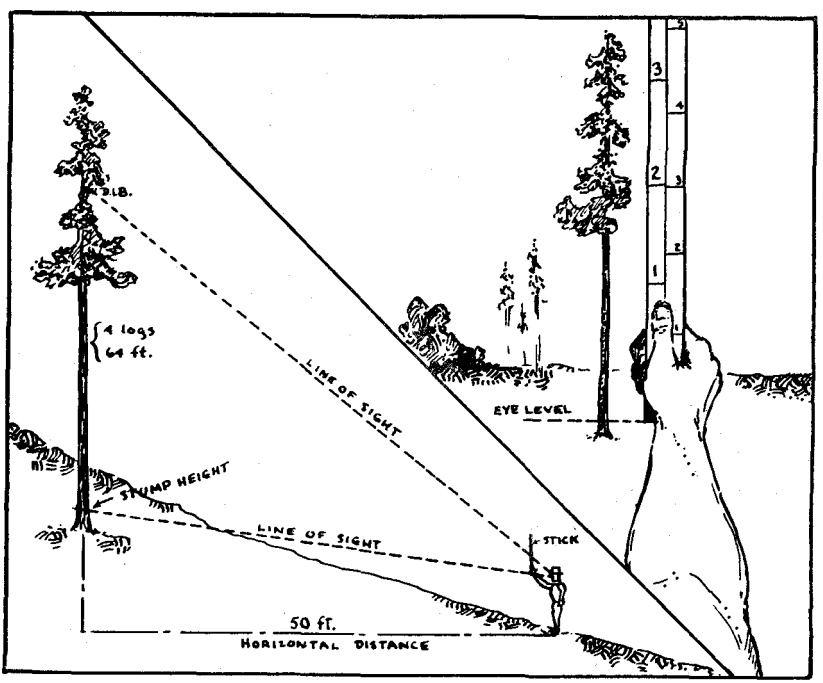
For measuring diameters of trees, mark one end of your stick "0" and measure from this point the distances listed in the following table and print on the proper DBH. This scale gives diameter readings when the stick is held 25 inches away from the eye. Therefore the mark reading 12 inches DBH would be 9.86 inches from the end of your stick and 14 inches DBH would be 11.21 inches and so on.

Actual DBH of tree	Placement of mark on Biltmore Stick*	Actual DBH of tree	Placement of mark on Biltmore Stick*
Inches	*Inches*	*Inches*	*Inches*
6	5.39	30	20.22
8	6.96	32	21.19
10	8.45	34	22.13
12	9.86	36	23.04
14	11.21	38	23.94
16	12.50	40	24.80
18	13.73	42	25.65
20	14.91	44	26.48
22	16.05	46	27.29
24	17.14	48	28.09
26	18.20	50	28.86
28	19.23		

* Marks should be placed this number of inches from the "0" end of stick. Each mark should be labeled with the corresponding number from the left column so as to read direct to the proper diameter of the tree.



BILTMORE STICK – ON WIDE FACE SIDE



With a little bit of practice and using proper caution, very acceptable diameters can be measured by using this stick. Points to remember in using the Biltmore Stick to measure diameters are:

- Keep your eyes level with the stick.
- Check the distance from your eye to the stick.
- Have the stick at right angles to the average diameter of the tree and at right angles to your eye.
- Move your eyes, not your head, when reading from one side to the other.

To graduate the stick for height measurements, begin again at the end of your stick on the reverse side. The graduations which allow height measurements are 6.06 inches for each 16.3 foot log when the distance from the tree is 1 chain (66 feet) and when the stick is held vertically, 25 inches from the eye. Therefore the 2 log mark would be 12.12 inches from the end of your stick, 3 logs would be 18.18 inches, etc. The graduation to use when $1\frac{1}{2}$ chains (99 feet) away from the tree is 2.53 inches for each 16.3-foot log.

The points to be remembered in using a Biltmore Stick for measuring height are:

- Pace as accurately as possible the horizontal distance required away from the tree.
- Check the distance from your eye to the stick.
- Make sure the stick is held straight up and down.
- Move your eyes, not your head, when reading from bottom to top of the stick.
- Know what minimum top diameter you want and carefully estimate this point on the tree.

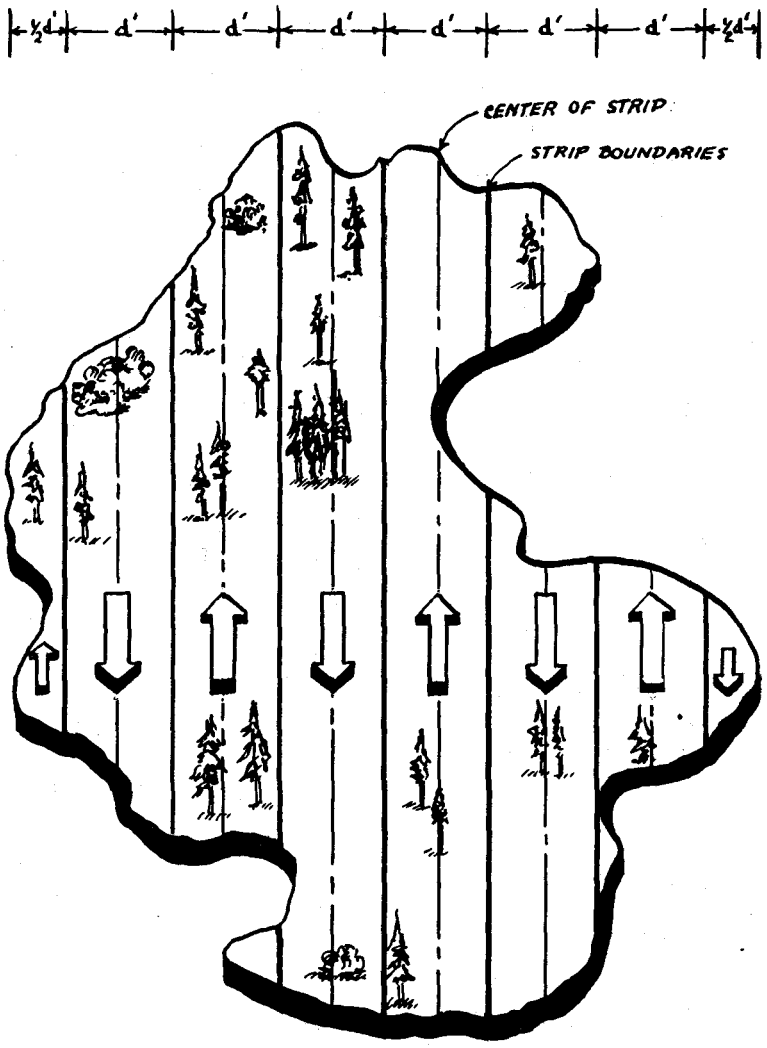
Measuring Volume of Timber Stands

Small woodlots

How much and what type of forest products does my woodlot contain? Before any timber farming can be started, this information must be obtained. Before any timber sales are made this information should be brought up to date.

Many farm woodlands are so small and irregular in shape that the simplest method of getting the volume of the stand is to measure each tree. By determining the volume of each individual tree, the sum of these volumes is the total volume of the woodlot. If the trees are scattered they can be measured without much chance for measuring the same tree twice.

If the trees are close together, much time and many unnecessary steps may be saved by laying out strips across the tract and measuring, individually, each of the trees growing within the strip. In



100% TALLY OF A SMALL IRREGULAR AREA -

average Douglas-fir stands of western Oregon, the most convenient width of such strips is between 60 and 80 feet. Strips in ponderosa pine stands in eastern Oregon may be much wider because the trees and underbrush are more scattered. Trees bordering the next strip

should be measured and blazed lightly on the side facing the next strip. This way on the return trip there will not be any doubt as to which trees were already measured.

In small, open woodlots it may not be necessary to measure each individual tree. Merely count the number of trees and, by measuring a few of them, arrive at the average size of the trees. By multiplying the volume of this average tree by the number of trees on the entire tract, total volume can be calculated.

Many woodlots will contain excessively rough trees, and trees with rot in them. Some of these trees will be of such poor quality that they will be completely unsalable. Others will require some reduction in volume because of partial defects. The amount of these defects must be determined and the volume reduced by this figure.

Many other woodlots will contain old growth snags or windfalls which may have some merchantable volume. The outside appearance of these trees or logs is deceiving. It is necessary either to chop into the tree at several spots or to fall or buck these trees to determine the quality inside. The sapwood may be entirely rotted away while the inside heartwood may be perfectly sound and bright in color.

Another factor which may reduce the volume of any cruise is breakage. On steep ground it is almost impossible to prevent breaking a few trees during falling. With careful falling this breakage will be slight; usually the tops are broken out. If the volume is being determined to an 8-inch top, on steep ground, 5 to 10 per cent of the volume should be deducted to allow for breakage.

Large areas

On large areas, 20 acres or more, it would be impractical to measure or count all the trees. To get the approximate volume of a large area, the simplest method is to estimate the volume on a sample of the forest. You should have sample plots well distributed over each kind of timber to get a good estimate of the volume per acre. These plots should be equally spaced along compass lines; they should not be located by the judgment of what appears to be an "average" part of the forest.

Sample plots give an accurate volume figure for 5 to 10 per cent of the woodland. The remaining acreage is estimated from these figures. It is obvious that unless you have accurate knowledge of the total number of acres in timber, you cannot get an accurate estimate of total volume. It may be necessary to traverse your timber area using a compass and chain. Perhaps the most rapid method of determining total area is by consulting an aerial photograph. The technicians of the Soil Conservation Service or Produc-

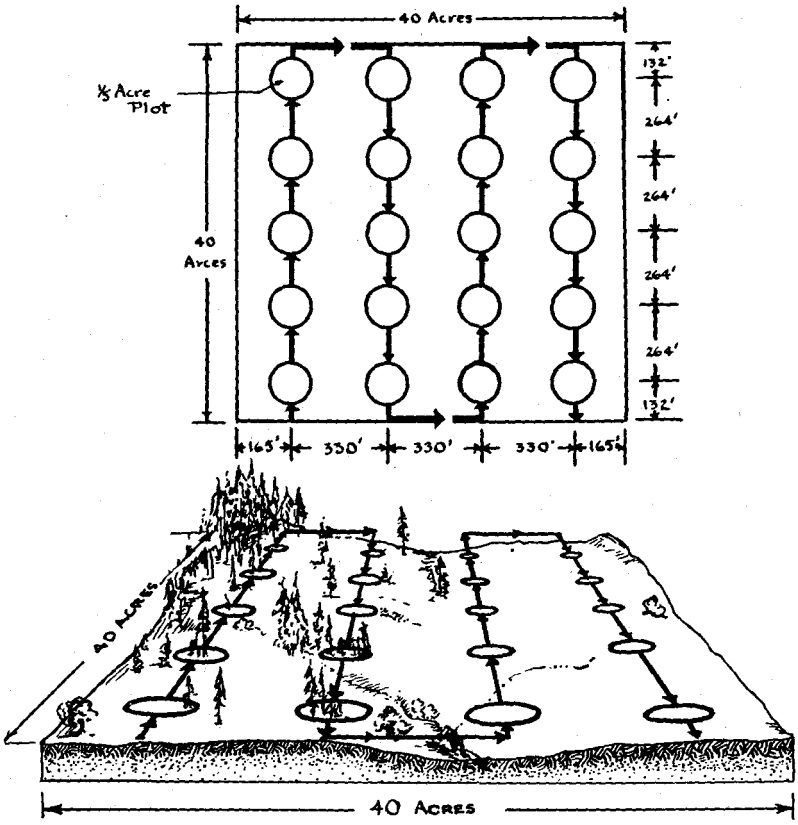
tion Marketing Administration have photos and would be ready to assist the landowner in determining accurately his acreage in timber stands.

To record the volume on the sample area, you measure the diameter of each tree and estimate the average merchantable height of the trees in each diameter class. By using the volume tables you can figure the volume per sample, then the volume per acre, and finally the total volume of your timberland.

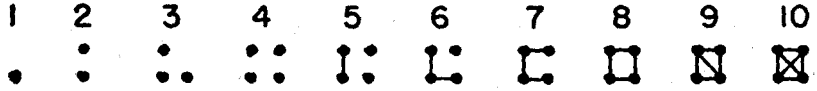
Circular plots are perhaps the easiest and most accurate for sampling timberlands. For young, second growth timber, where there are many trees per acre, a 1/10th- or 1/20th-acre plot is most practical. For older and larger timber where there are less than 100 trees per acre, the plots should be increased to about 1/5 acre in size. Dimensions of these circular plots are 1/20th-acre plot, 26.3 feet in radius; 1/10th-acre plot, 37.2 feet in radius; and 1/5th-acre plot, 52.7 feet in radius.

The following diagram shows an ideal plot arrangement for a 40-acre tract of timber. It is desirable to have this plan well in mind before beginning cruising. By mechanically selecting your plots in this manner, a much more accurate sample can be taken. One man can do the cruising alone but a two-man crew is better. It takes a certain amount of practice before one man can get much speed in cruising, and on steep ground it is much more desirable to have one man responsible for running the compass and tallying, and the other man taking the measurements.

In laying out a large area to sample, start from a known point, preferably a one-quarter or a section corner. Lay out your compass lines so you cross the drainage. This way you sample the timber along the creeks, on the slopes and the ridge tops. With a compass, pace or measure with a tape along the survey line into the timber one-half a tally (165 feet). Then turn at right angles and begin your sampling. Run the compass line into the timber one-half tally (165 feet) and mark this point as the center of your first plot. It is well to put up a stake or something which can be seen from the edges of the plot so that the plot center will always be in view. Measure the plot radius in several directions, marking these points and noting especially boundary trees. On steep ground use horizontal distance to measure your plot radii. In a two-man crew the tally man should stand at the center of the plot and check the measurements as they are made. Start at a natural breaking point in the plot and measure the trees either clockwise or counterclockwise around the plot up to this natural identifying mark. Tally all the trees within the plot by 2-inch-diameter classes and measure heights to the minimum top



diameter of several average trees in each plot. A convenient way to tally the trees is by the dot and dash method, in which: 1 dot equals 1 tree, 2 dots equal 2 trees. A dash also equals 1 tree and saves confusion in counting an irregular pattern of dots. A little practice and these symbols can be read at a glance:



After all the trees have been measured in this first plot, move on to the next one. The next plot should be along the main compass line, one tally (330 feet). Mark this point as plot center and repeat the procedure used in plot No. 1. Follow through this com-

pass line until you come to the edge of the timber or the edge of the legal subdivision, then turn at right angles and go one tally and turn back to parallel the previous compass line, taking plots in the same fashion. By running these parallel compass lines and plots through the timber, a very reliable sample may be obtained.

Yield Tables

In second growth Douglas-fir stands, the number of trees per acre, diameter, height, and age of the trees is very often quite similar. If the general reconnaissance of the entire timber area shows that the timber is very uniform in size and height, then these prepared yield tables will give a very close approximation for the volume per acre for dense stands on average western Oregon soils. Very good, dense stands may produce almost twice the amounts shown. Poor, open stands may yield only half as much as is shown.

EXPECTED YIELD PER ACRE FROM DOUGLAS-FIR FORESTS AT DIFFERENT AGES[1]

Age of trees	Yield per acre	
	Cordwood[2]	Saw timber[3]
	Cords	*Board feet*
20 years	6	.....
30 years	24	500
40 years	48	5,400
50 years	72	14,300
60 years	91	26,500
70 years	107	37,900
80 years	120	47,800
90 years	131	55,800
100 years	141	61,900
110 years	150	66,700
120 years	157	70,500

[1]Derived from U. S. Department of Agriculture Technical Bulletin 201.
[2]In trees 6 inches and larger in diameter.
[3]In trees 12 inches and larger in diameter.

This table shows also the tremendous growth rate of young timber stands. Notice that from age 40 to 60, the cordwood volume doubles and the sawlog volume is five times larger. Also notice that this growth rate continues at a very satisfactory rate up through 100 years. By careful study of this table and applying its figures to your own timberlands, it is easy to see that clear-cutting a stand of 40- to 60-year-old timber is about like mowing your hay crop before it reaches half of its normal height or volume growth.

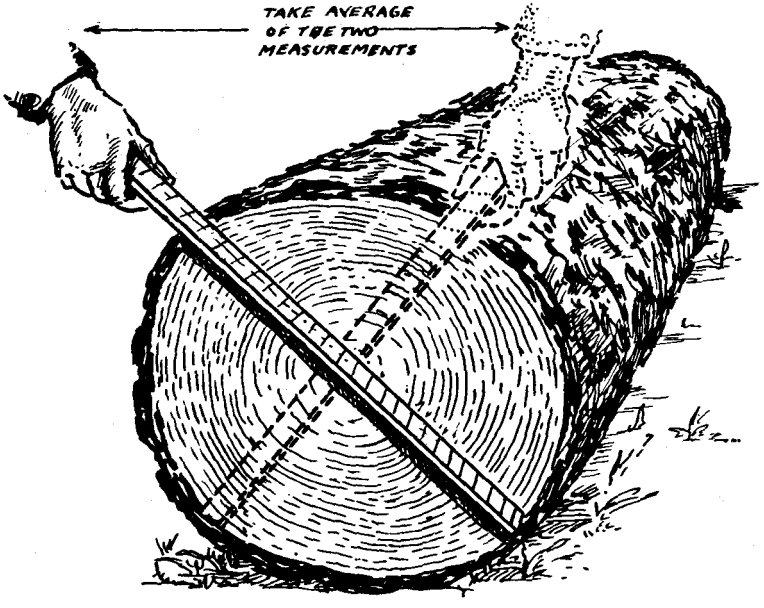
Volume of Logs

The volume of felled and bucked logs is generally measured in board feet. This volume is determined by measurements which are called scaling, in which you measure the length in feet and the diameter inside bark in inches at the small end, and read the volume from a log rule.

Log lengths are measured by two-foot intervals and a few inches is allowed for trimming. This trim is left because sawmills square off the boards cut from the log at exactly two-foot intervals. This would mean that a 16-foot log should actually be about 16 feet and 8 inches long. When logs are longer than 40 feet, additional trim allowance is required.

A measurement of diameters at the small end is the general practice in this area. The small end of the log is measured because in sawing no boards are generally obtained from the taper or slab. With oval shaped logs an average diameter is determined and is used in finding the log volume.

If a log is defective, that is, scarred by fire or partially rotted, a deduction for this defect should be made from the total log volume. Deducting for defects requires a great deal of experience in scaling. If logs are defective, you should talk with the prospective log buyer



and agree on procedure to be used in deducting for the defects. If there are defects in major portions of the stand, it would be well to consult a local forester about steps to buck out a lot of this defect and of methods of deducting from the scale.

Use of Volume Tables and Log Rules

A volume table gives the number of board feet or the cord content of an entire tree. A log rule gives the average number of board feet or cords in individual logs. These tables are made by scaling a large number of trees or logs, finding the number of board feet in each, then grouping those of the same size together and averaging them. Trees differ in shape, and even those of the same height and diameter will vary a good deal in contents, but on most trees that are measured the averages are fairly dependable.

There are many different rules in existence today which will give different volumes for the same log. The most commonly used tables, however, have been selected for use in this bulletin. The four tables included are:

- Cordwood Volume Table for Second Growth Douglas-Fir Trees
- Board Foot Volume Table for Second Growth Douglas-Fir Trees
- Scribner Decimal C Log Rule for Douglas-Fir
- Scribner Decimal C Log Rule for Ponderosa Pine

The first two tables are to be used when determining the volume of individual trees or entire timber tracts. Cordwood volume tables indicate the amount of pulpwood in each tree. The board foot volume table for whole trees indicates the amount of lumber which can be cut from these trees. The Scribner Decimal C log rules are to be used only for determining the volume of individual logs of both Douglas-fir and ponderosa pine.

To determine the cordwood volume of a tree, read the note at the bottom of the table. To estimate the total height of the tree, this table assumes that everything down to 4 inches in top diameter will be used; also that the stump will be about as high as the tree is big in diameter breast high. Therefore to figure the volume by this table it will require measuring the diameter at breast height and estimating the total height from the stump to 4 inches top diameter. To illustrate, a 20-inch tree that is 100 feet tall between stump and 4 inches top diameter contains .92 cord.

To determine the volume of this same tree by board foot volume table, the diameter would be the same but the note at the base of the table says that stump height is 2 feet and the tree is assumed to be cut off at 8 inches top diameter. This would give you a total height

between stump and 8 inches top diameter of about 90 feet. Therefore the volume of this 20-inch DBH tree with the total height of 90 feet will give you 310 board feet.

Using the log rule, the two measurements required are diameter inside the bark at the small end of the log and the total length less the trim allowance. To illustrate, a log which is 20 inches top diameter and 16 feet long contains 280 board feet.

Size Specifications for Forest Products

Each woodlot contains a variety of products and each individual tree has a specific use and value. To assist the landowner in determining what forest products are contained in his woodlot, a very brief listing of the size requirements for the different products is included.

Old growth

Woodlots containing old growth trees, that is, trees of very large sizes, generally will produce sawlogs or peelers. Old growth sawlogs are graded according to their minimum length and diameters and the quality of lumber which they will produce. These different grades are quite detailed and if any large quantity of old growth trees are present it would be best to talk with a log grader or forester to determine the quality of logs present. Peeler logs are old growth logs of exceptionally high quality with very few, if any, knot indicators.

Second growth

Second growth sawlogs are graded according to knot size and ring count. Only the large saw mills grade second growth sawlogs. Most mills prefer logs 16 feet or longer with minimum top diameters ranging from 8 to 12 inches.

Pulpwood

Pulpwood is bought as logs or in cords of 4- and 8-foot lengths. When old growth logs are of such low quality that they will not meet requirements for sawmill logs, they may be sold as pulpwood logs. In this case they are graded and scaled by the same rules used in grading sawlogs. Second growth pulpwood is sold in either 4- or 8-foot lengths and in some cases longer logs. When the timber is green and with very little or no rot, the minimum accepted is 4 inches top diameter. In many of the companies there is a maximum diameter at the large end; some of these companies cannot handle pulpwood any larger than 18 to 24 inches and all logs larger than

this must be split. Species most used for pulpwood are: hemlock, white fir, spruce, and Douglas-fir. There are certain requirements from each mill for hardwood species such as alder and cottonwood. Before the hardwood species are cut for pulpwood it is best to check with the prospective purchaser.

Poles

Poles have very rigid specifications that are rather complicated. The pole dealers have set up size classes and require straight, uniform trees free from defects and excessive roughness. Before poles are cut, detailed specifications and orders should be obtained from the pole dealer. In general the smaller poles will fall into the following measurement classes:

Length	Minimum top circumference outside bark	Approximate diameter	Circumference 6 feet from butt—outside bark	Approximate diameter
	Inches	*Inches*	*Inches*	*Inches*
30 feet	18	5.8	28 to 32	9.0 to 10.2
35 feet	18	5.8	29½ to 34	9.4 to 10.9
40 feet	25	8.0	39 to 45	12.5 to 14.4
45 feet	25	8.0	41 to 47	13.1 to 15.0

Piling

Piling generally is cut to order with definite specifications for each order. It becomes necessary, therefore, to secure orders from the pole company for a definite number of certain size piling. Piling, the same as poles, must be quite straight and uniform and free from defects. The following table lists minimum specifications which the timber should meet before any piling is cut.

Length	Minimum diameter at butt*	Maximum diameter at butt*	Minimum diameter at top*
	Inches	*Inches*	*Inches*
Under 40 feet	14	18	10
40 to 50 feet	14	18	9
50 to 70 feet	14	18	8
70 to 90 feet	14	18	7
Over 90 feet	14	20	6

* Inside bark.

Scribner Decimal C Log Rule for Douglas-Fir

Inches diameter inside bark*	Length of log in feet												
	8	10	12	14	16	18	20	22	24	26	28	30	32
	Volume in tens of board feet (add 0 for true volume)												
8	1	2	2	2	3	3	3	4	4	5	6	6	7
10	3	3	3	4	6	6	7	8	9	9	10	11	12
12	4	5	6	7	8	9	10	11	12	13	14	15	16
14	6	7	9	10	11	13	14	16	17	19	20	21	23
16	8	10	12	14	16	18	20	22	24	26	28	30	32
18	11	13	16	19	21	24	27	29	32	35	37	40	43
20	14	17	21	24	28	31	35	38	42	45	49	52	56
22	17	21	25	29	33	38	42	46	50	54	58	63	67
24	21	25	30	35	40	45	50	55	61	66	71	76	81
26	25	31	37	44	50	56	62	69	75	82	88	94	100
28	29	36	44	51	58	65	73	80	87	95	102	109	116
30	33	41	49	57	66	74	82	90	99	107	115	123	131
32	37	46	55	64	74	83	92	101	110	120	129	138	147
34	40	50	60	70	80	90	100	110	120	130	140	150	160
36	46	58	69	81	92	104	115	127	138	150	161	173	185
38	54	67	80	93	107	120	133	147	160	174	187	200	214
40	60	75	90	105	120	135	150	166	181	196	211	226	241

* Small end of log.

Scribner Decimal C Log Rule for Ponderosa Pine

Inches DBH outside bark	Number of 16-foot logs in tree								
	1	2	3	4	5	6	7	8	9
	Volume in board feet								
8	20	50							
10	30	60	100						
12	40	70	120	180					
14	50	90	150	220	280				
16	60	100	180	270	340	420			
18	70	120	220	320	420	520			
20	90	140	260	390	510	640	750		
22	110	170	310	460	620	780	910		
24	130	200	370	560	740	940	1,120		
26	150	230	440	660	890	1,120	1,340		
28	170	270	520	780	1,050	1,320	1,600	1,860	
30	210	310	600	900	1,210	1,540	1,870	2,180	
32	250	350	680	1,030	1,390	1,770	2,140	2,500	2,800
34		390	770	1,160	1,570	2,000	2,420	2,820	3,180
36		430	870	1,290	1,760	2,240	2,700	3,150	3,560
38		480	950	1,440	1,950	2,480	2,970	3,480	3,950
40			1,040	1,580	2,150	2,720	3,260	3,820	4,350

Sample Tally Sheet

Location: ..... Sec. ..... T. ..... R. ..... W.M.

Date: ..... Species .....

Plot size: ..... acres No. Plots ..... Area of sample ..... acres

Inches DBH	Number of trees D.-Fir H. C.	Ht. Class	Volume per tree		Total volume	
			Cords	Board feet	Cords	Board feet
4						
6						
8						
10						
12						
14						
16						
18						
20						
22						
24						
26						
28						
30						

Total trees on plots ..... Total volume .....

Average trees per acre ..... Average volume per acre .....