

University of Minnesota
Agricultural Experiment Station

Volume, Yield, and Stand Tables
for Tree Species in the Lake
States

COMPILED BY

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INTRODUCTION

A knowledge of the contents of standing trees, whether in board measure, cubic feet, cords, ties, or other forest products, is basic to any woods operation. Tables showing the contents of average trees of given sizes according to some unit of measure are known as volume tables. Such tables are used in estimating the amount of standing timber for purposes of purchase or sale and for logging operations; to determine the stand and growth of timber for the purpose of appraisal of fire damage, trespass, and forest valuation, and management in general; and also for all kinds of scientific studies involving volume, growth and yield. The need of volume tables is therefore apparent.

The purpose of this revision is twofold: (1) to supply the recent increase in demand for the original bulletin, which is out of print; and (2) to make available all the recently compiled volume, yield and stand tables for the Lake States tree species. Some of these tables are preliminary in nature, but in the absence of more reliable tables they fill a definite need. The number of volume tables in this revised edition has been increased from 93 to 136. In addition, normal stand and yield tables for aspen, jack pine, white pine, and oaks are included.

Application of Volume Tables

All volume tables have limitations. For this reason, their use requires judgment and a knowledge of the conditions under which they are to be applied.

Volume tables give average values based on measurements taken on a large number of felled trees. It cannot be expected, therefore, that a single tree taken at random will have the exact contents given in the table. On the contrary, these average values must be applied to a large number of trees in order to obtain a fairly reliable estimate of the contents of standing timber.

Whenever it is possible, the applicability of any volume table should be checked by comparing the table values with actual tree volumes. If the average deviation of the felled trees does not differ considerably from that of the table, and if their aggregate difference is not more than $2\frac{1}{2}$ times the average deviation of the table divided by the square root of the number of test trees, then the volume table in question may be considered applicable to the locality. If this test is not satisfactory, plot tree volumes over table volumes and correct the table by means of this curve.

Most of the volume tables presented in this publication are based on diameter breast high and total or merchantable height. Some of the tables, called Girard form-class volume tables, also take into account the form of the trees, which is expressed as the ratio of the diameter inside the bark at the small end of the butt 16-foot log to the diameter outside the bark at breast height. This ratio is the Girard form quotient. If properly used, these form-class

tables give a more accurate estimate of volume. To apply them, it is necessary to determine the average form quotient of each species in a given locality, preferably by diameter breast high classes. These average form quotients should be smoothed out by plotting them over diameter breast high. The volumes corresponding to these smoothed values are then obtained by interpolating between the form-class volume tables given in the text.

The composite form-class taper table, Table 150, can be used in an emergency to prepare a volume table based on 16-foot logs, if a table is not available for a given species. To do this, determine the average Girard form-class of the species by diameter classes and from the composite taper table obtain the relative taper measurements for the average form by interpolation. Assume diameters breast high and compute the absolute taper table by multiplying these diameters by the relative taper measurements. To prepare the volume table, scale this taper table by the required log rule.

Application of Normal Yield Tables

Normal yield tables show the average amount of timber produced per acre in a given time by fully-stocked stands growing on different qualities of site. A fully-stocked stand is one in which the trees fully utilize the available growing space and produce the largest amount of wood in a given time.

Yield tables for even-aged, fully-stocked stands of aspen, jack pine and mixed oaks in the Lake States are presented in this bulletin.

Determination of the Productive Capacity of Forest Land Site Index

The height of the average dominant trees has been accepted by foresters as a good index of the productive capacity of forest land. However, before the heights of stands of different ages can be used as an index of site, they must be changed to heights produced in equal periods of time, such as 50 or 100 years. This average height of the dominant trees at 50 or 100 years is the site index. The yield tables in this bulletin are based on a 50-year site index.

For the classification of forest lands on forest or economic surveys, or for forest management purposes, it is necessary to assign an area only to a broad productivity class, such as a poor, good or medium site, or to a ten-foot site index class. For this purpose the determination of the site index for a given stand can be based upon the heights and ages of about a dozen or more average dominant* trees. The ages can be obtained with an increment borer. The time required to grow to the height at which the boring is taken should be added to the age of the core to obtain the total age. The site quality of the area is then determined by plotting the height over age on the site index graph for the given species as shown in Figure 5.

Quite frequently, however, the research forester needs a more exact quantitative measure of forest productivity for use in his investigations. For

*Dominant trees that have not been affected by previous suppression, fire damage, disease or cuttings should be used to determine site.

for this purpose, the site index is usually determined to the nearest foot as follows: Sample areas, confined to a single soil type, or topographical unit, are located in pure even-aged, fully-stocked stands of the given species. On these sample areas all the trees one inch and over are tallied by diameter classes within crown classes. In this work, only three crown classes are recognized—dominant, intermediate, and suppressed. The dominant trees are tallied separately. Enough heights are then measured to obtain a well-defined, diameter-height curve for the range of diameters in the stand. The average age of the stand is determined by the method given in the foregoing section.

The average diameter of the dominant trees is found by computing their average basal area and looking up in the basal area table the average diameter corresponding to this average. The height of the dominant tree having this average diameter is read from the height curve. By the use of this height and the average age of the stand, the site index of area is determined from the site index graph.

The method of obtaining the site index to the nearest foot from a site index graph is illustrated by the following example: Suppose that the average age of a fully-stocked stand of white pine is 61 years and that the height of its average dominant tree is 66 feet. Turning to the site index graph for second-growth white pine in Wisconsin, page 201, 61 years is located on the age scale and 66 feet on the height scale. Perpendicular lines are then extended from these two points until the lines cross at point A. Now, if another line is drawn from zero through point A, the height that the average dominant tree had at 50 years can be read where this line crosses the heavy vertical line drawn upward from age 50. The site index, as shown, is 55, and represents the height of an average dominant tree attained at the age of 50 years. In other words, this stand is growing on 55-foot white-pine land.

Prediction of Total Yield in Under-Stocked Stands

The majority of forest stands throughout the Lake States are under-stocked. Therefore, before an estimate of their future yields can be made, the degree to which they are under-stocked must be determined. This is done by comparing the total basal area per acre of the actual stand with the basal area given in the yield table for a fully-stocked stand. For example: A fully-stocked white pine stand 70 years old with a site index of 60 should have a total basal area of 250 square feet per acre. If, instead, the stand has a basal area of only 180 square feet per acre, it is obviously only 72 per cent normal, or 28 per cent under-stocked. The ratio of the actual to the normal stand basal area is known as the density index. Usually it is conservatively assumed that this same stand will still be 72 per cent normal in the future and contain 72 per cent of the volume given in the yield table. For example: The yield of a normal fully-stocked stand of white pine 90 years old on 60-foot land is 10,400 cubic feet. Seventy-two per cent of 10,400 cubic feet is 7,500 cubic feet, which is the amount of wood that may be expected 20 years hence from this stand now 70 years old.

Stand Tables for Fully-Stocked Stands and Their Application

One of the most useful applications of stand tables is in connection with the modification of yield tables for different diameter breast high limits. This

correction can be made as follows by using the percentage stand tables accompanying each yield table and the percentage diameter-height curve presented in Table 178.

The average diameter breast high and the total number of trees per acre one inch and over are obtained from the yield table for a fully-stocked stand of the required age and site index. The absolute stand table for this average diameter and number of trees is next prepared by multiplying the total number of trees by the percentages or relative diameters given for each diameter class in the stand table for the given species. Next, the average diameter is multiplied by the relative diameters in Table 178 to obtain the absolute diameter-class values. The heights corresponding to these diameters are then obtained by multiplying the average height of the total stand, found in the yield table for the given age and site, by the percentages of average height from Table 178. The height-over-diameter curve is secured by plotting these heights over their corresponding diameters. By the use of the appropriate volume table, the yield to the required diameter limit can easily be computed. If the actual yield is wanted, a density index can be applied to this corrected yield for a fully-stocked stand. The same type of correction can be used to modify a yield table for different top diameter limits by merely applying a volume table to the required top diameter.

Table 1
AREA OF CIRCLES IN SQUARE FEET

(Basal area table)

Diameter	Diameter—tenths of inches									
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Inches	Area—square feet									
1.....	0.006	0.007	0.008	0.009	0.011	0.012	0.014	0.016	0.018	0.020
2.....	.022	.024	.026	.029	.031	.034	.037	.040	.043	.046
3.....	.049	.052	.056	.059	.063	.067	.071	.075	.079	.083
4.....	.087	.092	.096	.101	.106	.110	.115	.121	.126	.131
5.....	.136	.142	.147	.153	.159	.165	.171	.177	.184	.190
6.....	.196	.203	.210	.216	.223	.230	.238	.245	.252	.260
7.....	.267	.275	.283	.291	.299	.307	.315	.323	.332	.340
8.....	.349	.358	.367	.376	.385	.394	.403	.413	.422	.432
9.....	.442	.452	.462	.472	.482	.492	.503	.513	.524	.535
10.....	.545	.556	.568	.579	.590	.601	.613	.625	.636	.648
11.....	.660	.672	.684	.697	.709	.721	.734	.747	.760	.772
12.....	.785	.799	.812	.825	.839	.852	.866	.880	.894	.908
13.....	.922	.936	.950	.965	.979	.994	1.009	1.024	1.039	1.054
14.....	1.069	1.084	1.100	1.115	1.131	1.147	1.163	1.179	1.195	1.211
15.....	1.227	1.244	1.260	1.277	1.294	1.310	1.327	1.344	1.362	1.379
16.....	1.396	1.414	1.431	1.449	1.467	1.485	1.503	1.521	1.539	1.558
17.....	1.576	1.595	1.614	1.632	1.651	1.670	1.689	1.709	1.728	1.748
18.....	1.767	1.787	1.807	1.827	1.847	1.867	1.887	1.907	1.928	1.948
19.....	1.969	1.990	2.011	2.032	2.053	2.074	2.095	2.117	2.138	2.160
20.....	2.181	2.204	2.226	2.248	2.270	2.292	2.315	2.337	2.360	2.383
21.....	2.405	2.428	2.451	2.475	2.498	2.521	2.545	2.568	2.592	2.616
22.....	2.640	2.664	2.688	2.712	2.737	2.761	2.786	2.810	2.835	2.860
23.....	2.885	2.910	2.936	2.961	2.986	3.012	3.038	3.064	3.089	3.115
24.....	3.142	3.168	3.194	3.221	3.247	3.275	3.301	3.328	3.355	3.382

Diameter	Area	Diameter	Area	Diameter	Area	Diameter	Area	Diameter	Area
Inches	Sq. ft.	Inches	Sq. ft.	Inches	Sq. ft.	Inches	Sq. ft.	Inches	Sq. ft.
25.....	3.41	32	5.59	39	8.30	46	11.54	53	15.32
26.....	3.69	33	5.94	40	8.73	47	12.05	54	15.90
27.....	3.98	34	6.30	41	9.17	48	12.57	55	16.50
28.....	4.28	35	6.68	42	9.62	49	13.10	56	17.10
29.....	4.59	36	7.07	43	10.08	50	13.64	57	17.72
30.....	4.91	37	7.47	44	10.56	51	14.19	58	18.35
31.....	5.24	38	7.88	45	11.04	52	14.75	59	18.99

Area in square feet=.00545D².
D is the diameter in inches.

Table 2
CYLINDER VOLUMES

Diameter	Length—feet						
	4	6	8	10	12	14	16
	Volume—cubic feet						
Inches							
2	0.09	0.13	0.17	0.22	0.26	0.31	0.35
3	0.20	0.29	0.39	0.49	0.59	0.69	0.79
4	0.35	0.52	0.70	0.87	1.05	1.22	1.40
5	0.55	0.82	1.09	1.36	1.64	1.91	2.18
6	0.79	1.18	1.57	1.96	2.36	2.75	3.14
7	1.07	1.60	2.14	2.67	3.21	3.74	4.28
8	1.40	2.09	2.79	3.49	4.19	4.89	5.59
9	1.77	2.65	3.53	4.42	5.30	6.19	7.07
10	2.18	3.27	4.36	5.45	6.54	7.64	8.73
11	2.64	3.96	5.28	6.60	7.92	9.24	10.6
12	3.14	4.71	6.28	7.85	9.42	11.0	12.6
13	3.69	5.53	7.37	9.22	11.1	12.9	14.8
14	4.28	6.41	8.55	10.7	12.8	15.0	17.1
15	4.91	7.36	9.82	12.3	14.7	17.2	19.6
16	5.59	8.38	11.2	14.0	16.8	19.6	22.3
17	6.31	9.46	12.6	15.8	18.9	22.1	25.2
18	7.07	10.6	14.1	17.7	21.2	24.7	28.3
19	7.88	11.8	15.8	19.7	23.6	27.6	31.5
20	8.73	13.1	17.4	21.8	26.2	30.5	34.9
21	9.62	14.4	19.2	24.0	28.9	33.7	38.5
22	10.6	15.8	21.1	26.4	31.7	37.0	42.2
23	11.5	17.3	23.1	28.8	34.6	40.4	46.2
24	12.6	18.8	25.1	31.4	37.7	44.0	50.3
25	13.6	20.4	27.3	34.1	40.9	47.7	54.5
26	14.8	22.1	29.5	36.9	44.2	51.6	59.0
27	15.9	23.9	31.8	39.8	47.7	55.7	63.6
28	17.1	25.7	34.2	42.8	51.3	59.9	68.4
29	18.4	27.5	36.7	45.9	55.0	64.2	73.4
30	19.6	29.4	39.3	49.1	58.9	68.7	78.5
31	21.0	31.4	41.9	52.4	62.9	73.4	83.9
32	22.3	33.5	44.7	55.8	67.0	78.2	89.4
33	23.8	35.6	47.5	59.4	71.3	83.2	95.0
34	25.2	37.8	50.4	63.0	75.7	88.3	100.9
35	26.7	40.1	53.4	66.8	80.2	93.5	106.9
36	28.3	42.4	56.6	70.7	84.8	99.0	113.1

Volume in cubic feet = .00545D²L.
D is the diameter in inches.
L is the length in feet.

Table 3
THE INTERNATIONAL LOG RULE

[Saw kerf 1/4 inch]

Top diameter	Length of log in feet							Top diameter
	8	10	12	14	16	18	20	
	Volume—board feet							
Inches								
4								
5	5	5	5	5	5	10	4	
6	6	6	10	10	10	15	5	
7	10	10	15	15	20	25	6	
8	10	15	20	25	30	35	7	
9	15	20	25	35	40	45	8	
10	20	30	35	45	50	60	9	
11	30	35	45	55	65	75	10	
12	35	45	55	70	80	95	11	
13	45	55	70	85	95	110	12	
14	55	70	85	100	115	135	13	
15	65	80	100	115	135	155	14	
16	75	95	115	135	160	180	15	
17	85	110	130	155	180	205	16	
18	95	125	150	180	205	235	17	
19	110	140	170	200	230	265	18	
20	125	155	190	225	260	300	19	
21	135	175	210	250	290	330	20	
22	155	195	235	280	320	365	21	
23	170	215	260	305	355	405	22	
24	185	235	285	335	390	445	23	
25	205	255	310	370	425	485	24	
26	220	280	340	400	460	525	25	
27	240	305	370	435	500	570	26	
28	260	330	400	470	540	615	27	
29	280	355	430	510	585	665	28	
30	305	385	465	545	630	715	29	
31	325	410	495	585	675	765	30	
32	350	440	530	625	720	820	31	
33	375	470	570	670	770	875	32	
34	400	500	605	715	820	930	33	
35	425	535	645	760	875	990	34	
36	450	565	685	805	925	1050	35	
37	475	600	725	855	980	1115	36	
38	505	635	770	905	1040	1175	37	
39	535	670	810	955	1095	1245	38	
40	565	710	855	1005	1155	1310	39	
41	595	750	900	1060	1220	1380	40	

Shrinkage allowance: 1/8-inch per 1-inch board.
Taper allowance: 1/4-inch per 4-foot section.
Formula for 4-foot sections: (.22D² - .71D).9048.

Table 4
SCRIBNER DECIMAL C LOG RULE

Top diameter	Length—feet										Top diameter
	6	8	10	12	14	16*	18	20	22	24	
Contents—board feet, in tens											
Inches											Inches
6	0.5	0.5	1	1	1	2	2	2	3	3	6
7	.5	1	1	2	2	3	3	3	4	4	7
8	1	1	2	2	2	3	3	3	4	4	8
9	1	2	3	3	3	4	4	4	5	6	9
10	2	3	3	3	4	6	6	7	8	9	10
11	2	3	4	4	5	7	8	8	9	10	11
12	3	4	5	6	7	8	9	10	11	12	12
13	4	5	6	7	8	10	11	12	13	15	13
14	4	6	7	9	10	11	13	14	16	17	14
15	5	7	9	11	12	14	16	18	20	21	15
16	6	8	10	12	14	16	18	20	22	24	16
17	7	9	12	14	16	18	21	23	25	28	17
18	8	11	13	16	19	21	24	27	29	32	18
19	9	12	15	18	21	24	27	30	33	36	19
20	11	14	17	21	24	28	31	35	38	42	20
21	12	15	19	23	27	30	34	38	42	46	21
22	13	17	21	25	29	33	38	42	46	50	22
23	14	19	23	28	33	38	42	47	52	57	23
24	15	21	25	30	35	40	45	50	55	61	24
25	17	23	29	34	40	46	52	57	63	69	25
26	19	25	31	37	44	50	56	62	69	75	26
27	21	27	34	41	48	55	62	68	75	82	27
28	22	29	36	44	51	58	65	73	80	87	28
29	23	31	38	46	53	61	68	76	84	91	29
30	25	33	41	49	57	66	74	82	90	99	30
31	27	36	44	53	62	71	80	89	98	106	31
32	28	37	46	55	64	74	83	92	101	110	32
33	29	39	49	59	69	78	88	98	108	118	33
34	30	40	50	60	70	80	90	100	110	120	34
35	33	44	55	66	77	88	98	109	120	131	35
36	35	46	58	69	81	92	104	115	127	138	36
37	39	51	64	77	90	103	116	129	142	154	37
38	40	54	67	80	93	107	120	133	147	160	38
39	42	56	70	84	98	112	126	140	154	168	39
40	45	60	75	90	105	120	135	150	166	181	40

*When smooth values are needed for 16-foot logs, use the following formula:
B.M. = .79D² - 2D - 4. D is the top diameter inside bark in inches.

VOLUME TABLES

Table 5
OLD-GROWTH BLACK ASH
(Fraxinus nigra)

VOLUME IN BOARD FEET

New Hampshire, New York, Michigan, Indiana

Sterrett Barrows		1912										Scribner Decimal C	
Diameter breast high	Number of 16-foot logs										Top diameter inside bark	Basis	
	2	2½	3	3½	4	4½	5	5½	6				
	Volume—board feet, in tens												
Inches	3.8	5.2	6.5								Inches	Trees	
8	3.8	5.2	6.5								6	4	
9	4.2	5.7	7.2								6	6	
10	4.7	6.3	8	10							6	8	
11	5.3	7	9	12							6	5	
12	5.9	8	10	13	16						6	10	
12	6.6	9	11	15	18						6	16	
14	7.4	10	13	17	20	23					6	4	
15	8.3	11	15	19	23	26					6	9	
16	9.3	13	17	21	25	29	34				6	12	
17		14	19	24	28	33	37				6	4	
18		16	21	27	32	36	42	46			6	7	
19		18	24	30	36	40	46	51			6	5	
20		19	27	34	40	45	51	57	61		6	3	
21			30	38	44	50	57	63	68	7	8		
22			34	43	50	56	63	70	75	7	2		
23			38	49	56	63	70	77	83	8	2		
24			43	55	63	71	77	85	92	9	1		
25				62	70	79	86	94	102	9	2		
26				69	78	87	95	103	112	10	1		
27				77	86	96	104	113	122	10	2		
28				85	95	105	114	124	134	11	1		
29				93	104	114	124	135	145	11	1		
30				102	113	123	134	146	157	12	1		
Basis												114	

Trees 75 to 300 years old. Stump height, 1 foot. Based on taper curves compiled by W. B. Barrows; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Grafton County, N. H.; Franklin County, N. Y.; Ontonagon County, Mich.; and Wayne County, Ind.
Table 46, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 6
OLD-GROWTH BLACK ASH
(Fraxinus nigra)

VOLUME IN BOARD FEET

New Hampshire, New York, Michigan, Indiana

Sterrett Barrows		1912						Scribner Decimal C	
Diameter breast high	Total height—feet						Top diameter inside bark	Basis	
	60	70	80	90	100	110			
	Volume—board feet, in tens								
Inches	2.6	3.5	4.7				Inches	Trees	
8	2.6	3.5	4.7				6	4	
9	3.7	5.0	6.2				6	6	
10	5.0	6.5	7.9				6	8	
11	6.1	8.1	9.7				6	5	
12	7.6	9.9	12	15			6	10	
13	9.1	12	14	18			6	16	
14	11	14	17	21			6	4	
15	13	16	20	24			6	9	
16	15	19	23	27	31		6	12	
17	17	22	27	31	36		6	4	
18	20	26	31	35	40	44	6	7	
19		30	35	39	45	49	6	5	
20		34	40	44	50	55	6	3	
21		39	45	49	56	61	7	8	
22		44	50	55	62	68	7	2	
23		49	56	62	68	75	8	2	
24		55	62	69	76	82	9	1	
25			68	76	84	91	9	2	
26			74	83	92	100	10	1	
27			81	91	100	109	10	2	
28			88	99	109	119	11	1	
29			95	106	118	129	11	1	
30			103	114	127	139	12	1	
31			110	123	136	150	13		
32			117	131	146	160	13		
Basis								114	

Trees 75 to 300 years old. Stump height, 1 foot. Based on taper curves scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Grafton County, N. H.; Franklin County, N. Y.; Ontonagon County, Mich.; and Wayne County, Ind.
Table 78, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 7
OLD-GROWTH BLACK ASH
(Fraxinus nigra)

UNPEELED TOTAL VOLUME
New Hampshire, New York, Michigan, Indiana

Sterrett Barrows	1912						Standard cords	
	Total height—feet						Bark	Basis
	60	70	80	90	100	110		
Volume—cords						Per ct.	Trees	
Diameter breast high								
Inches								
6	.066	.077	.088				18.0	
7	.088	.103	.117				17.6	2
8	.114	.133	.152				17.2	4
9	.143	.167	.190				16.8	6
10	.179	.208	.238				16.4	8
11	.212	.248	.283				16.0	5
12	.253	.296	.338	.381			15.7	10
13	.293	.342	.391	.440			15.3	16
14	.341	.398	.454	.511			14.9	4
15	.388	.453	.518	.583			14.5	9
16	.442	.516	.590	.663	.737		14.2	12
17	.495	.578	.660	.742	.825		13.8	4
18	.554	.647	.739	.832	.923		13.5	7
19		.714	.815	.918	1.019		13.1	5
20		.790	.903	1.015	1.128	1.241	12.8	3
21		.865	.990	1.113	1.236	1.360	12.4	8
22		.948	1.083	1.219	1.354	1.490	12.1	2
23		1.028	1.175	1.322	1.469	1.617	11.8	2
24		1.118	1.277	1.437	1.597	1.756	11.4	1
25			1.375	1.547	1.718	1.891	11.1	2
26			1.487	1.673	1.859	2.046	10.8	1
27			1.605	1.805	2.006	2.206	10.5	2
28			1.711	1.924	2.138	2.352	10.2	1
29			1.834	2.063	2.293	2.582	9.9	1
30			1.962	2.208	2.453	2.697	9.6	1
Basis								116

Volume includes stump, stem, top and bark.
To reduce to cubic feet, multiply the number of cords in each case by 100.
Based on taper tables compiled by W. B. Barrows. Trees 75 to 300 years old.
Table 45, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 8
OLD-GROWTH BLACK ASH
(Fraxinus nigra)

PEELED TOTAL VOLUME

New Hampshire, New York, Michigan, Indiana

Sterrett Barrows	1912						Cubic feet	
	Total height—feet						Factors to multi- ply by to con- vert to cu. ft., includ- ing bark	Basis
	60	70	80	90	100	110		
Peeled volume—cubic feet						Factors to multi- ply by to con- vert to cu. ft., includ- ing bark	Basis	
Diameter breast high								
Inches								Trees
6	5.4	6.3	7.2				1.22	
7	7.3	8.5	9.7				1.21	2
8	9.4	11.0	12.6				1.21	4
9	11.9	13.9	15.8				1.20	6
10	14.9	17.3	19.8				1.20	8
11	17.8	21.0	24.0				1.19	5
12	21.0	25.0	28.0	32			1.19	10
13	25.0	29.0	33.0	37			1.18	16
14	29.0	32.0	39.0	43			1.18	4
15	33.0	39.0	44.0	50			1.17	9
16	38.0	44.0	50.0	57	63		1.17	12
17	43.0	50.0	57.0	64	71		1.16	4
18	48.0	56.0	64.0	72	80		1.16	7
19		62.0	71.0	80	89		1.15	5
20		69.0	78.0	88	98	108	1.15	3
21		76.0	87.0	98	108	119	1.14	8
22		83.0	95.0	107	119	131	1.14	2
23		91.0	104.0	117	130	143	1.13	2
24		99.0	113.0	127	141	155	1.13	1
25			123.0	138	153	169	1.12	2
26			133.0	149	166	183	1.12	1
27			143.0	161	179	197	1.12	2
28			154.0	173	193	212	1.11	1
29			165.0	186	207	227	1.11	1
30			177.0	199	221	243	1.11	1
Basis								116

Volume of stump, stem, and top without bark.
Based on taper curves.
Trees 75 to 300 years old.
Table 44, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 9
SECOND-GROWTH BLACK ASH
(Fraxinus nigra)
PEELED TOTAL VOLUME

Gevorkiantz		Wisconsin						Cubic feet	
		1930							
Diameter breast high	Total height—feet							Basis	
	10	20	30	40	50	60	70		
		Volume—cubic feet							
Inches								Trees	
1	.03	.06							
2	.06	.14	.25	.36					
3		.41	.65	.92					
4		.82	1.17	1.50	1.90			11	
5		1.22	1.75	2.30	2.80	3.30		4	
6			2.44	3.18	3.90	4.60	5.35	7	
7			3.26	4.23	5.25	6.20	7.18	6	
8				5.45	6.65	7.90	9.11	2	
9				6.80	8.28	9.70	11.15	3	
Basis			6	10	14	3		33	

Preliminary table.
Volume includes stump, stem, and top without bark.
Compiled by the alinement-chart method at the Lake States Forest Experiment Station.
Block indicates the range of data.
Aggregate deviation, .5 per cent.
Average deviation, ±6.6 per cent.

Table 10
OLD-GROWTH WHITE ASH
(Fraxinus americana)

VOLUME IN BOARD FEET
Vermont, New York, Michigan, Indiana, Tennessee

Diameter breast high	Number of 16-foot logs								Top diam- eter inside bark	Basis	
	2	2½	3	3½	4	4½	5	5½			6
	Volume—board feet, in tens										
Inches									Inches	Trees	
8	3.2	4.3	5.1	6.0	6.9					6	13
9	3.7	5.0	6.0	8.0						6	23
10	4.2	5.8	7.0	9.1						6	28
11	4.9	6.8	8.0	10						6	42
12	5.7	7.8	9.3	12	14					6	49
13	6.6	9.0	11	13	16					6	46
14	7.7	10	12	15	18	20	23			6	51
15	9.0	12	14	17	20	23	26			6	32
16	10	13	16	19	22	26	29	33	37	6	51
17	12	15	18	21	25	29	33	37	41	6	30
18	13	17	20	24	28	32	37	41	46	6	24
19	15	19	23	27	32	36	42	46	52	6	21
20	17	21	25	30	36	41	47	52	59	6	17
21	19	23	28	34	40	46	52	59	66	7	10
22	21	26	31	38	45	51	59	66	75	7	11
23		29	35	42	50	58	66	75	84	8	7
24		32	38	46	55	65	74	84	94	9	1
25		35	42	51	61	73	83	94	105	9	5
26		38	46	57	68	81	92	105	117	10	2
27		41	51	63	76	89	102	116	130	10	2
28		45	56	69	84	98	113	128	144	11	2
29		48	61	76	92	107	124	141	159	11	3
30		52	66	83	101	117	136	155	175	12	1
31			72	90	110	128	149	169	191	13	2
32			79	99	119	139	162	185	208	13	1
33			86	107	129	151	176	202	226	14	
34			93	116	140	164	191	220	247	14	
35			100	125	150	176	205	238	269	15	1
36			108	134	161	189	221	256	290	16	
37			116	144	172	202	236	274	312	16	
38			124	154	183	216	252	293	335	17	
39			132	165	195	231	269	313	362	17	
40			141	176	206	247	287	334	390	18	
Basis											475

Trees 75 to 150 years old. Stump height, 1 foot. Based on taper curves; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary.
Table 37, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 11
SECOND-GROWTH WHITE ASH
(Fraxinus americana)

VOLUME IN BOARD FEET

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett Barrows		1912								Scribner Decimal C	
Diameter breast high	Total height—feet								Top diameter inside bark	Basis	
	30	40	50	60	70	80	90	100			
	Volume—board feet, in tens										
Inches									Inches	Trees	
8.....	0.5	0.8	1.3	1.9	2.5	3.2	3.9		6	80	
9.....	0.8	1.4	2.0	2.9	3.7	4.7	5.7		6	57	
10.....	1.2	2.0	2.7	4.0	4.9	6.4	7.6	9.1	6	63	
11.....		1.7	2.6	3.6	5.0	6.3	8.1	9.7	11	6	
12.....		2.2	3.4	4.7	6.4	7.9	10	12	14	6	
13.....		2.8	4.3	5.8	7.8	9.6	12	14	17	6	
14.....		3.5	5.2	7.0	9.3	12	14	17	20	6	
15.....			6.3	8.5	11	14	17	20	23	6	
16.....			7.3	9.9	13	16	19	23	26	6	
17.....				12	15	19	22	26	30	6	
18.....				13	17	21	25	29	33	6	
19.....				15	19	24	28	33	38	6	
20.....				17	22	27	32	37	42	6	
21.....											
22.....				19	24	30	35	41	47	7	
				21	27	33	39	46	52	7	
Basis.....										423	

Trees less than 75 years old. Stump height, 1 foot. Based on taper curves; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Chittenden, Orange, Washington, and Windsor Counties, Vt.; Herkimer, Oswego, and Otsego Counties, N. Y.; Montgomery and Wabash Counties, Ind.; Leelanau County, Mich.; and Stewart County, Tenn.
Table 82, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 12
SECOND-GROWTH WHITE ASH
(Fraxinus americana)

UNPEELED TOTAL VOLUME

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett Barrows		1912								Standard cords	
Diameter breast high	Total height—feet								Bark	Basis	
	20	30	40	50	60	70	80	90			
	Total volume—cords										
Inches									Per cent	Trees	
4.....	.009	.014	.017	.022	.026	.031				18.6	65
5.....	.013	.020	.027	.033	.040	.046	.054			18.3	70
6.....	.020	.028	.038	.048	.057	.067	.076			17.9	81
7.....		.039	.051	.064	.076	.090	.102	.115		17.6	57
8.....		.050	.067	.082	.099	.116	.132	.149		17.3	80
9.....		.061	.083	.103	.124	.144	.164	.185		17.0	57
10.....			.103	.128	.155	.180	.206	.232		16.7	63
11.....			.124	.155	.185	.216	.247	.278		16.4	54
12.....			.146	.183	.220	.257	.293	.330		16.1	45
13.....				.213	.256	.299	.342	.384		15.8	33
14.....				.247	.295	.345	.394	.444		15.5	28
15.....				.283	.340	.396	.453	.510		15.2	19
16.....				.322	.387	.451	.516	.579		15.0	14
17.....					.433	.504	.577	.649		14.7	10
18.....					.484	.565	.646	.727		14.4	6
19.....					.539	.629	.720	.808		14.2	6
20.....					.592	.690	.789	.887		13.9	3
21.....					.654	.763	.872	.981		13.7	4
22.....					.717	.836	.956	1.075		13.5	1
Basis.....											696

Volume of stump, stem, top and bark.
To reduce to cubic feet, multiply the number of cords in each case by 100.
Trees under 75 years. Table based on taper curves.
Table 33, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 13
OLD-GROWTH WHITE ASH
(Fraxinus americana)

PEELED TOTAL VOLUME

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett Barrows	1912								Cubic feet	Factors to multiply by to convert to cubic feet including bark	Basis
	Total height—feet										
	50	60	70	80	90	100	110	120			
	Peeled volume—cubic feet										
Inches											
6	4.0	4.8	5.6						1.38	5	
7	5.4	6.5	7.6						1.36	8	
8	7.0	8.4	9.8	11.2					1.34	13	
9	8.8	10.6	12.3	14.1					1.32	23	
10	11.0	13.2	15.4	17.6	19.8				1.31	28	
11	13.2	15.8	18.5	21.	24.				1.30	42	
12	15.3	19.	22.	25.	28.	32.			1.28	49	
13	18.4	22.	26.	29.	33.	37.			1.27	46	
14	21.	26.	30.	34.	39.	43.	47.		1.26	51	
15	25.	30.	34.	39.	44.	49.	54.		1.25	32	
16	28.	34.	39.	45.	50.	56.	62.	67.	1.24	51	
17	32.	38.	44.	51.	57.	63.	70.	76.	1.23	30	
18	35.	42.	50.	57.	64.	71.	78.	85.	1.22	24	
19	39.	47.	55.	63.	71.	79.	87.	95.	1.21	21	
20	44.	52.	61.	70.	78.	87.	96.	105.	1.20	17	
21	48.	58.	67.	77.	87.	96.	106.	116.	1.19	10	
22	53.	63.	74.	84.	95.	106.	116.	127.	1.18	11	
23	59.	69.	81.	92.	104.	116.	127.	139.	1.17	7	
24	65.	75.	88.	100.	113.	126.	138.	151.	1.17	1	
25	71.	82.	95.	109.	123.	136.	150.	164.	1.16	5	
26	77.	89.	103.	118.	133.	148.	162.	177.	1.15	2	
27	83.	96.	111.	127.	143.	159.	175.	191.	1.15	2	
28	89.	103.	120.	137.	154.	171.	188.	205.	1.14	2	
29	95.	109.	129.	147.	165.	184.	202.	220.	1.14	3	
30	101.	117.	137.	157.	177.	196.	216.	236.	1.13	1	
31	107.	124.	145.	168.	189.	210.	231.	252.	1.13	2	
32	113.	131.	153.	179.	201.	224.	246.	268.	1.12	1	
33	119.	138.	161.	190.	214.	238.	261.	285.			
34	125.	145.	169.	202.	227.	252.	278.	303.			
35	131.	152.	177.	214.	240.	267.	294.	321.			1
36	137.	159.	186.	226.	255.	283.	311.	339.			
Basis											488

Volume of stem and top without bark above a 1-foot stump. Trees from 75 to 150 years old. Based on taper tables. Table excludes bark.
Table 32, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 14
SECOND-GROWTH WHITE ASH
(Fraxinus americana)

PEELED TOTAL VOLUME

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett Barrows	1912								Cubic feet	Factors to multiply by to convert to cubic feet including bark	Basis	
	Total height—feet											
	20	30	40	50	60	70	80	90				
	Peeled volume—cubic feet											
Inches												
2	0.2	0.2	0.3								Trees 63	
3	0.4	0.6	0.8								47	
4	0.7	1.1	1.4	1.8	2.1	2.5					65	
5	1.1	1.6	2.2	2.7	3.3	3.8					70	
6	1.6	2.3	3.1	3.9	4.7	5.5	6.2				81	
7		3.2	4.2	5.3	6.3	7.4	8.4				57	
8		4.1	5.5	6.8	8.2	9.6	10.9	12.3			80	
9		5.1	6.9	8.6	10.3	12.0	13.7	15.4			57	
10			8.6	10.7	12.9	15.0	17.2	19.3			63	
11				10.3	12.9	15.4	18.0	21.0	23.0	1.20	54	
12				12.3	15.4	18.5	22.0	25.0	28.0	1.19	45	
13					17.9	22.0	25.0	29.0	32.0	1.19	33	
14					21.0	25.0	29.0	33.0	38.0	1.18	28	
15					24.0	29.0	34.0	38.0	43.0	1.18	19	
16						27.0	33.0	38.0	44.0	49.0	1.18	
17							37.0	43.0	49.0	55.0	1.17	
18							41.0	48.0	55.0	62.0	1.17	
19							46.0	54.0	61.0	69.0	1.17	
20							51.0	60.0	68.0	77.0	1.16	
21								56.0	66.0	75.0	85.0	1.16
22								62.0	72.0	82.0	93.0	1.16
Basis											806	

Volume of stem and top without bark above a 1-foot stump. Trees under 75 years. Based on taper tables.
Table 31, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 15
SECOND-GROWTH ASPEN
(Populus tremuloides)
VOLUME IN BOARD FEET

Minnesota

Diameter breast high	Number of 16-foot logs								Basis
	1	1½	2	2½	3	3½	4	4½	
	Volume—board feet								
Inches									Trees
6.....	14	18	24	28					43
7.....	14	22	29	36					42
8.....	14	24	35	45	54				47
9.....	14	27	40	52	67	81			37
10.....		31	46	62	78	94	110		36
11.....		33	52	71	90	109	130	151	22
12.....		37	60	83	107	130	155	179	26
13.....			68	96	125	154	183	211	23
14.....			78	111	146	180	214	248	18
15.....				129	168	208	250	289	5
16.....				148	193	239	289	334	
Basis.....	36	36	32	35	44	39	68	9	299

For well-stocked stands.
Stump height, 1 foot; top diameter inside of bark, 5 inches; trees scaled in 16-foot lengths.

The original table for a ½-inch kerf, compiled at the Lake States Forest Experiment Station by the frustum-form-factor method, was reduced by 9.5 per cent.

Data collected by E. E. Probstfield. A. F. Verrall assisted in the original computations.

Block indicates extent of data.
Aggregate deviation, .1 per cent.
Average deviation, ±5.3 per cent.

Table 16
SECOND-GROWTH ASPEN
(Populus tremuloides)
VOLUME IN BOARD FEET

Minnesota

Diameter breast high	Number of 16-foot logs								Basis
	1	1½	2	2½	3	3½	4	4½	
	Volume—board feet, in tens								
Inches									Trees
7.....	2	3	4	6					20
8.....	2	3	4	6	7				47
9.....	2	3	5	6	8	9			37
10.....		3	5	7	8	10	12		36
11.....		4	6	7	9	11	13	15	22
12.....		4	6	8	10	13	15	17	26
13.....			7	9	12	14	17	20	23
14.....			8	11	14	16	19	23	18
15.....				12	15	19	22	26	5
16.....				14	17	22	26	30	
Basis.....	22	34	27	45	25	45	35	1	234

For well-stocked stands.
Stump height, 1 foot; top diameter inside of bark, 6 inches. Scaled in 16-foot logs. Compiled at the Lake States Forest Experiment Station by the frustum-form-factor method from data collected in 1925 by E. E. Probstfield. A. F. Verrall assisted in the computations.

Block indicates the extent of the original data.
Aggregate deviation, .4 per cent.
Average deviation, ±6.5 per cent.

SECOND-GROWTH ASPEN

(POPULUS TREMULOIDES)

UNPEELED MERCHANTABLE VOLUME

D.B.H. INCHES	TOTAL HEIGHT - FEET															BASIS TREES	
	30	35	40	45	50	55	60	65	70	75	80	85	90	95			
	VOLUME - CORDS																
4	.01	.01	.02	.02	.02	.03	.03	.03									84
5	.02	.02	.03	.04	.04	.04	.05	.06	.06								74
6	.03	.04	.04	.05	.06	.07	.07	.08	.09	.10							61
7		.06	.07	.08	.09	.10	.11	.11	.12	.13							42
8			.08	.09	.10	.11	.12	.13	.14	.15	.16	.17					47
9				.12	.13	.14	.16	.17	.18	.20	.21						38
10					.14	.16	.17	.19	.21	.22	.24	.26	.27				36
11						.19	.21	.23	.25	.26	.28	.30	.32				24
12							.24	.26	.28	.31	.33	.35	.37				27
13								.30	.33	.35	.38	.40	.43	.45			21
14									.37	.40	.43	.46	.48	.51	.18		
15										.42	.45	.48	.51	.54	.57	5	
16											.47	.51	.54	.56	.61	.65	
BASIS		4	25	57	63	43	44	43	33	38	47	57	23	1	477		

For well-stocked stands. For understocked stands reduce 10 percent.
 Standard cords, 4x4x8 feet of unpeeled wood. Merchantable volume above a one-foot stump to a 3-inch top diameter inside of bark.
 Compiled at the Lake States Forest Experiment Station from the merchantable volume in cubic feet by dividing the peeled volume per tree by the number of cubic feet of solid wood contained in an unpeeled cord for each diameter class. (See P. 176).
 Data collected in 1925 by E. E. Probstfield.
 Block indicates extent of original data.

Table 18

SECOND-GROWTH ASPEN

(Populus tremuloides)

PEELED MERCHANTABLE VOLUME

Minnesota

Diameter breast high	Total height—feet															Basis	
	30	35	40	45	50	55	60	65	70	75	80	85	90	95			
	Volume—cubic feet																
Inches																	Trees
4	.58	.76	.93	1.1	1.3	1.5	1.6	1.9									84
5	1.3	1.5	1.8	2.2	2.5	2.8	3.1	3.4	3.7								74
6	2.2	2.5	2.9	3.4	3.8	4.2	4.7	5.2	5.6	6.1							61
7		4.2	4.8	5.4	5.9	6.5	7.2	7.8	8.4	8.9	9.5						42
8			5.6	6.3	7.0	7.8	8.6	9.4	10.2	11.0	11.7	12.5					47
9					8.9	9.9	10.8	11.8	12.8	13.8	14.8	15.8					38
10						11.0	12.2	13.4	14.6	15.8	17.0	18.2	19.4	20.6			36
11							14.7	16.2	17.6	19.1	20.5	22.0	23.4	24.9			24
12								19.2	20.9	22.6	24.4	26.1	27.7	29.5			27
13									24.5	26.5	28.5	30.5	32.4	34.4	36.4		21
14										30.7	33.0	35.2	37.5	39.8	42.1		18
15											35.1	37.7	40.2	42.8	45.4	48.0	5
16												40.	43	46	49	52	55
Basis		4	25	57	63	43	44	43	33	38	47	57	23	1	477		

For well-stocked stands. For understocked stands reduce 10 per cent.
 Volume inside of bark.
 Stump height, 1 foot; top diameter inside of bark, 3 inches.
 Compiled at the Lake States Forest Experiment Station by expressing merchantable volume as a percentage of the total volume.
 Data collected in 1925 by E. E. Probstfield. A. F. Verrall assisted in the computations.
 Block indicates extent of original data.
 Aggregate deviation, .2 per cent.
 Average deviation, ±6.0 per cent.

Table 19
SECOND-GROWTH ASPEN
(*Populus tremuloides*)
PEELED TOTAL VOLUME

Gevoerkiantz		Minnesota														Cubic feet			
		1926																	
Diameter at breast high	Total height—feet	Volume—cubic feet														Basis			
		25	30	35	40	45	50	55	60	65	70	75	80	85	90		95		
		Inches																	
2		.26	.31	.37	.42												31		
3		.57	.69	.80	.92	1.0	1.1	1.3									74		
4		1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6							84		
5		1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3						74		
6			2.7	3.1	3.5	4.0	4.4	4.9	5.3	5.8	6.2	6.6					61		
7				4.8	5.4	6.0	6.6	7.2	7.8	8.3	8.9	9.5	10.1				42		
8					6.2	7.0	7.7	8.5	9.3	10.0	10.8	11.6	12.4	13.1			47		
9						9.7	10.7	11.6	12.6	13.6	14.5	15.5	16.5				38		
10							11.9	13.1	14.3	15.4	16.6	17.8	19.0	20.2	21.4		36		
11								15.7	17.1	18.6	20.0	21.4	22.9	24.3	25.7		24		
12									20.2	21.9	23.6	25.3	27.0	28.7	30.4		27		
13										25.6	27.6	29.6	31.6	33.5	35.5	37.5	23		
14											31.9	34.1	36.4	38.7	41.0	43.3	18		
15												36.4	39.0	41.6	44.2	46.8	49.4	5	
16													41	44	47	50	53	56	
Basis		9	20	47	52	63	63	43	44	43	33	38	47	57	24	1	584		

For well-stocked stands. For understocked stands reduce 10 per cent.
Volume includes stump, stem, and top without bark.
Compiled at the Lake States Forest Experiment Station by the form-factor method from data collected by E. E. Probstfield in 1925.
Cubed in 8-foot sections by Smalian's formula. A. F. Verrall assisted in the computations.
Block indicates the extent of the original data.
Aggregate deviation, .1 per cent.
Average deviation, ±5.3 per cent.

Table 20
OLD-GROWTH BALSAM FIR
(*Abies balsamea*)
VOLUME IN BOARD FEET

Zon		Maine												Scribner	
		1914													
Diameter at breast high	Total height—feet	Swamp				Top diam- eter inside bark	Hardwood slope and flat					Top diam- eter inside bark			
		Volume—board feet					Volume—board feet								
		40	50	60	70		40	50	60	70	80				
		Inches					Inches								
7		14	17	20	22	5.8	13	19	27				5.3		
8		19	23	27	32	5.9	21	26	33	40			5.9		
9		24	31	37	44	6.1	29	34	41	48	56		6.0		
10			39	48	57	6.2	38	45	52	60	70		6.1		
11				48	60	73	6.4		56	65	75	86	6.2		
12				57	73	92	6.6		69	80	92	107	6.3		
13				66	87	110	6.8		82	95	111	130	6.4		
14										111	132	155	6.4		
15										127	153	182	6.5		
16										144	174	209	6.6		

Based upon analysis of 1,056 trees. Stump height, 1 foot.
Table 41, U. S. Dept. of Agr. Bul. 55, Balsam Fir. 1914.

Table 21
SECOND-GROWTH BALSAM FIR
(Abies balsamea)
UNPEELED MERCHANTABLE VOLUME

Wisconsin

Diameter breast high	Total height—feet													Basis
	20	25	30	35	40	45	50	55	60	65	70	75		
	Volume—cords													
<i>Inches</i>														<i>Trees</i>
4.....	.007	.009	.010	.011	.013	.014								7
5.....		.016	.018	.021	.024	.027	.029							9
6.....			.024	.028	.033	.037	.041	.046	.050					12
7.....				.041	.046	.051	.057	.062	.068	.073	.079			11
8.....					.060	.067	.074	.081	.089	.096	.103			7
9.....						.082	.091	.100	.109	.119	.128			5
10.....							.111	.123	.134	.145	.156	.167		5
11.....								.147	.160	.174	.187	.201		1
12.....								.171	.187	.203	.219	.233	.249	1
13.....								.197	.214	.233	.250	.268	.285	1
Basis.....		2	9	6	12	11	4	6	6	2				59

Volume in standard cords includes the stem above a 1-foot stump to a 3-inch top diameter inside bark.
Data collected in 1930. Wood piled with bark but measured inside bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station from original cubic-foot table by variable converting factors.
Block indicates extent of data.
Aggregate deviation, 0.2 per cent.
Average deviation, ±5.9 per cent.

Table 22
SECOND-GROWTH BALSAM FIR
(Abies balsamea)
PEELED MERCHANTABLE VOLUME

Wisconsin

Diameter breast high	Total height—feet													Basis			
	20	25	30	35	40	45	50	55	60	65	70	75					
	Volume—cubic feet																
<i>Inches</i>														<i>Trees</i>			
4.....		.50	.60	.70	.80	.90	1.00							7			
5.....			1.13	1.33	1.53	1.73	1.93	2.13						9			
6.....				1.80	2.12	2.44	2.76	3.08	3.40	3.72				12			
7.....					3.10	3.52	3.93	4.36	4.76	5.18	5.60	6.02		11			
8.....						4.63	5.20	5.76	6.32	6.88	7.46	8.01		7			
9.....							6.48	7.20	7.92	8.66	9.40	10.1		5			
10.....								8.91	9.83	10.7	11.6	12.5	13.4	5			
11.....									11.9	13.0	14.1	15.2	16.3	1			
12.....										14.0	15.3	16.6	17.9	19.1	20.4	1	
13.....											16.3	17.7	19.2	20.6	22.1	23.5	
Basis.....		2	9	6	12	11	4	6	6	2						58	

Volume includes the peeled stem above a 1-foot stump to a 3-inch top diameter inside the bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by the alignment-chart method.
Data collected in 1930.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ±5.9 per cent.

Table 23
SECOND-GROWTH BALSAM FIR
(Abies balsamea)
PEELED TOTAL VOLUME
Wisconsin

Lotti Gevorkiantz		1930							Cubic feet	
Diameter breast high	Total height—feet							Basis	Trees	
	10	20	30	40	50	60	70			80
	Volume—cubic feet									
Inches										
1	.08	.07	.11							
2	.12	.22	.32						1	
3		.48	.69	.91					2	
4		.85	1.21	1.56					6	
5		1.27	1.82	2.37	2.92				8	
6		1.81	2.59	3.37	4.15				11	
7			3.56	4.52	5.50	6.48			10	
8			4.50	5.80	7.10	8.40			8	
9				7.20	8.80	10.5	12.1		6	
10					10.8	12.7	14.7	16.6	6	
11					12.9	15.3	17.7	20.1	1	
12					15.1	17.8	20.5	23.3	1	
13					17.5	20.6	23.8	26.9		
Basis		2	13	22	15	7	1		60	

Preliminary table.
 Volume includes stump, stem, and top without bark.
 Data collected in 1930.
 Volumes by planimeter.
 Compiled at the Lake States Forest Experiment Station by plotting actual volumes over modified cylinder volumes.
 Block indicates extent of data.
 Aggregate deviation, .2 per cent.
 Average deviation, ±5.9 per cent.

Table 24
OLD-GROWTH BASSWOOD
(Tilia glabra)
VOLUME IN BOARD FEET
Michigan, Wisconsin

Frothingham Barrows		1913						Scribner Decimal C	
Diameter breast high	Number of 16-foot logs						Top diam- eter inside bark	Basis	
	2	2½	3	3½	4	4½			
	Volume—board feet, in tens								
Inches							Inches	Trees	
8	3	5	6				6	6	
9	4	5	7				6	9	
10	4	6	8	10	13		6	7	
11	5	7	9	11	14		6	8	
12	6	8	10	13	16		7	7	
13	8	9	12	15	18	22	7	9	
14	9	11	14	17	20	24	7	7	
15	10	13	16	19	23	27	8	17	
16	12	15	18	22	26	30	8	17	
17	17	21	25	29	34	39	9	20	
18	19	24	28	33	38	43	9	18	
19	21	27	32	37	43	48	10	14	
20	24	30	36	42	48	54	10	31	
21	27	34	40	47	54	61	11	21	
22	30	38	45	52	60	68	12	14	
23	34	42	50	58	67	76	12	17	
24	38	47	56	65	75	84	13	19	
25	41	52	62	72	83	93	14	14	
26	45	57	68	79	92	104	15	17	
27	50	62	75	87	101	115	15	8	
28	54	68	82	96	110	125	16	9	
29	59	74	89	104	119	134	17	6	
30	64	80	97	113	129	145	17	4	
31	69	87	105	122	140	158	18	8	
32	75	94	113	131	150	169	18	3	
33	81	101	121	141	161	181	19	3	
34	87	108	129	150	172	193	20	4	
35	94	115	138	160	183	206	20	1	
36	101	124	147	170	195	220	21		
37	108	132	156	180	206	231	22	1	
38	115	141	165	190	218	243	22		
39	122	149	175	200	230	253	23		
40	130	157	185	210	242	264	24		
Basis								319	

Charlevoix and Kalkaska Counties, Mich., Iron and Price Counties, Wis.
 Height of stump, 1 foot. Scaled from taper curves, mostly in 16.3-foot logs,
 with a few shorter logs where necessary. Average utilization.
 Table 38, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest by
 E. H. Frothingham. 1915.

Table 25
OLD-GROWTH BASSWOOD
(*Tilia glabra*)
UNPEELED TOTAL VOLUME
Michigan, Wisconsin

Diameter breast high	1913										Basis
	Total height—feet										
	40	50	60	70	80	90	100	110	120		
	Volume—cords										
<i>Inches</i>											<i>Trees</i>
8.....	.08	.10	.12	.14	.15						6
9.....	.11	.14	.17	.20	.22						9
10.....	.14	.18	.22	.25	.28	.30					7
11.....		.22	.26	.31	.34	.37					8
12.....		.26	.32	.37	.41	.45	.48				7
13.....			.38	.45	.49	.54	.57				9
14.....			.45	.52	.58	.63	.67	.70			7
15.....			.53	.61	.68	.73	.78	.82			17
16.....			.61	.70	.78	.83	.89	.94	.98		17
17.....				.85	.94	1.00	1.06	1.12	1.20		20
18.....				.99	1.06	1.13	1.19	1.25	1.18		18
19.....				1.10	1.18	1.26	1.33	1.40	1.44		14
20.....				1.23	1.30	1.39	1.47	1.55	3.1		31
21.....				1.36	1.44	1.52	1.62	1.70	2.1		21
22.....				1.49	1.58	1.67	1.77	1.86	1.4		14
23.....				1.64	1.73	1.83	1.93	2.03	1.7		17
24.....				1.80	1.89	1.99	2.10	2.21	1.9		19
25.....				1.95	2.05	2.15	2.27	2.40	1.4		14
26.....				2.10	2.21	2.32	2.44	2.58	1.7		17
27.....				2.28	2.39	2.50	2.64	2.78	1.8		8
28.....				2.46	2.58	2.70	2.84	3.00	1.9		9
29.....				2.66	2.80	2.96	3.08	3.24	1.6		6
30.....				2.87	3.01	3.14	3.31	3.48	1.4		4
31.....					3.24	3.38	3.55	3.74	1.8		8
32.....					3.49	3.66	3.84	4.04	1.3		3
33.....					3.78	3.94	4.14	4.35	1.3		3
34.....					4.04	4.22	4.43	4.66	1.4		4
35.....					4.32	4.53	4.74	4.98	1.1		1
36.....					4.85	5.09	5.33				
37.....					5.14	5.39	5.65				1
38.....					5.46	5.73	6.00				
39.....					5.78	6.07	6.34				
40.....					6.10	6.40	6.68				
Basis.....											319

Charlevoix and Kalkaska Counties, Mich.; Iron and Price Counties, Wis.
Compiled from Table 24. Volume includes stem wood, bark, and branch wood. Minimum branch wood taken, 5 feet long, 4 inches in diameter outside of bark at mid point.
Table 76, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 26
OLD-GROWTH BASSWOOD
(*Tilia glabra*)
UNPEELED TOTAL AND MERCHANTABLE VOLUME
Michigan, Wisconsin

Diameter breast high	1912										Cubic feet				
	Total height—feet										Volume of top- wood	Top diameter inside bark	Per cent of bark	Basis trees	
	40	50	60	70	80	90	100	110	120	Logs				Tops	
	Volume of logs including bark— cubic feet														
<i>Inches</i>											<i>Cu. ft.</i>	<i>In.</i>			
8.....	3.9	5.4	7.0	8	9						2.2	6	22.1	6	6
9.....	5.7	8.1	10.3	12	14						2.4	6	21.7	9	7
10.....	7.8	10.7	13.5	16	18	20					2.6	6	21.2	7	6
11.....		13.5	17.1	20	23	25					2.8	6	20.8	8	7
12.....		16.6	21.0	25	28	30	33				3.2	7	20.5	7	5
13.....			25.0	30	33	36	39				3.7	7	20.1	9	10
14.....			30.0	35	39	43	46	49			4.3	7	19.7	7	6
15.....			34.0	41	46	49	53	56			5.2	8	19.4	17	16
16.....			40.0	47	52	56	60	64	68		6.2	8	19.1	17	15
17.....				58	63	68	72	76			7.5	9	18.8	20	18
18.....				65	70	75	80	85			9.0	9	18.6	18	13
19.....				72	78	83	89	94			10.9	10	18.3	14	15
20.....				79	85	91	97	103			13.1	10	18.0	31	28
21.....				86	92	99	106	112	15.6		11	17.8	21	20	
22.....				93	100	107	114	121	18.6		12	17.5	14	12	
23.....				101	108	115	122	131	22.0		12	17.3	17	17	
24.....				109	116	123	131	140	26.0		13	17.1	19	17	
25.....				116	124	132	140	150	30.0		14	16.9	14	12	
26.....				124	132	140	149	159	34.0		15	16.7	17	15	
27.....				132	140	149	159	169	39.0		15	16.5	8	10	
28.....				140	149	158	168	180	45.0		16	16.3	9	9	
29.....				148	158	170	179	191	52.0		17	16.1	6	6	
30.....				156	167	177	189	202	59.0		17	15.9	4	4	
31.....					176	187	199	214	67.0		18	15.7	8	8	
32.....					185	197	211	226	77.0		18	15.5	3	1	
33.....					195	208	222	238	88.0		19	15.4	3	3	
34.....					205	219	234	251	98.0		20	15.2	4	4	
35.....					215	230	247	265	109.0		20	15.1	1	1	
36.....						242	260	279	121.0		21	14.9			
37.....						255	274	293	131.0		22	14.7	1		
38.....						268	288	308	142.0		22	14.6			
39.....						280	302	323	153.0		23	14.4			
40.....						294	317	338	163.0		24	14.3			
Basis.....														319	291

Charlevoix and Kalkaska Counties, Mich., Iron and Price Counties, Wis.
The "log" volume is the solid contents of wood and bark on a stump height of one foot and the "diameter inside bark of top" shown in the twelfth column. The volume of "top" is that contained in the stem above this point, and in addition all branches suitable for cordwood having a diameter, outside bark, of 4 inches or more at the middle of a 5-foot stick.
Table 36, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest by E. H. Frothingham. 1915.

Table 27
BASSWOOD SPROUTS
(Tilia glabra)
PEELED TOTAL VOLUME

Gevorkiantz		1930							Cubic feet
Diameter breast high	Total height—feet							Basis	
	10	20	30	40	50	60	70		80
Volume—cubic feet								Trees	
Inches									
1	.03	.06							
2	.11	.21	.30	.40					
3		.44	.64	.84					
4		.76	1.12	1.48	1.82	2.18			1
5			1.70	2.24	2.76	3.30	3.81		2
6			2.45	3.13	3.90	4.62	5.35		8
7			3.27	4.23	5.26	6.24	7.22		7
8				5.50	6.80	8.00	9.20	10.4	3
9				6.80	8.35	9.85	11.3	12.9	2
10				8.40	10.2	11.9	13.6	15.3	3
Basis			1	8	9	7	1		26

Preliminary table.
Volume includes stump, stem, and top, without bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by curving tree volumes over cylinder volumes.
Data collected by S. R. Gevorkiantz and T. Lotti.
Block indicates extent of data.
Aggregate deviation, .5 per cent.
Average deviation, ±5.9 per cent.

Table 28
OLD-GROWTH BEECH
(Fagus grandifolia)
VOLUME IN BOARD FEET

Frothingham Barrows		1912							Scribner Decimal C	
Diameter breast high	Number of 16-foot logs							Top diameter inside bark	Basis	
	1	1½	2	2½	3	3½	4			4½
Volume—board feet, in tens										
Inches									Inches	Trees
6	1.6	2.5	3	4	5				6	2
7	1.7	2.7	3	4	6				6	13
8	1.8	2.9	4	5	7	8			6	20
9	2.0	3.2	4	6	8	10			6	11
10	2.2	3.7	5	7	9	11	13		6	23
11	2.4	4.2	6	8	11	13	16		6	22
12	2.6	4.7	7	9	12	15	18	21	7	30
13	2.8	5.3	8	11	14	18	21	24	7	19
14	3.0	6.0	9	12	16	20	24	28	7	25
15	3.3	6.8	11	14	18	23	27	31	8	26
16	3.6	7.7	12	16	21	25	30	35	8	28
17		8.5	14	19	24	29	34	40	9	14
18		9.5	16	21	27	32	39	45	9	14
19		11.0	18	24	31	37	43	50	10	9
20			20	28	35	42	49	56	10	6
21			22	32	39	47	55	63	11	7
22			25	36	44	53	62	71	12	8
23				40	50	60	69	80	12	4
24				44	56	67	78	89	13	3
25					62	74	86	100	14	1
26					68	82	96	111	15	
Basis										285

Wexford County.
Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs.
Stump height, 1 foot. Average utilization.
Table 20, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest.
E. H. Frothingham, 1915.

Table 29
OLD-GROWTH BEECH
(Fagus grandifolia)
UNPEELED TOTAL VOLUME
Michigan

Frothingham Barrows	1912							Standard cords	Basis
	Total height—feet								
	40	50	60	70	80	90	100		
Diameter breast high	Volume—cords							Trees	
Inches									
6	.027	.035	.044	.057				2	
7	.056	.068	.088	.112				14	
8	.085	.103	.128	.161	.176	.207		20	
9	.117	.137	.165	.201	.228	.267		11	
10	.151	.173	.205	.247	.284	.329	.380	23	
11	.187	.213	.244	.297	.345	.399	.455	22	
12	.224	.256	.287	.352	.412	.473	.535	30	
13		.300	.329	.411	.485	.555	.624	19	
14		.340	.376	.475	.564	.644	.721	25	
15		.385	.423	.543	.649	.740	.824	26	
16		.417	.472	.613	.739	.845	.940	28	
17			.524	.691	.833	.957	1.060	14	
18			.576	.771	.939	1.072	1.188	14	
19				.860	1.048	1.197	1.323	9	
20				.957	1.167	1.331	1.472	6	
21				1.075	1.296	1.480	1.629	7	
22				1.197	1.444	1.632	1.795	8	
23				1.321	1.600	1.799	1.968	4	
24						1.969	2.161	3	
25						2.149	2.349	1	
26						2.333	2.547		
Basis								286	

Wexford County.
Compiled from Table 27. Converting factor, 75 cubic feet per cord. Volume includes wood, bark, and branch wood above a 1-foot stump. Minimum branch wood taken, 5-foot stick, 2 inches outside of bark at middle.
Table 37, U. S. Dept. of Agr. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 30
OLD-GROWTH BEECH
(Fagus grandifolia)
UNPEELED TOTAL AND MERCHANTABLE VOLUME
Michigan

Frothingham Barrows	1912														Cubic feet	Basis trees	
	Total height—feet																
	Volume—cubic feet																
	Diameter, inside bark																
Di- am- eter breast high	40		50		60		70		80		90		100		Per cent of bark	Logs	Tops
	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top			
4		0.7		0.9		1.4									6	8.1	3
5		0.9		1.1		1.4									6	8.0	3
6	1.0	1.0	1.3	1.3	1.7	1.6	2.4	1.9							6	7.9	2 5
7	2.9	1.3	3.5	1.6	4.7	1.9	6.2	2.2							6	7.8	14 16
8	4.9	1.5	5.9	1.8	7.4	2.2	9.6	2.5	10.4	2.8	12.4	3.1			6	7.7	20 15
9	7.1	1.7	8.2	2.1	10.0	2.4	12.3	2.8	13.9	3.2	16.5	3.5			6	7.6	11 15
10	9.4	1.9	10.7	2.3	12.7	2.7	15.4	3.1	17.8	3.5	21.0	3.9	24	4.3	6	7.6	23 23
11	11.8	2.2	13.4	2.6	15.3	3.0	18.8	3.5	22.0	3.9	26.0	4.3	29	4.7	6	7.5	22 29
12	14.4	2.4	16.3	2.9	18.1	3.4	23.0	3.8	27.0	4.3	31.0	4.8	35	5.2	7	7.4	30 25
13			19.3	3.2	21.0	3.7	27.0	4.2	32.0	4.8	36.0	5.3	41	5.8	7	7.3	19 18
14			22.0	3.5	24.0	4.1	31.0	4.7	37.0	5.3	42.0	5.9	49	6.5	7	7.2	25 25
15			25.0	3.9	27.0	4.5	35.0	5.2	43.0	5.9	49.0	6.6	54	7.3	8	7.1	26 23
16			27.0	4.3	30.0	4.9	40.0	5.6	49.0	6.5	56.0	7.5	62	8.5	8	7.0	28 21
17					34.0	5.4	45.0	6.3	55.0	7.3	63.0	8.5	70	9.7	9	6.9	14 14
18					37.0	5.9	51.0	7.0	62.0	8.3	71.0	9.6	78	11.0	9	6.8	14 10
19						56.0	8.1	69.0	9.6	79.0	11.1	87	12.6	10	6.7	9 6	
20						62.0	9.5	76.0	11.2	87.0	13.0	96	14.8	10	6.6	6 5	
21						69.0	11.6	84.0	13.5	96.0	15.4	105	17.3	11	6.5	7 8	
22						75.0	14.8	92.0	16.6	104.0	18.3	115	20.0	12	6.4	8 4	
23						81.0	18.1	100.0	20.0	113.0	21.7	125	23.0	12	6.3	4 1	
24										123.0	25.0	135	27.0	13	6.2	3	
25										132.0	29.0	145	31.0	14	6.1	1	
26										142.0	33.0	156	35.0	15	6.0		
Basis															286	239	

Wexford County.
The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top" shown in the fourth from the last column. Volume of "top" is contained in the stem above this point, and in addition all branches suitable for cordwood, having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered topwood.
Table 32, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 31
OLD-GROWTH PAPER BIRCH
(Betula papyrifera)

VOLUME IN BOARD FEET
New England and New York

Diameter breast high	Number of 16-foot logs								Basis	
	½	1	1½	2	2½	3	3½	4		
	Volume—board feet									
Inches									Trees	
8.....	14.7	25.0	35.5							39
9.....	16.8	29.1	41.5	49.7						42
10.....	19.8	34.3	48.8	58.4	69.0					42
11.....	24.0	40.5	58.0	69.0	81.0	86.5				40
12.....	29.2	48.4	69.0	82.4	95.5	103				24
13.....	35.0	58.2	82.8	97.6	113	122	134			25
14.....	41.5	69.8	99.5	117	134	145	157	163		14
15.....	48.5	82.0	117	138	158	169	184	190		5
16.....	56.3	96.0	137	163	186	200	216	225		11
17.....	64.8	111	159	190	218	235	252	264		2
18.....	73.8	127	183	220	253	274	295	309		1
19.....	83.4	145	209	252	291	318	342	359		
20.....	94.2	164	235	287	334	363	394	412		1
21.....	104	184	266	325	380	416	450	471		
22.....	116	205	298	364	430	472	515	535		
23.....	128	229	332	408	481	533	580	607		
24.....	142	255	368	455	540	599	653	685		
Basis.....		6	64	95	46	32	3			246

Stump height, 1 foot. Top diameter variable, not less than 6 inches.
Based on taper tables in alinement-chart form prepared by curvilinear multiple correlation.
Logs scaled as 16.3 or 8.15-foot logs.
Block indicates extent of data.
Aggregate deviation: less than .5 per cent.

Table 32
SECOND-GROWTH PAPER BIRCH
(Betula papyrifera)

PEELED MERCHANTABLE VOLUME
Lake States

Diameter breast high	Total height—feet								Basis	
	35	40	45	50	55	60	65	70		
	Volume—cords									
Inches									Trees	
4.....	.01	.01	.02	.02	.02					21
5.....	.02	.02	.03	.03	.04	.04				18
6.....	.03	.04	.04	.05	.05	.06	.07			14
7.....	.04	.05	.06	.06	.07	.08	.09	.09		13
8.....		.06	.07	.08	.09	.10	.11	.12		8
9.....			.09	.10	.11	.12	.13	.14		3
10.....				.12	.13	.14	.15	.16		1
Basis.....	1	9	17	18	12	18	2	1		78

Standard cords, 4x4x8 feet.
Volume of peeled stem above a 1-foot stump to a 3-inch top diameter inside bark.
Compiled at the Lake States Forest Experiment Station from the merchantable volume in cubic feet by dividing the volume per tree by the number of cubic feet per cord for each D.B.H. class. The cordwood factors from U. S. Forest Service Circular 163 were converted to D.B.H. basis.
Data collected in 1926.
Block indicates extent of data.
Table XX University of Minnesota Agricultural Experiment Station Technical Bulletin 60.

Table 33
SECOND-GROWTH PAPER BIRCH
(Betula papyrifera)
PEELED MERCHANTABLE VOLUME

Gevorkiantz		1926								Cubic feet
Diameter breast high	Total height—feet								Basis	
	35	40	45	50	55	60	65	70		
Volume—cubic feet										
Inches										Trees
4	.69	.92	1.2	1.4	1.7					21
5	1.5	1.9	2.2	2.6	3.0	3.3				18
6	2.5	3.0	3.5	4.0	4.4	4.9	5.3			14
7	3.6	4.2	4.8	5.5	6.1	6.7	7.3	7.9		13
8		5.6	6.4	7.1	7.9	8.7	9.5	10.3		8
9			8.0	9.0	9.9	10.9	11.9	12.8		3
10				11.0	12.2	13.4	14.5	15.7		1
Basis.....	1	9	17	18	12	18	2	1		78

Volume without bark.
Stump height, 1 foot; top diameter inside bark, 3 inches.
Compiled at the Lake States Forest Experiment Station by expressing merchantable volume as a percentage of the total volume.
Data collected in 1926.
Block indicates extent of data.
Aggregate deviation, ± 0.2 per cent.
Average deviation, ± 7.7 per cent.
Table XIX University of Minnesota Agricultural Experiment Station Technical Bulletin 60.

Table 34
SECOND-GROWTH PAPER BIRCH
(Betula papyrifera)
PEELED TOTAL VOLUME

Gevorkiantz		1926								Cubic feet			
Diameter breast high	Total height—feet								Basis				
	25	30	35	40	45	50	55	60		65	70		
Volume—cubic feet													
Inches										Trees			
2	.28	.34	.40	.46						17			
3	.61	.74	.86	.98	1.1	1.2				21			
4	1.1	1.3	1.5	1.7	1.9	2.1	2.3			21			
5		1.9	2.3	2.6	2.9	3.2	3.6	3.9		18			
6			2.7	3.2	3.6	4.1	4.5	5.0	5.5	5.9	14		
7				4.2	4.9	5.5	6.1	6.7	7.3	7.9	13		
8					7.0	7.7	8.5	9.3	10.1	10.8	8		
9						8.6	9.6	10.6	11.5	12.5	3		
10								11.7	12.8	14.0	15.2	16.3	1
Basis.....	1	18	13	15	18	18	12	18	2	1	116		

Volume includes stump, stem, and top without bark.
Compiled at the Lake States Forest Experiment Station by the form-factor method from data collected in 1926.
Cubed in 8.15-foot sections by Smalian's formula.
Block indicates extent of data.
Aggregate deviation, 0.1 per cent.
Average deviation, ± 4.0 per cent.
Table XVIII University of Minnesota Agricultural Experiment Station Technical Bulletin 60.

Table 35
OLD-GROWTH YELLOW BIRCH
(*Betula lutea*)

VOLUME IN BOARD FEET

Michigan, Wisconsin

Diameter breast high	Number of 16-foot logs					Top diam- eter inside bark	Basis
	1½	2	2½	3	3½		
	Volume—board feet, in tens						
<i>Inches</i>					<i>Inches</i>	<i>Trees</i>	
8.....	2.3	3.7				6	11
9.....	3.0	4.5				6	17
10.....	3.6	5.4	7.2	9.2		6	26
11.....	4.3	6.3	8.4	10.		6	17
12.....	5.0	7.3	9.7	12.		7	27
13.....	5.7	8.3	11.	14.	17.	7	20
14.....	6.5	9.4	13.	16.	19.	7	16
15.....	7.3	11.	14.	18.	21.	8	8
16.....	8.2	12.	16.	20.	24.	8	16
17.....		14.	18.	23.	27.	9	15
18.....		16.	21.	26.	30.	9	15
19.....		18.	23.	29.	34.	10	13
20.....		20.	27.	33.	38.	10	9
21.....		23.	30.	37.	43.	11	6
22.....		26.	34.	41.	49.	12	3
23.....		29.	38.	46.	55.	12	5
24.....		33.	43.	51.	61.	13	4
25.....		36.	47.	57.	68.	14	4
26.....		40.	52.	63.	75.	15	2
27.....		44.	57.	69.	83.	15	
28.....		48.	62.	76.	90.	16	1
29.....		52.	67.	83.	98.	17	2
30.....		56.	72.	90.	105.	17	
Basis.....							237

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves; mostly in 16.3-foot logs, with a few shorter logs
where necessary. Stump height, 1 foot. Average utilization.
Table 15, U. S. Dept. of Agr. Bul. 285. The Northern Hardwood Forest.
E. H. Frothingham. 1915.

Table 36
OLD-GROWTH YELLOW BIRCH
(*Betula lutea*)

VOLUME IN BOARD FEET

Wisconsin

Diameter breast high	Number of 16-foot logs			Basis
	1	2	3	
	Volume—board feet			
<i>Inches</i>				<i>Trees</i>
11.....	34			9
12.....	45			7
13.....	56	95		5
14.....	68	113	148	5
15.....	78	130	173	6
16.....	89	151	202	5
17.....	100	175	232	5
18.....	116	197	266	4
19.....	129	225	300	7
20.....	147	257	338	
21.....	159	253	375	3
22.....	175	305	416	3
23.....	193	337	456	1
24.....	215	369	499	6
25.....	232	404	545	
26.....	255	441	591	3
27.....	273	478	640	
28.....	294	512	690	1
29.....	315	552	741	2
30.....	339	590	792	
31.....	362	630	847	
32.....	385	674	904	1
33.....	416	715	960	
34.....	433	758	1019	2
Basis.....	24	51		75

Preliminary table.
Volume above stump to the point where the stem breaks into large branches.
Stump height 2 feet; top diameter variable, not less than 8 inches inside
bark.
Compiled at the Lake States Forest Experiment Station from Girard form-
class taper tables.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ±13.1 per cent.

Table 37
OLD-GROWTH YELLOW BIRCH
(Betula lutea)
UNPEELED TOTAL VOLUME
Michigan, Wisconsin

Diameter breast high	1912					Basis
	Total height—feet					
	50	60	70	80	90	
	Volume—cords					
Inches						Trees
6	.035	.039	.043			4
7	.085	.091	.099	.103		12
8	.128	.136	.148	.157	.169	11
9	.164	.175	.193	.209	.229	17
10	.204	.219	.244	.267	.292	26
11	.249	.267	.301	.331	.363	17
12	.296	.323	.364	.400	.439	27
13	.347	.384	.433	.476	.520	20
14	.399	.451	.512	.561	.609	16
15		.528	.599	.653	.703	8
16		.613	.692	.751	.800	16
17		.711	.791	.853	.908	15
18		.815	.896	.961	1.019	15
19		.925	1.004	1.075	1.136	13
20		1.041	1.117	1.189	1.257	9
21			1.231	1.309	1.387	6
22			1.351	1.439	1.523	3
23			1.473	1.571	1.664	5
24			1.603	1.711	1.815	4
25			1.748	1.871	1.987	4
26			1.883	2.016	2.144	2
27			2.031	2.176	2.317	
28			2.181	2.340	2.488	1
29			2.333	2.504	2.661	2
30			2.487	2.667	2.837	
Basis						253

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis. Compiled from Table 33 by a converting factor of 75 cubic feet to the cord. The volume with bark of the logs and branches to 2 inches. Stump height, 1 foot.

Table 23, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 38
OLD-GROWTH YELLOW BIRCH
(Betula lutea)
UNPEELED TOTAL AND MERCHANTABLE VOLUME
Michigan, Wisconsin

Diameter breast high	1912												Top diam- eter inside bark	Basis
	Total height—feet													
	40	50	60	70	80	90	Volume—cubic feet							
Inches	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Inches	Trees	
4	0.8		0.9											6
5	1.1		1.3		1.4									4
6	1.4	1.0	1.6	1.1	1.8	1.2	2.0							4
7	1.7	4.5	1.9	4.8	2.0	5.1	2.3	5.4	2.3					12
8	1.9	7.5	2.1	7.9	2.3	8.5	2.6	9.2	2.6	10.1	2.6	6		11
9		9.9	2.4	10.5	2.6	11.6	2.9	12.8	2.9	14.3	2.9	6		17
10		12.6	2.7	13.4	3.0	15.1	3.2	16.8	3.2	18.7	3.2	6		26
11		15.6	3.1	16.6	3.4	18.9	3.7	21.0	3.7	24.0	3.7	6		17
12		18.6	3.6	20.0	4.0	23.0	4.2	26.0	4.2	29.0	4.2	7		27
13		22.0	4.3	24.0	4.7	28.0	4.9	31.0	4.9	34.0	4.9	7		20
14		25.0	5.1	28.0	5.5	32.0	5.9	36.0	5.9	40.0	5.9	7		16
15				33.0	6.6	38.0	7.1	42.0	7.1	46.0	7.1	8		8
16				38.0	8.0	43.0	8.4	48.0	8.4	52.0	8.4	8		16
17				44.0	9.6	49.0	9.9	54.0	9.9	58.0	9.9	9		15
18				50.0	11.3	56.0	11.5	61.0	11.5	65.0	11.5	9		15
19				56.0	13.2	62.0	13.3	67.0	13.3	72.0	13.3	10		13
20				63.0	15.2	69.0	15.2	74.0	15.2	79.0	15.2	10		9
21						75.0	17.2	81.0	17.2	87.0	17.2	11		6
22						82.0	19.6	88.0	19.6	95.0	19.6	12		3
23						88.0	22.0	96.0	22.0	103.0	22.0	12		5
24						95.0	25.0	103.0	25.0	111.0	25.0	13		4
25						102.0	29.0	111.0	29.0	120.0	29.0	14		4
26						109.0	32.0	119.0	32.0	129.0	32.0	15		2
27						116.0	36.0	127.0	36.0	138.0	36.0	15		
28						124.0	40.0	135.0	40.0	147.0	40.0	16		1
29						131.0	44.0	144.0	44.0	156.0	44.0	17		2
30						138.0	48.0	152.0	48.0	165.0	48.0	17		
Basis														253

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis. Height includes both logs and top. The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top" shown in the eighth column. The volume of "top" is that contained in the stem above this point and in addition all branches suitable for cordwood having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered topwood. Bark comprises about 13 per cent of total volume.

Table 31, U. S. Dept. of Agr. Bul. 285. The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 39
NORTHERN WHITE CEDAR
(Thuja occidentalis)
PEELED MERCHANTABLE VOLUME
New York

Diameter breast high	1922							Cubic feet
	Total height—feet							
	20	30	40	50	60	70	80	
	Volume—cubic feet							
<i>Inches</i>								
5	0.40	0.78	1.10	1.45				
6	1.38	1.82	2.20	2.92				
7	2.15	2.78	3.60	4.60				
8	3.50	4.10	5.05	6.30				
9	4.45	5.35	6.50	7.95	9.80			
10		7.00	8.20	9.75	11.40	13.35		
11			10.40	12.00	13.75	15.80	18.10	
12			12.65	14.45	16.35	18.40	20.90	
13			15.00	16.90	19.80	21.45	24.30	
14			17.50	19.50	21.75	24.20	27.80	
15			20.25	22.90	25.20	28.00	30.95	
16				25.80	28.50	31.75	35.00	
17				29.20	31.95	34.95	38.55	
18				32.00	35.41	39.15	42.70	
19				35.52	39.45	43.25	46.45	
20				40.00	43.50	47.00	50.50	

Volume includes the stem without bark above a 1-foot stump to a 4-inch top inside bark.
Based on 221 trees collected in St. Lawrence Co., N. Y.
Compiled by cross-curving volumes over diameter and height.
Table 66, N. Y., State College of Forestry, Bul. 14, H. C. Belyea, O. M. Porter.

Table 40
NORTHERN WHITE CEDAR
(Thuja occidentalis)
PEELED TOTAL VOLUME
New York

Diameter breast high	1922							Cubic feet
	Total height—feet							
	20	30	40	50	60	70	80	
	Volume—cubic feet							
<i>Inches</i>								
5	0.51	1.02	1.44	1.90				
6	1.75	2.31	2.79	3.70				
7	2.65	3.42	4.43	5.65				
8	4.17	4.89	6.02	7.50				
9	5.16	6.20	7.54	9.23	10.35			
10		7.92	9.27	11.00	12.90	15.10		
11			11.57	13.31	15.29	17.55	20.05	
12			13.91	15.90	18.00	20.27	23.00	
13			16.30	18.35	20.45	23.30	26.39	
14			18.72	20.85	23.30	25.95	29.70	
15			21.45	24.25	26.70	29.65	32.80	
16				27.10	29.95	33.30	36.80	
17				30.65	33.50	36.65	40.35	
18				33.35	36.90	40.60	44.50	
19				36.60	40.75	44.55	47.85	
20				41.05	44.55	48.25	51.95	

Volume includes the stump, stem and top without bark.
Based on 221 trees collected in St. Lawrence Co., N. Y.
Volumes computed by Smalian's formula.
Compiled by cross-curving volumes over diameter and height.
Table 65, N. Y. State College of Forestry, Bul. 14, H. C. Belyea, O. M. Porter.

Table 41
SECOND-GROWTH COTTONWOOD
(Populus deltoides)
VOLUME IN BOARD FEET
Mississippi Valley

Williamson Homans		1912						Scribner Decimal C	
Diameter breast high	Number of 16-foot logs						Top diameter inside bark	Basis	
	1	2	3	4	5	6			
	Volume—board feet, in tens								
<i>Inches</i>							<i>Inches</i>	<i>Trees</i>	
14	8	17					12	21	
15	9	18					12		
16	10	19					12	30	
17	11	21					13		
18	12	23	30				13	32	
19	14	25	34				13		
20	16	28	38	46			13	33	
21	18	31	43	53			14		
22	20	35	48	61	72		14	32	
23	23	39	54	68	80		15		
24	26	44	60	75	88		15	34	
25		48	66	82	96		15		
26		54	72	89	104	115	16	50	
27		59	79	97	113	124	16		
28		64	86	105	121	134	17	47	
29		70	93	113	130	144	17		
30		76	100	122	139	156	18	40	
31		82	107	130	149	167	18		
32		88	114	140	160	170	19	28	
33			121	149	171	192	19		
34			129	158	182	205	20	31	
35			136	167	194	219	20		
36			144	177	205	233	21	30	
37			152	186	217	247	22		
38			160	195	229	261	22	24	
39			168	205	241	275	23		
40			176	215	253	289	24	20	
41			184	225	265	303	25		
42			193	235	276	317	25	16	
43			201	245	288	331	26		
44			210	255	300	346	27	5	
45				266	313	361	28		
46				276	325	376	28	5	
47				287	337	392	29		
48				297	350	407	30		
49				307	362	423	31		
50				319	374	439	32		
Basis								478	

Height of stump, 2 feet for trees less than 36 inches in diameter breast high; 2.5 feet for trees 36 inches and over. Trees from Arkansas, Kentucky, Louisiana, Missouri, Mississippi, Tennessee.
Table 11, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 42
SECOND-GROWTH COTTONWOOD
(Populus deltoides)
VOLUME IN BOARD FEET
Mississippi Valley

Williamson Homans		1912										Scribner Decimal C	
Diameter breast high	Total height—feet										Top diameter inside bark	Basis	
	90	100	110	120	130	140	150	160	170	180			
	Volume—board feet, in tens												
<i>Inches</i>											<i>Inches</i>	<i>Trees</i>	
12	1	2	3	4							11		
13	4	5	6	7							12		
14	6	7	8	9							12	20	
15	9	11	12	13							12		
16	12	14	15	17	19						12	30	
17	15	18	20	22	24						13		
18	19	22	25	27	30	33					13	32	
19	23	26	30	33	37	40					13		
20	26	31	35	39	43	47	51				13	33	
21	30	36	40	45	50	55	59				14		
22	34	41	46	52	57	62	66	70			14	32	
23	39	46	52	58	64	69	74	78			15		
24	43	51	58	65	71	77	82	86	91		15	34	
25		57	64	71	78	84	90	94	98		15		
26		63	71	78	85	92	97	102	106		16	50	
27		69	77	85	92	99	105	110	115		16		
28		75	84	92	100	107	113	118	123		17	47	
29		81	90	99	108	115	121	127	132		17		
30		87	96	106	115	123	130	135	141	147	18	40	
31			102	112	122	131	138	145	150	156	18		
32			108	119	129	139	147	154	160	166	19	28	
33			114	126	137	148	156	163	170	176	19		
34			120	133	144	156	165	172	180	186	20	33	
35			125	140	152	164	174	182	189	196	20		
36			131	147	159	172	182	191	200	207	21	30	
37				153	166	180	191	201	210	218	22		
38				160	173	188	200	211	221	229	22	24	
39				167	180	196	208	221	231	240	23		
40				173	187	204	217	231	241	251	24	20	
41					194	211	225	240	250	262	25		
42					201	218	234	249	260	273	25	17	
43					208	226	242	258	270	284	26		
44					215	233	250	266	280	294	27	5	
45					222	241	259	275	290	305	28		
46					229	248	267	284	300	315	28	5	
47					236	256	276	293	310	326	29		
48					243	263	284	302	319	336	30		
49					250	270	292	311	329	347	31		
50					256	278	301	320	338	357	32		
Basis												480	

Height of stump, 2 feet for trees less than 36 inches in diameter breast high; 2.5 feet for trees 36 inches and over. Trees from Arkansas, Missouri, Kentucky, Mississippi, Tennessee, Louisiana.
Table 12, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 43
SECOND-GROWTH COTTONWOOD
(Populus deltoides)
Mississippi Valley

Homans Williamson		1910										Cubic feet
Diameter breast high	Total height—feet										Basis	
	50	60	70	80	90	100	110	120	130	140		150
Peeled volume—cubic feet												
Inches	2.5	3.0	3.5									Trees
5												16
6	3.5	4.5	5.0	6.0								26
7	5.0	6.0	6.5	7.5	8.5							22
8	6.5	7.5	8.5	9.5	11.0	12.5						24
9		9.5	10.5	12.0	14.0	16.5	19.5					29
10		11.5	13.0	15.0	17.5	20.5	24.0					21
11		13.5	15.5	18.0	21.0	24.5	28.5	33.0				32
12		16.0	18.5	21.5	25.0	29.0	33.5	38.0				20
13			22.5	25.5	29.0	33.5	38.0	43.0				25
14			26.5	29.5	33.5	38.0	43.0	48.5	54.0			25
15			33.5	37.5	42.5	48.5	54.5	60.0				18
16				37.5	42.0	47.5	53.5	60.0	67.0			14
17				41.5	47.0	53.0	59.5	66.5	73.5	80.5		19
18					52.0	58.5	65.5	73.0	80.5	89.0		13
19					56.5	64.5	72.5	80.5	89.0	97.5		19
20					62.0	71.0	79.5	88.5	97.5	107.5		9
21						78.5	88.0	97.5	107.5	118.5	129.0	8
22						86.5	97.0	107.5	118.5	130.0	142.5	7
23						95.5	107.0	118.5	130.0	142.5	156.0	6
24							118.5	130.5	142.5	156.0	170.0	9
25							131.0	143.0	156.0	169.0	183.0	9
26								156.0	169.0	183.0	197.0	10
27								168.5	182.0	196.0	211.5	9
28									194.5	210.0	225.5	2
29									208.0	223.5	239.5	10
30									221.5	238.0	254.5	7
Basis	20	36	26	41	54	55	64	35	30	33	15	409

Trees from Arkansas, Kentucky, Tennessee, Missouri, Mississippi, and Louisiana.
Table 14, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 44
SECOND-GROWTH WHITE AND ROCK ELM
(Ulmus americana and racemosa)
TOTAL PEELED VOLUME

Lott Bonninghausen Georkiantz		1930										Cubic feet
Diameter breast high	Total height—feet										Basis	
	10	20	30	40	50	60	70	80	90			
Volume—cubic feet												
Inches	.03	.05	.10									Trees
1												
2	.07	.15	.22	.30								
3	.12	.28	.43	.60	.80							
4	.18	.45	.70	1.00	1.30							
5		.70	1.15	1.65	2.12	2.60						1
6		1.05	1.75	2.50	3.25	4.00						10
7		1.55	2.55	3.60	4.60	5.60						4
8			3.45	4.85	6.29	7.68	9.05					3
9			4.55	6.38	8.15	10.0	11.8					2
10				8.10	10.4	12.8	15.1					1
11				9.90	12.9	15.8	18.9	22.0				
12					15.5	19.1	22.7	26.4				
13					18.5	22.9	27.3	31.5				1
14					22.0	27.0	31.8	36.9	41.6			1
15					26.0	31.0	36.1	41.5	46.5			1
Basis												24

Preliminary table.
Total volume includes stump, stem, and top without bark.
Compiled at the Lake States Forest Experiment Station by plotting actual volumes over cylinder volumes.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, +6.1 per cent.

Table 45
MIXED HARDWOODS
UNPEELED TOTAL VOLUME
Southern Michigan

Chittenden	1923	Cubic feet
	Diameter breast high	Volume
	Inches	Cubic feet
	2	0.4
	3	0.8
	4	1.5
	5	3.0
	6	4.6
	7	7.0
	8	9.5
	9	12.6
	10	16.2
	11	20.5
	12	25.0
	13	30.5
	14	36.0
	15	42.0
	16	48.0
	17	55.0
	18	62.0
	19	70.0
	20	79.5
	21	88.0
	22	99.0
	23	110.0
	24	122.5
	25	135.0

Volume includes cordwood in tops and branches.
Table II. Special Bul. 122, Improvement of the Farm Woodlot. Mich. Agr. College.

Table 46
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
VOLUME IN BOARD FEET
Michigan, Wisconsin

Frothingham Barrows	1912	Scribner Decimal C										
	Number of 16-foot logs										Top diameter inside bark	Basis
Diameter breast high	1	1 1/4	2	2 1/2	3	3 1/2	4	4 1/2	5			
	Volume—board feet, in tens											
Inches											Inches	Trees
8	1.8	2.8	3.8								6	53
9	1.9	3.0	4.2								6	72
10	2.0	3.2	4.7	6							6	56
11	2.3	3.9	5.7	7							6	53
12	2.5	4.5	6.6	8	11						7	46
13	2.6	5.3	7.9	10	13						7	35
14	2.8	6.3	9.2	12	14	17					7	18
15	3.0	7.2	11.0	13	17	20					8	31
16	3.2	8.2	12	15	19	22					8	25
17	3.4	9.4	14	18	21	25					8	30
18	3.6	11.0	16	20	24	28	32				8	14
19	3.8	12.0	18	22	27	31	35				9	16
20	4.0	13.0	20	25	29	34	39				9	20
21		15.0	23	28	33	38	43				9	11
22		17.0	26	31	36	42	48	53			10	13
23			28	34	40	46	53	60			10	4
24			31	37	44	51	58	66			10	6
25			33	40	48	56	64	73			10	9
26			36	43	52	60	70	81	92		11	4
27				47	56	66	77	88	100		11	8
28				50	60	71	83	96	109		11	6
29				53	64	76	90	104	118		11	3
30				56	68	82	96	111	127		12	1
31					72	88	104	120	137		12	2
32					77	93	111	128	146		12	1
33					82	99	118	137	156		12	3
34					87	105	125	145	167		13	1
35						114	134	155	176		13	1
36						121	142	164	187		13	
37						127	150	173	197		13	
38						133	158	183	208		14	
Basis												542

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs where necessary. Stump height, 2 feet.
Table 90, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 47
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
VOLUME IN BOARD FEET
Michigan, Wisconsin

Frothingham Barrows		1912							Scribner Decimal C	
Diameter breast high	Total height—feet							Top diameter inside bark	Basis	
	30	40	50	60	70	80	90			100
	Volume—board feet, in tens									
<i>Inches</i>								<i>Inches</i>	<i>Trees</i>	
8.....	0.5	0.7	1.3	2.0	2.5	3		6	53	
9.....	0.8	1.4	2.2	2.9	3.5	4		6	72	
10.....	1.2	2.2	3.2	4.0	4.7	5		6	56	
11.....	1.6	2.9	4.2	5.1	6.0	7	8	6	53	
12.....	2.0	3.7	5.3	6.4	7.6	8	9	7	46	
13.....	2.5	4.6	6.5	7.8	9.4	10	11	7	35	
14.....	3.0	5.6	7.7	9.5	11	13	14	7	18	
15.....	3.6	6.5	9	11	13	15	16	8	31	
16.....	4.1	7.6	11	13	16	18	19	20	8	
17.....		8.7	12	15	18	21	22	24	8	
18.....		10.0	14	18	21	24	26	28	8	
19.....			16	20	24	28	30	32	9	
20.....			18	23	28	31	34	36	9	
21.....			20	26	31	35	38	41	9	
22.....			22	29	35	39	43	47	10	
23.....				33	38	44	48	52	10	
24.....				36	42	49	54	58	10	
25.....				39	46	53	60	65	10	
26.....				43	51	58	66	72	11	
27.....				47	55	64	72	79	11	
28.....				50	59	69	78	87	11	
29.....				54	64	75	85	94	11	
30.....				57	68	80	92	103	12	
31.....					72	86	99	111	12	
32.....					76	93	107	120	12	
33.....					81	99	114	129	12	
34.....					85	105	122	138	13	
35.....						112	130	148	13	
36.....						118	138	157	13	
37.....							147	167	13	
38.....							155	178	14	
Basis.....									542	

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.
 Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs.
 Stump height, 2 feet.
 Table 12, U. S. Dept. of Agr. Bul. 152. The Eastern Hemlock. 1913.

Table 48
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
PEELED MERCHANTABLE VOLUME
New York

Belyea		1919							Standard cords	
Diameter breast high	Total height—feet							Top diameter inside bark	Basis	
	40	50	60	70	80	90	100			
	Merchantable volume—cords*									
<i>Inches</i>								<i>Inches</i>	<i>Trees</i>	
6.....	.06	.07								
7.....	.07	.09								
8.....	.09	.11	.13							
9.....	.12	.14	.17							
10.....	.14	.17	.20	.24						
11.....	.16	.20	.24	.28	.34					
12.....	.20	.24	.28	.34	.38					
13.....	.24	.28	.34	.38	.44					
14.....		.34	.38	.44	.51	.58				
15.....		.38	.43	.50	.57	.66				
16.....		.42	.48	.56	.64	.73	.82			
17.....		.46	.56	.62	.71	.80	.90			
18.....		.51	.61	.70	.80	.92	1.04			
19.....			.67	.78	.89	1.04	1.19			
20.....			.73	.85	.99	1.17	1.34			
21.....				.93	1.10	1.29	1.51			
22.....				1.01	1.23	1.44	1.67			
23.....				1.10	1.36	1.60	1.86			
24.....				1.20	1.49	1.77	2.05			
25.....				1.31	1.64	1.95	2.24			
26.....				1.45	1.79	2.16	2.43			
27.....					1.92	2.34	2.62			
28.....					2.00	2.54	2.83			
29.....					2.17	2.74	3.05			
30.....					2.35	2.94	3.27			

*Converted on the basis of 90 cubic feet of mixed diameters to the solid cord.
 Volume of stem without bark above a 1.5-foot stump to a 4-inch top diameter inside bark.
 Volumes by Smelian's formula.
 Cubic-foot table compiled by cross-curving volumes over diameter and height.
 Based on 950 trees collected in St. Lawrence Co., N. Y.
 Table 51, N. Y. State College of Forestry Bul. 14, H. C. Belyea, O. M. Porter.

Table 49
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
UNPEELED MERCHANTABLE VOLUME
Michigan, Wisconsin

Frothingham Barrows		1912								Cubic feet	
Diameter breast high	Total height—feet								Basis		
	30	40	50	60	70	80	90	100			
Unpeeled volume—cubic feet											
Inches									Trees		
5	1.0	1.2	1.7							18	
6	2.0	2.6	3.3							16	
7	3.1	4.1	5.2	5.9						28	
8	4.1	5.5	7.3	8.4						53	
9	5.4	7.4	9.3	10.9	12.3					72	
10	7.0	9.5	11.9	14.1	15.7					56	
11	8.6	11.8	14.6	17.2	19.6	22				53	
12	10.6	14.4	18.0	21.0	24.0	26				46	
13	12.5	17.0	21.0	24.0	28.0	31	33			35	
14	14.8	20.0	24.0	28.0	33.0	37	39			18	
15	17.0	23.0	28.0	33.0	38.0	42	45			31	
16	19.3	26.0	32.0	38.0	44.0	48	51	54		25	
17			36.0	43.0	50.0	54	59	62		30	
18			41.0	48.0	56.0	61	67	71	14	16	
19			45.0	54.0	62.0	69	75	79	16	14	
20			50.0	60.0	69.0	77	83	87	20	20	
21				66.0	76.0	85	91	98	11	11	
22				72.0	83.0	93	100	109	13	13	
23				79.0	91.0	102	109	119	4	4	
24				85.0	99.0	111	119	129	6	6	
25					107.0	120	131	143	9	9	
26					116.0	130	144	156	4	4	
27					123.0	139	155	169	8	8	
28					131.0	147	167	182	6	6	
29						157	179	195	3	3	
30						169	191	208	1	1	
31						180	204	222	2	2	
32						192	218	237	1	1	
33							231	252	3	3	
34							246	267	1	1	
35							260	283	1	1	
36							275	299			
Basis										604	

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.
Based on taper curves. Volume includes stem with bark between a 2-foot stump and a 4-inch top. Bark forms 19 per cent of the total volume of the stem.
Table 17, U. S. Dept. of Agr. Bul. 152, The Eastern Hemlock. 1913.

Table 50
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
PEELED MERCHANTABLE VOLUME
Wisconsin

Lotti Gevorkiantz		1930								Cubic feet	
Diameter breast high	Total height—feet								Basis		
	20	30	40	50	60	70	80	90		100	
Volume—cubic feet											
Inches									Trees		
4	.416	.640	.864	1.08						1	
5	.777	1.19	1.61	2.02	2.44					3	
6	1.22	1.90	2.58	3.25	3.92					4	
7	1.77	2.74	3.71	4.69	5.65					2	
8		3.83	5.14	6.45	7.76	9.07				4	
9		4.83	6.62	8.41	10.2	12.0				1	
10			8.37	10.6	12.8	15.1	17.3			2	
11			10.3	13.2	16.0	18.8	21.6			3	
12				15.7	18.9	22.1	25.3	28.5		3	
13				18.6	22.6	26.6	30.6	34.6		2	
14				22.0	26.6	31.1	35.4	39.9		1	
15					30.9	36.1	41.3	46.5	51.7	2	
16					34.9	41.1	47.3	53.5	59.6	1	
17					40.1	46.3	52.5	58.7	64.8	1	
18					44.5	52.2	59.9	67.7	75.4	3	
19					49.9	58.6	67.2	75.8	84.5	3	
20					54.7	64.3	73.9	83.5	93.1	1	
21					60.3	71.0	81.7	92.3	103	2	
22					67.1	78.4	89.6	101	112	1	
23						86.3	98.0	109	121	1	
24						93.1	106	118	131	2	
25						99.9	113	126	139		
Basis		3	8	9	5	8	9	1		43	

Volume includes peeled stem above 1-foot stump to a 3-inch top diameter inside bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by curving merchantable volumes over total volumes.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ±7.1 per cent.

Table 51
OLD-GROWTH EASTERN HEMLOCK
(Tsuga canadensis)
PEELED TOTAL VOLUME

Wisconsin

Lotti
Gevorkiantz

1930

Cubic feet

Diameter breast high	Total height—feet										Basis	
	10	20	30	40	50	60	70	80	90	100		
Volume—cubic feet												
Inches											Trees	
1	.020	.65	.110									
2	.080	.200	.320									
3	.170	.385	.600									
4		.650	1.00	1.35	1.70							1
5		1.05	1.61	2.17	2.72	3.28						3
6		1.50	2.34	3.18	4.02	4.84						4
7		2.06	3.20	4.33	5.46	6.59						2
8			4.30	5.78	7.26	8.74	10.2					4
9			5.30	7.30	9.30	11.2	13.1					1
10				9.00	11.4	13.8	16.2	18.6	20.9			2
11				11.0	14.0	17.0	20.0	23.0	26.0			3
12				13.3	16.7	20.1	23.6	27.1	30.6			3
13				15.4	19.6	23.8	28.0	32.2	36.4			2
14					23.2	28.0	32.7	37.3	42.0	46.6		1
15					26.6	32.1	37.6	43.0	48.4	53.8		2
16					29.8	36.3	42.8	49.2	55.7	61.2		1
17						41.8	48.2	54.7	61.1	67.5		1
18						46.4	54.4	62.4	70.5	78.5		3
19						52.0	61.0	70.0	79.0	88.0		3
20						57.0	67.0	77.0	87.0	97.0		1
21						62.2	73.2	84.2	95.2	106		2
22						69.6	81.0	92.4	104	115		1
23						76.9	89.0	101	113	125		1
24						83.0	96.0	109	122	135		2
25						90.0	103	117	130	143		
Basis			3	8	9	5	8	9	1			43

Total volume includes the stump, stem and top without bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by curving actual volumes over modified cylinder volumes.
Data collected in 1930.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ±7.1 per cent.

Table 52
OLD-GROWTH HICKORY
(Hicoria sp.)

UNPEELED MERCHANTABLE VOLUME
Mississippi and Ohio Valleys, Appalachians

Boisen

1909

Cubic feet

Diameter breast high	Merchantable length—feet														Top diam- eter inside bark	Basis	
	5	10	15	20	25	30	35	40	45	50	55	60	65				
Volume—cubic feet																	
Inches															Inches	Trees	
5	1.0	1.8	2.3													4	5
6	1.3	2.5	3.2	3.6												5	19
7	1.6	3.2	4.2	5.0	5.7											6	26
8	2.0	4.0	5.4	6.5	7.5											6	43
9	2.5	4.8	6.6	8.2	9.6	10.0										7	56
10	3.0	5.8	8.1	10.0	11.5	13.0										8	53
11	3.5	6.9	9.7	12.0	14.0	16.0	18.0									8	55
12	4.1	8.0	11.5	14.5	17.0	20.0	21.5	23.5								9	30
13	4.8	9.3	13.5	17.0	20.5	23.5	26.0	28.5	31							10	36
14	5.5	10.5	15.5	20.0	24.0	27.5	31.0	34.0	37							11	36
15	6.2	12.0	17.5	23.0	27.5	32.0	36.0	39.0	43							11	29
16	7.0	14.0	20.0	26.5	31.0	36.0	41.0	45.0	50	54						12	24
17	8.0	15.5	23.0	29.5	36.0	41.0	46.0	51.0	56	61	66					13	23
18		17.5	25.5	33.0	40.0	46.0	52.0	58.0	63	69	74					14	17
19		19.5	28.5	37.0	45.0	52.0	58.0	64.0	70	76	82					14	23
20		21.5	32.0	41.0	50.0	57.0	64.0	71.0	78	84	90	97	103			15	22
21		24.0	35.0	45.0	54.0	63.0	71.0	79.0	86	93	100	107	113			16	19
22		26.0	38.0	50.0	60.0	69.0	77.0	86.0	94	102	110	118	126			16	20
23		28.5	42.0	54.0	65.0	75.0	84.0	93.0	102	111	120	128	137			17	25
24		31.0	45.0	59.0	70.0	81.0	91.0	102.0	111	121	130	139	148			18	16
25		34.0	49.0	64.0	76.0	88.0	99.0	110.0	121	130	140	149	158			19	10
26		36.5	53.0	69.0	82.0	95.0	107.0	119.0	130	140	151	161	171			19	12
27			57.0	74.0	89.0	103.0	116.0	128.0	140	151	162	173	183			20	8
28			61.0	80.0	97.0	112.0	125.0	137.0	149	161	173	185	197			20	3
Basis																	610

Data for five species of hickory.
Table 8, U. S. Forest Service Bul. 80, The Commercial Hickories, 1910.

Table 53

HICKORY

(Hicoria sp.)

UNPEELED TOTAL VOLUME

Mississippi and Ohio Valleys, Appalachians

Boisen	1909						Cubic feet	
	Total height—feet							Used volume
	40	50	60	70	80	90		
Total volume—cubic feet							Per cent	
Inches								40
5	2.1	3.1	4.3	6.0				40
6	3.3	4.5	5.9	7.8				41
7	4.7	6.2	7.9	9.9	12.6			42
8	6.4	8.2	10.1	12.5	15.5	18.7		44
9	8.2	10.4	12.8	15.5	18.8	22.5		45
10	10.4	13.0	15.8	19.0	22.6	26.7		47
11	12.8	15.9	19.3	23.0	27.0	31.5		49
12	15.6	19.0	23.2	27.4	31.9	36.8		50
13		22.6	27.5	32.1	37.2	42.8		52
14			32.0	37.2	43.0	49.2		53
15			36.8	42.6	49.1	55.8		53
16				48.4	55.5	62.8		54
17				54.5	62.5	70.4		54
18				60.8	69.8	78.8		54

Basis, 365 trees of 5 species cut for staves and bolts. Volume includes tops and larger branchwood and bark. Top diameter 2 inches outside bark.
Table 7, U. S. Forest Service Bul. 80, The Commercial Hickories. 1910.

Table 54

PLANTATION BLACK LOCUST

(Robinia pseudoacacia, Linn.)

VOLUME IN BOARD FEET

Central Hardwood Region

Kellogg, L. F.	1934						International ¼		
	Total height—feet							Basis	
	30	40	50	60	70	80			90
Volume—board feet							Trees		
(o. b.) (i. b.)									
Inches									
6	5.0	2.5	2.5	3.5	3.5	4.5	29		
7	5.9	2.5	3.5	6.5	8.0	11.0	27		
8	6.7	2.5	7.0	14.0	19.0	22.0	25		
9	7.6	3.5	16.0	27.0	32.0	36.0	27		
10	8.4		24.0	36.0	43.0	48.0	33		
11	9.3		31.0	45.0	53.0	62.0	23		
12	10.2		38.0	56.0	67.0	77.0	18		
13	11.0			67.0	80.0	91.0	8		
14	11.9			79.0	94.0	112.0	6		
15	12.8			90.0	113.0	133.0	5		
16	13.6				132.0	157.0	4		
17	14.5				155.0	183.0	5		
18	15.3				176.0	208.0	4		
19	16.2				199.0	233.0	4		
20	17.1				222.0	261.0	419		
Basis		5	16	75	31	50	29	12	218

Plantation black locust from Indiana, Illinois and Ohio.
Stump height, 1 foot; top diameter, 5 inches inside bark.
Trees scaled in 12.3-foot log lengths.
Compiled at the Central States Forest Experiment Station by the alignment-chart method.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ± 17.4 per cent (190 trees).

Table 55
PLANTATION BLACK LOCUST
(Robinia pseudoacacia, Linn.)
VOLUME IN BOARD FEET
Central Hardwood Region

Kellogg, L. F.		1934						Scribner
Diameter breast high		Total height—feet						Basis
		40	50	60	70	80	90	
(o. b.)	(i. b.)	Volume—board feet						
Inches								Trees
10	8.4	10	10	10	10	10	10	5
11	9.3	18	19	21	25	52	42	22
12	10.2	35	38	42	48	57	71	18
13	11.0	52	55	59	66	79	97	8
14	11.9		73	79	88	103	126	6
15	12.8			97	107	126	155	5
16	13.6			117	130	153	189	4
17	14.5			139	155	181	225	5
18	15.4			160	176	209	260	4
19	16.2			179	200	237	285	4
20	17.1			200	223	262	325	
Basis		1	9	9	29	21	12	81

Plantation black locust from Indiana, Illinois, and Ohio.
 Stump height, 1 foot; top diameter, 8 inches inside bark.
 Trees scaled in 12.3-foot log lengths.
 Compiled at the Central States Forest Experiment Station by the alignment-chart method.
 Block indicates extent of data.
 Aggregate deviation, .4 per cent.
 Average deviation, ± 12.0 per cent (74 trees).

Table 56
PLANTATION BLACK LOCUST
(Robinia pseudoacacia)
UNPEELED MERCHANTABLE VOLUME
Central Hardwood Region

Kellogg, L. F.		1934						Cubic feet		
Diameter breast high		Total height—feet						Basis		
		20	30	40	50	60	70		80	90
Inches		Volume—cubic feet						Trees		
		4	0.26	0.36	0.44	0.52				
5	0.56	1.08	1.58	2.00	2.40				44	
6	0.90	1.93	2.84	3.58	4.30				29	
7	1.34	2.90	4.20	5.30	6.30	7.20			30	
8		4.00	5.80	7.30	8.60	10.00	11.20		21	
9		5.10	7.50	9.40	11.00	12.70	14.40		39	
10		6.30	9.30	11.50	13.70	15.80	17.80	20.00	26	
11			11.30	14.20	16.70	19.30	21.70	24.50	24	
12			13.50	17.00	20.00	23.10	26.00	29.40	9	
13			19.70	23.20	26.80	30.10	34.00		11	
14			23.00	27.00	31.00	35.00	39.50		5	
15			31.10	35.90	40.60	46.00			2	
16				35.20	40.80	46.10	53.00		5	
17				39.50	46.00	53.00	62.00		5	
18				45.00	53.00	62.00	72.00		3	
19				51.00	61.00	70.00	82.00		3	
20				58.00	68.00	80.00	93.00			
Basis		15	37	69	60	36	41	30	2	290

Plantation black locust from Indiana, Illinois and Ohio.
 Volume above a 1-foot stump to a 4-inch top outside bark.
 Volumes by planimeter.
 Compiled at the Central States Forest Experiment Station by the alignment-chart method.
 Block indicates extent of data.
 Aggregate deviation, .7 per cent.
 Average deviation, ± 9.5 per cent.

Table 57
PLANTATION BLACK LOCUST*
(Robinia pseudoacacia)
PEELED TOTAL STEM VOLUME
Central Hardwood Region

Kellogg, L. F.		1933								Cubic feet	
Diameter breast high	Total height—feet								Basis		
	10	20	30	40	50	60	70	80		90	
	Volume—cubic feet										
Inches										Trees	
1	0.04	0.07	0.09	0.11						14	
2	0.13	0.22	0.30	0.38	0.46					32	
3	0.21	0.38	0.53	0.70	0.85	1.03				34	
4	0.36	0.62	0.90	1.21	1.50	1.78	2.07			37	
5	0.49	0.96	1.39	1.84	2.30	2.73	3.07			42	
6		1.34	1.97	2.61	3.22	3.83	4.46	5.20		45	
7		1.80	2.70	3.55	4.25	5.25	6.20	7.00	8.30	27	
8			3.52	4.65	5.80	6.80	8.10	9.30	10.70	26	
9			4.40	5.90	7.30	8.75	10.20	11.60	13.30	26	
10			5.50	7.25	9.10	10.70	12.40	14.20	16.50	30	
11			6.60	8.80	10.80	12.80	14.70	17.00	19.50	25	
12			7.80	10.30	12.70	15.10	17.30	20.00	23.30	22	
13			9.20	12.00	14.90	17.50	20.20	23.40	27.00	8	
14			13.80	17.00	20.20	23.30	26.70	31.00		6	
15			15.80	19.50	23.00	26.50	30.40	35.00		5	
16					22.30	26.30	30.40	34.40	40.10	4	
17					25.00	29.60	34.40	39.40	45.30	4	
18						33.70	38.90	45.00	52.00	4	
19						38.60	44.00	51.60	59.50	4	
20						44.00	50.70	59.00	68.00	1	
Basis	18	53	65	44	90	39	43	29	15	396	

*Plantation black locust from Indiana, Illinois, and Ohio.
Volume includes the stem and top without bark.
Stump height, 1 foot.
Volumes by planimeter.
Compiled at the Central States Forest Experiment Station by the aline-
ment-chart method.
Block indicates extent of data.
Aggregate deviation, .01 per cent.
Average deviation, ±9 per cent.

Table 58
SUGAR MAPLE
(Acer saccharum)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
Form Class 70
Michigan and Wisconsin

Gevorkiantz				Scribner			
Diameter breast high	Number of 16-foot logs	Volume	Basis	Diameter breast high	Number of 16-foot logs	Volume	Basis
Inches		Board feet	Trees	Inches		Board feet	Trees
12	1	34	3	25	1	202	3
13	1	43	3	2	2	350	3
14	1	52	3	3	3	476	4
	2	86	3	4	4	574	2
15	1	63	3	26	1	221	
	2	108	7	2	2	385	2
	3	142		3	3	521	3
16	1	74		4	4	629	2
	2	126	5	27	1	240	
	3	157	1	2	2	417	1
17	1	85		3	3	566	4
	2	145	5	4	4	682	1
	3	196	4	28	1	260	
18	1	97		2	2	451	4
	2	167	2	3	3	613	2
	3	225	7	4	4	743	
19	1	110		29	1	281	
	2	190	5	2	2	488	1
	3	256	4	3	3	667	2
20	1	123		4	4	801	1
	2	215		30	1	302	
	3	289	5	2	2	526	
	4	345		3	3	716	3
21	1	137		4	4	865	
	2	238	3	31	1	323	
	3	322	5	2	2	563	
	4	386		3	3	765	1
22	1	153		4	4	928	2
	2	264	1	32	1	348	
	3	358	4	2	2	605	
	4	432		3	3	825	3
23	1	168		4	4	995	
	2	291	3	33	1	372	
	3	396	7	2	2	647	
	4	476		3	3	881	1
24	1	185		4	4	1065	
	2	320	2	34	1	397	
	3	437	6	2	2	690	1
	4	525		3	3	941	
				4	4	1135	
Basis							134

*Girard form class.
Volume above stump to point where stem divides into branches.
Top diameter variable, not less than 8 inches inside bark.
Stump height, 2 feet.
Compiled at the Lake States Forest Experiment Station from Girard form-
class taper tables. Based on both second-growth and old-growth timber.
Aggregate deviation, .6 per cent.
Average deviation, ±5.5 per cent.

Table 59
SUGAR MAPLE
(*Acer saccharum*)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
Form Class 75
Michigan and Wisconsin

Gevorkiantz				Scribner			
Diameter breast high	Number of 16-foot logs	Volume	Basis	Diameter breast high	Number of 16-foot logs	Volume	Basis
Inches		Board feet	Trees	Inches		Board feet	Trees
11	1	32	6	25	1	237	
12	1	42	8		2	410	
13	1	52	3		3	553	3
	2	88	8		4	654	2
14	1	63		26	1	257	
	2	106	11		2	446	3
	3	140			3	598	4
15	1	74			4	713	1
	2	126	6	27	1	278	
	3	166	3		2	482	1
16	1	86			3	651	1
	2	147	7		4	776	
	3	197	1	28	1	302	
17	1	101			2	526	
	2	173	7		3	707	
	3	230	6		4	842	
18	1	113		29	1	327	
	2	194	1		2	567	1
	3	261	8		3	761	
19	1	127			4	909	
	2	220	3	30	1	351	
	3	295	3		2	611	
	4	347			3	820	
20	1	144			4	980	
	2	248	3	31	1	375	
	3	333	2		2	663	
	4	393	1		3	881	2
21	1	165			4	1051	2
	2	278	4	32	1	403	
	3	374	4		2	702	
	4	443	1		3	944	1
22	1	177			4	1127	
	2	306	3	33	1	431	
	3	411	8		2	748	
	4	490	3		3	1008	1
23	1	194			4	1208	
	2	338	3	34	1	458	
	3	455	5		2	798	
	4	540			3	1076	1
24	1	216			4	1287	
	2	373	3	Basis			149
	3	503	3				
	4	597	1				

*Girard form class.
Volume above stump to point where stem divides into branches.
Top diameter variable, not less than 8 inches inside bark.
Stump height, 2 feet.
Compiled from Girard form-class taper tables.
Aggregate deviation, .6 per cent.
Average deviation, ±5.5 per cent.

Table 60
SUGAR MAPLE
(*Acer saccharum*)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
Form Class 80
Michigan and Wisconsin

Gevorkiantz				Scribner			
Diameter breast high	Number of 16-foot logs	Volume	Basis	Diameter breast high	Number of 16-foot logs	Volume	Basis
Inches		Board feet	Trees	Inches		Board feet	Trees
10	1	30	3	24	1	248	
11	1	39	11		2	425	2
12	1	50	6		3	566	5
	2	83	5		4	665	1
13	1	61		25	1	272	
	2	102	17		2	466	1
14	1	74			3	620	2
	2	124	8		4	785	1
	3	162		26	1	296	
15	1	85			2	509	
	2	146	11		3	677	4
	3	192	3		4	799	1
16	1	101		27	1	320	
	2	171	10		2	551	1
	3	226	7		3	734	
17	1	115			4	868	
	2	196	6	28	1	348	
	3	259	6		2	599	
18	1	131	1		3	796	2
	2	224	4		4	943	2
	3	297	10	29	1	375	
	4	347	1		2	647	
19	1	148	1		3	853	
	2	254	4		4	1017	
	3	336	3	30	1	403	
	4	393	1		2	693	1
20	1	166			3	924	1
	2	285	1		4	1092	
	3	377	4	31	1	431	
	4	443	1		2	742	
21	1	185			3	989	
	2	316	1		4	1172	
	3	422	9	32	1	462	
	4	496	1		2	796	
22	1	204			3	1061	
	2	350	3		4	1258	
	3	467	6	33	1	494	
	4	548	1		2	852	
23	1	227			3	1135	
	2	388	1		4	1346	
	3	517	7	34	1	526	
	4	609	2		2	908	
					3	1210	
					4	1437	
				Basis			179

*Girard form class.
Volume above stump to point where stem divides into branches.
Top diameter variable, not less than 8 inches inside bark.
Stump height, 2 feet.
Compiled from Girard form-class taper tables.
Aggregate deviation, .6 per cent.
Average deviation, ±5.5 per cent.

Table 61
OLD-GROWTH SUGAR MAPLE
(Acer saccharum)

VOLUME IN BOARD FEET

Central Michigan

Chittenden, A. K.		1925						Scribner	
Diameter breast high	Merchantable length—feet*						Top diam- eter	Basis	
	24	32	40	48	56	64			
	Volume—board feet								
Inches						Inches	Trees		
10	44	60				8.6	19		
11	48	68	89			9.1	29		
12	53	76	95	112		9.3	32		
13	62	87	113	136		9.7	37		
14	75	104	132	161	196	10.1	38		
15	93	123	156	189	227	10.4	47		
16	114	147	184	220	256	10.8	48		
17	141	174	215	254	294	11.2	63		
18	171	205	250	295	336	11.7	57		
19	203	239	288	336	377	12.1	36		
20		277	329	380	424	12.6	30		
21		319	372	425	474	13.2	46		
22		363	418	473	529	13.8	50		
23		408	467	525	588	14.5	36		
24		455	519	583	651	15.2	44		
25		503	574	644	721	16.0	28		
26		550	634	712	798	16.9	25		
27			694	787	879	17.8	24		
28			756	867	967	18.9	13		
29			821	951	1061	20.1	10		
30				1040	1159	21.3	8		
31				1130	1258	22.6	7		
32					1357	23.9	9		
Basis							725		

*Merchantable length is the length which can be used for logs.
 Chittenden, A. K., Mich. State College Agr. Exp. Sta. Quart. Bul. Volume
 of Sugar Maple Trees. Vol. 7. No. 4. 1925.

Table 62
SUGAR MAPLE
(Acer saccharum)
VOLUME IN BOARD FEET
 Michigan, Wisconsin

Gévorkiantz 1933 Scribner

Diameter breast high	Number of 16-foot logs				Basis
	1	2	3	4	
	Volume—board feet				
Inches					Trees
10	31				4
11	40				17
12	56	84			22
13	61	102			31
14	72	123	157		25
15	85	146	189		33
16	95	169	221		31
17	111	192	253		34
18	126	219	287	340	34
19	149	244	322	381	24
20	156	270	330	423	16
21	172	299	397	470	28
22	189	328	437	520	33
23	207	359	480	568	28
24	226	390	522	622	23
25	246	424	567	676	18
26	266	460	616	732	20
27	287	496	670	793	10
28	308	532	720	852	10
29	330	571	769	914	5
30	351	611	820	980	5
31	373	649	868	1046	7
32	395	690	923	1108	4
33	417	730	984	1177	2
34	442	780	1054	1246	2
35	465	829	1140	1314	
Basis					466

Volume above a 2-foot stump to the point where the stem divides into large
 branches. Top diameter not less than 8 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-
 class taper tables.

Based on both second-growth and virgin timber.
 Block indicates extent of data.
 Average deviation, ± 12 per cent.

Table 65
OLD-GROWTH SUGAR MAPLE
(*Acer saccharum*)

Michigan

Neetzel
Gevorkiantz
Zillgitt

1933

Scribner

Diameter breast high	Total height—feet					Basis
	70	80	90	100	110	
	Volume—board feet					
Inches	20	30	40	60		Trees
14						3
15	50	70	80	110	170	9
16	90	110	140	170	240	16
17	130	160	180	220	300	12
18	170	200	230	280	370	15
19	220	250	280	330	430	14
20	260	300	340	390	490	13
21	310	350	390	440	540	23
22	360	400	440	490	600	26
23	410	450	490	550	660	24
24	460	500	540	600	720	18
25	500	550	590	660	790	18
26	550	600	650	710	850	17
27	600	650	700	770	920	9
28	650	700	760	830	990	9
29	700	760	820	890	1070	5
30	750	810	870	960	1180	2
31		860	930	1020	1230	5
32		920	990	1100	1310	3
33		980	1070	1170	1390	2
34		1050	1140	1250	1480	2
Basis	12	67	126	39	1	245

Data from Upper Peninsula Forest Experiment Station.
Stump height, 1.5 feet; top diameter, 12 inches inside bark.
Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
Block indicates extent of data.
Aggregate deviation, .4 per cent.
Average deviation, ± 17.9 per cent.

Table 64
OLD-GROWTH SUGAR MAPLE
(*Acer saccharum*)

VOLUME IN BOARD FEET

Michigan, Wisconsin

Frothingham
Barrows

1912

Scribner Decimal C

Diameter breast high	Number of 16-foot logs						Top diam- eter inside bark	Basis
	1½	2	2½	3	3½	4		
	Volume—board feet, in tens							
Inches							Inches	Trees
8	2.5	3.1	3.8				6	21
9	3.0	4.0	5.0				6	35
10	3.7	4.7	6.2	7.6	9.4		6	23
11	4.3	5.9	7.6	9.3	11		6	26
12	5.0	7.0	9.1	11	14	17	7	25
13	5.7	8.2	11	13	16	19	7	20
14	6.5	9.5	13	16	19	22	7	22
15	7.3	11	15	18	22	25	8	16
16	8.3	12	17	21	25	29	8	22
17	9.3	14	19	24	28	33	9	7
18	10	16	22	27	32	38	9	13
19		18	24	30	37	43	10	6
20		20	27	34	41	49	10	9
21		22	30	38	46	55	11	7
22		25	34	42	52	62	12	7
23		28	37	47	58	69	12	6
24		31	41	52	64	77	13	2
25		34	46	57	71	84	14	6
26		37	50	63	78	93	15	1
27			55	69	86	102	15	2
28			60	76	94	111	16	
29			65	82	102	121	17	
30			69	89	111	130	17	2
Basis								278

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves mostly in 16.3-foot logs, with a few shorter logs
where necessary. Stump height, 1 foot. Average utilization.
Table 25, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest.
1915.

Table 65

OLD-GROWTH SUGAR MAPLE
(*Acer saccharum*)

UNPEELED TOTAL VOLUME

Michigan, Wisconsin

Diameter breast high	1912						Basis
	Total height—feet						
	50	60	70	80	90	100	
	Volume—cords						
<i>Inches</i>							<i>Trees</i>
6.....	.032	.039	.045	.053			9
7.....	.071	.087	.103	.119			18
8.....	.113	.132	.151	.169			21
9.....	.160	.175	.195	.221			35
10.....	.207	.223	.247	.279		.315	23
11.....	.257	.273	.304	.343	.387		26
12.....	.312	.329	.365	.413	.465	.523	25
13.....		.391	.432	.489	.552	.621	20
14.....		.456	.505	.572	.644	.727	22
15.....		.529	.580	.660	.744	.840	16
16.....		.608	.663	.755	.853	.960	22
17.....			.747	.855	.968	1.087	7
18.....			.836	.964	1.091	1.221	13
19.....			.932	1.079	1.220	1.360	6
20.....			1.033	1.197	1.352	1.507	9
21.....			1.140	1.324	1.497	1.660	7
22.....			1.255	1.456	1.644	1.823	7
23.....			1.377	1.599	1.803	1.997	6
24.....			1.505	1.748	1.981	2.189	2
25.....				1.909	2.171	2.408	6
26.....				2.104	2.379	2.661	1
27.....				2.288	2.592	2.907	2
28.....				2.484	2.811	3.149	
29.....				2.692	3.045	3.400	
30.....				2.885	3.269	3.656	2
Basis.....							305

Data collected in Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Volume includes wood and bark of stem above a 1-foot stump, and in addition all branches suitable for cordwood having a diameter, outside of bark, of 2 inches or more at the middle of a 5-foot stick.
Standard cords 4x4x8 feet; 75 cubic feet per cord.

Table 66
OLD-GROWTH SUGAR MAPLE
(*Acer saccharum*)

UNPEELED TOTAL AND MERCHANTABLE VOLUME

Michigan and Wisconsin

Diameter breast high	1912												Top diam- eter inside bark	Basis	
	Total height—feet														
	50	60	70	80	90	100	Volume—cubic feet								
							Logs	Top	Logs	Top	Logs	Top			
<i>Inches</i>														<i>Inches</i>	<i>Trees</i>
6.....	0.6	1.8	0.7	2.2	0.8	2.6	1.0	3.0						6	9
7.....	3.4	1.9	4.2	2.3	5.0	2.7	5.7	3.2						6	18
8.....	6.5	2.0	7.4	2.5	8.4	2.9	9.4	3.3						6	21
9.....	9.8	2.2	10.4	2.7	11.8	3.0	13.1	3.5						6	35
10.....	13.1	2.4	13.8	2.9	15.2	3.3	17.2	3.7	19.4	4.2				6	23
11.....	16.7	2.6	17.4	3.1	19.3	3.5	22.4	4.0	25.4	4.5				6	26
12.....	21.0	2.8	21.3	3.4	24.4	3.8	27.7	4.4	30.4	4.9	34	5.4		7	25
13.....			25.3	3.7	28.4	4.2	32.4	4.8	36.4	5.4	41	6.0		7	20
14.....			30.4	4.1	33.4	4.8	37.4	5.4	42.4	6.0	48	6.7		7	22
15.....			35.4	4.7	38.4	5.4	43.4	6.1	49.4	6.8	55	7.5		8	16
16.....			40.4	5.4	43.4	6.3	50.4	7.0	56.4	7.8	64	8.5		8	22
17.....				49.4	7.2	56.4	8.0	64.4	8.9	72.4	9.0	9.0		9	7
18.....				54.4	8.4	63.4	9.4	72.4	10.2	81.4	11.0	11.0		9	13
19.....				60.4	9.8	70.4	11.0	80.4	11.8	92.4	12.6	12.6		10	6
20.....				66.4	11.5	77.4	12.7	88.4	13.5	99.4	14.4	14.4		10	9
21.....					72.4	13.4	85.4	14.6	97.4	15.5	108.4	16.5		11	7
22.....					79.4	15.6	92.4	16.9	105.4	17.8	118.4	19.4		12	7
23.....					85.4	18.3	100.4	20.4	114.4	21.4	128.4	22.4		12	6
24.....					92.4	21.0	108.4	23.4	124.4	25.4	138.4	26.4		13	2
25.....						116.4	27.4	133.4	30.4	149.4	32.4	32.4		14	6
26.....							125.4	33.4	142.4	36.4	160.4	40.4		15	1
27.....							134.4	38.4	152.4	42.4	171.4	47.4		15	2
28.....							142.4	44.4	163.4	48.4	182.4	54.4		16	
29.....							152.4	50.4	173.4	55.4	194.4	61.4		17	
30.....							161.4	55.4	184.4	61.4	206.4	68.4		17	2
Basis.....														305	299

The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top." The volume of "top" is that contained in the stem above this point, and in addition all branches suitable for cordwood having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered top wood. Bark comprises about 17 per cent of the total volume; there was no consistent variation with the size of the trees. Trees from Gogebic and Wexford Counties, Mich., and Marinette and Vilas Counties, Wis.

Table 35, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. 1915.

Table 67
SUGAR MAPLE
(Acer saccharum)
PEELED TOTAL VOLUME*
Michigan

Blythe, R. H.		1933										Cubic feet
Diameter breast high	Total height—feet										Basis	
	20	30	40	50	60	70	80	90	100	110		
Inches	Volume—cubic feet										Trees	
2	.16	.25										
3	.37	.55	.73									
4		.97	1.28	1.60								
5			2.03	2.52	3.02							
6			2.95	3.68	4.40	5.10						1
7				5.00	6.02	7.00						
8				6.6	7.9	9.2	10.4					1
9					10.0	11.6	13.2					7
10					12.2	14.3	16.4					5
11					15.0	17.5	19.8					11
12					17.7	20.6	23.5	26.5	29.4			12
13					20.9	24.1	27.6	31.0	34.5			10
14					24.0	28.1	32.0	36.0	40.0			6
15					27.6	32.1	36.9	41.0	45.7			9
16					31.2	36.6	41.8	46.8	52.0			16
17					35.3	41.2	47.0	52.6	58.7			12
18					39.9	46.2	52.7	59.3	66.0			15
19					44.2	51.5	58.8	66.0	73.5			14
20					48.7	56.5	64.7	73.0	81.0			13
21					53.5	62.3	71.8	80.0	89.0			23
22					59.0	68.2	78.0	88.0	97.5			26
23						75.0	86.0	96.0	105.0			24
24						81.3	93.0	103.0	112.5			17
25						88.0	100.0	110.0	121.5			18
26						95.0	107.0	119.0	130.0			17
27						101.5	114.0	127.0	139.0			9
28						108.0	122.0	135.5	149.0			6
29						115.0	130.0	144.0	158.0			2
30							138.	153.	166.5			1
31							146	162	175	186		5
32							155	170	183	195		3
33							163	178	190	204		2
34							170	185	198	211		2
Basis					5	30	90	125	36	1	287	

*Total volume of peeled stem above the stump.
Stump height, 1 foot for diameters from 2 to 14 inches, 1.5 feet for diameters over 14 inches.
Data from Upper Peninsula Forest Experiment Station. Second and old-growth.
Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
Block indicates extent of data.
Aggregate deviation, .1 per cent.
Average deviation, ±8.9 per cent.

Table 68
SECOND-GROWTH SUGAR MAPLE
(Acer saccharum)
PEELED TOTAL VOLUME

Gevorkiantz		1930										Cubic feet
Diameter breast high	Total height—feet										Basis	
	10	20	30	40	50	60	70	80	90			
Inches	Volume—cubic feet										Trees	
1	.04	.10										
2	.12	.27	.40									
3	.24	.52	.77	.98								
4	.40	.90	1.21	1.55	1.90							1
5		1.28	1.80	2.32	2.85	3.35						3
6			1.75	2.55	3.30	4.10	4.90					11
7				3.45	4.50	5.50	6.58	7.60				11
8					5.80	7.20	8.68	10.1				8
9					7.30	9.20	11.0	12.9				2
10					9.00	11.4	13.7	15.9				1
11						13.7	16.5	19.3	22.1			
12						16.5	19.8	23.1	26.3			
13						19.3	23.1	27.0	31.0	34.7		1
14						22.5	27.2	31.7	36.5	41.0		
15							31.0	36.2	41.5	47.0		2
16							35.2	41.5	47.5	53.8		
Basis											40	

Preliminary table.
Total volume includes stump, stem, and top without bark.
Data collected in 1930 by Bonninghausen, Gevorkiantz, Lotti, and Scholz.
Compiled at the Lake States Forest Experiment Station by a modified alinement-chart method.
Block indicates the range of data.
Aggregate deviation, .05 per cent.
Average deviation, ±9.2 per cent.

Table 69
SECOND-GROWTH RED, BLACK, WHITE AND
JACK OAK
(*Quercus sp.*)

VOLUME IN BOARD FEET

Michigan

Diameter breast high	Number of 16-foot logs			Basis
	1	1½	2	
Inches	Volume—board feet			Trees
7.....	14	16		6
8.....	17	21	30	10
9.....	20	26	39	4
10.....	24	31	48	6
11.....		36	57	2
12.....		42	67	1
13.....		46	78	
Basis.....	13	14	2	29

Quercus borealis, *Q. velutina*, *Q. alba*, and *Q. ellipsoidalis*.
Stump height, 1 foot; top diameter inside of bark, 5 inches; trees scaled in
16.3-foot lengths.
Compiled at the Lake States Forest Experiment Station by the frustum-
form-factor method.
Original volumes for a ⅛-inch kerf reduced by 9.5 per cent.
Block indicates extent of data.
Aggregate deviation, 1.1 per cent.
Average deviation, ±7.0 per cent.

Table 70
SECOND-GROWTH RED, BLACK, WHITE AND
JACK OAK
(*Quercus sp.*)

PEELED TOTAL VOLUME

Michigan

Diameter breast high	Total height—feet										
	15	20	25	30	35	40	45	50	55	60	65
Inches	Total volume—cords										
4.....	.008	.011	.014	.016	.019	.022	.024	.027			
5.....	.012	.016	.020	.023	.027	.031	.034	.038	.042		
6.....		.020	.025	.030	.035	.040	.045	.050	.055		
7.....			.032	.039	.045	.052	.058	.065	.072		
8.....				.049	.057	.065	.074	.082	.091		
9.....				.061	.071	.081	.091	.10	.11	.12	
10.....					.085	.098	.11	.12	.13	.14	.16
11.....						.12	.13	.15	.16	.17	.19
12.....						.14	.15	.17	.18	.20	.22
13.....						.16	.18	.19	.21	.23	.25

Quercus borealis, *Q. velutina*, *Q. alba*, and *Q. ellipsoidalis*.
Standard cords, 4x4x8 feet.
Total volume of peeled stem.
Compiled at the Lake States Forest Experiment Station from total cubic-
foot volume table by dividing the volume per tree by the number of cubic
feet per cord for each D. B. H. class as given in United States Forest Service
Bulletin 96.
Block indicates the extent of data.
Basis same as given in total cubic-foot volume table.

Table 71
SECOND-GROWTH RED, BLACK, WHITE AND
JACK OAK
(Quercus sp.)

PEELED TOTAL VOLUME

Michigan

Chase, W.		1929											Cubic feet	
Diameter breast high	Total height—feet											Basis		
	15	20	25	30	35	40	45	50	55	60	65			
	Total volume—cubic feet													
Inches												Trees		
2	.22	.29	.37	.4								7		
3	.39	.51	.64	.77	.9	1.0						14		
4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0				23		
5	.9	1.2	1.5	1.8	2.1	2.4	2.7	2.9	3.2			26		
6		1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4			20		
7			2.7	3.2	3.7	4.3	4.8	5.3	5.9			20		
8				4.1	4.8	5.5	6.2	6.9	7.6	8.2		11		
9				5.2	6.0	6.9	7.8	8.6	9.5	10.3		4		
10					7.3	8.4	9.4	10.5	11.5	12.6	13.6	6		
11						10.1	11.3	12.6	13.9	15.1	16.4	2		
12						11.9	13.4	14.8	16.3	17.8	19.3	1		
13						13.7	15.5	17.2	18.9	20.6	22.3			
Basis	1	8	9	28	27	18	24	15	3	1		134		

Quercus borealis, Q. velutina, Q. alba, and Q. ellipsoidalis.
 Volume includes stump, stem, and top without bark.
 Cubed in 8-foot sections by Smalian's formula.
 Compiled at the Lake States Forest Experiment Station by the form-factor method.
 Block indicates the extent of data.
 Aggregate deviation, 0.1 per cent.
 Average deviation, ± 8.3 per cent.

Table 72
RED, BLACK AND SCARLET OAK
(Quercus sp.)

VOLUME IN TIES AND CUBIC FEET

New York and Connecticut

Frothingham Barrows		1912								Ties Cubic feet	
Diameter breast high	Total height—feet								Basis		
	50		60		70		80				
	Ties	Top-wood	Ties	Top-wood	Ties	Top-wood	Ties	Top-wood			
Inches	No.	Cu. ft.	No.	Cu. ft.	No.	Cu. ft.	No.	Cu. ft.	Trees		
10	1	8.4	1	10.8	1	12.9	1	15.0	24		
11	1	9.0	1	10.8	2	12.6	2	14.2	35		
12	2	9.8	2	11.1	2	12.6	3	13.1	33		
13	2	11.1	2	12.2	3	12.7	4	12.5	30		
14	2	12.3	4	13.0	5	13.1	5	12.4	13		
15	4	13.7	4	14.0	5	13.5	7	12.2	12		
16	4	15.7	4	15.3	6	14.2	7	12.1	5		
17					7	14.6	8	12.1	4		
18					8	14.8	10	11.5	2		
19					8	15.2	11	11.8	1		
Basis									159		

All first-class ties, 6 by 8 inches by 8 feet.
 NOTE—The volume in "topwood" (top and branches) was obtained by subtracting the aggregate cubic volume of tie logs to a minimum top diameter of 9 inches, outside bark, from the total used volume of the tree, in cubic feet (to a minimum diameter of 2 inches, outside bark).
 Table 46, U. S. Forest Service Bul. 96, Second-Growth Hardwoods in Connecticut. E. H. Frothingham. 1912.

Table 73
SECOND-GROWTH BLACK OAK
(Quercus velutina)
VOLUME IN BOARD FEET
 Eastern States

Martell, E. R.		1928						International ¼	
Diameter breast high	Total height—feet							Basis	
	40	50	60	70	80	90	100		
Volume—board feet								Trees	
Inches									
7		5	14	22				29	
8	6	18	26	33	41			47	
9	16	27	37	47	58	70		48	
10	24	36	48	62	76	92	111	43	
11	31	44	60	77	95	116	138	51	
12	37	54	74	95	118	141	169	45	
13	44	65	89	115	141	170	204	34	
14	52	78	106	135	167	204	244	15	
15	62	91	124	159	197	240	285	19	
16		106	143	183	228	279	328	12	
17		121	163	210	264	317	376	12	
18			185	240	297	358	428	7	
19			208	270	335	403	482	10	
20			235	300	371	451	538	6	
21			261	335	416	505	598	4	
22			290	371	457	556	670	3	
23			317	407	507	611	738		
Basis	10	59	105	103	75	31	1	385	

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., N. J., Ohio, Tenn., and W. Va.
 Stump height, 1.0 foot.
 Top diameter inside bark, 5.0 inches.
 Prepared by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, 0.6 per cent.
 Average deviation, ±14.7 per cent for trees 8 inches and over.

Table 74
SECOND-GROWTH BLACK OAK
(Quercus velutina)
VOLUME IN BOARD FEET
 Eastern States

Martell, E. R.		1928						Scribner	
Diameter breast high	Total height—feet							Basis	
	40	50	60	70	80	90	100		110
Volume—board feet								Trees	
o. b.	i. b.								
Inches								Trees	
10	8.9		4	13	30	47	61	27	
11	9.8		4	20	45	63	80	93	
12	10.8	1	14	50	73	92	109	127	
13	11.7	4	36	72	95	116	140	164	
14	12.6	10	54	90	116	144	173	202	
15	13.6	21	70	107	140	173	208	240	
16	14.5		84	125	163	203	240	278	
17	15.4		96	144	190	233	277	321	
18	16.3			163	214	263	312	362	
19	17.3			184	240	295	352	409	
20	18.2			206	266	330	394	456	
21	19.2			228	292	365	435	507	
22	20.1			250	326	401	480	560	
23	21.0			272	358	442	528	615	
Basis			12	46	81	74	31	1	
								245	

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Md., N. Y., N. J., Ohio, Tenn., and W. Va.
 Stump height, 1 foot. Top diameter, 8 inches inside bark.
 Compiled by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.8 per cent (for trees 12 inches and over).

Table 75
SECOND-GROWTH BLACK OAK
(Quercus velutina)

UNPEELED TOTAL VOLUME

Eastern States

Martell, E. R.		1928								Cubic feet
Diameter breast high	Total height—feet								Basis	
	20	30	40	50	60	70	80	90		100
Volume—cubic feet										
Inches										Trees
5	.89	1.23	1.57	1.90	2.27					48
6	1.58	2.21	2.86	3.50	4.19	4.92				44
7	2.30	3.25	4.22	5.20	6.25	7.40				39
8	3.06	4.40	5.74	7.15	8.50	10.1	11.7			47
9	3.89	5.60	7.38	9.12	11.1	13.1	15.2	17.3		49
10		7.00	9.2	11.4	13.9	16.3	18.9	21.8	24.6	
11			11.2	14.0	16.8	19.9	23.2	26.5	30.0	51
12			13.4	16.7	20.2	23.8	27.7	31.8	35.8	45
13			15.8	19.6	23.7	27.9	32.5	37.2	42.0	34
14			18.3	22.9	27.6	32.8	38.0	43.2	48.8	15
15			21.0	26.3	32.0	37.8	43.5	49.8	56.5	19
16			24.0	30.0	36.2	42.8	49.6	56.8	63.9	12
17				33.9	40.8	48.2	56.1	64.0	72.0	12
18					45.7	54.3	62.8	71.5	80.8	7
19					51.2	60.0	69.9	80.0	90.0	10
20					56	67	77	88	100	6
21					62	73	85	98	110	4
22					66	81	94	107	121	3
23					74	88	102	118	133	
Basis	2	43	45	78	111	101	76	31	1	488

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Penn., Tenn., and W. Va. Volume of stump, stem, top, and bark. Volumes by planimeter. Compiled by the alinement-chart method. Block indicates extent of data. Aggregate deviation, .1 per cent. Average deviation, ±9.5 per cent.

Table 76
SECOND-GROWTH BLACK OAK
(Quercus velutina)

PEELED TOTAL VOLUME

Eastern States

Martell, E. R.		1928								Cubic feet	
Diameter breast high	Total height—feet								Basis		
	20	30	40	50	60	70	80	90		100	
Volume—cubic feet											
Inches										Trees	
2	1.4	.20	.26	.33	.40						
3	2.4	.44	.58	.73	.89					16	
4	3.3	.77	1.02	1.29	1.60	1.94				33	
5	4.2	1.20	1.60	2.02	2.48	3.02				48	
6	5.2	1.73	2.28	2.90	3.58	4.32	5.15			44	
7	6.1	2.34	3.12	3.94	4.85	5.88	7.00			39	
8	7.0	3.08	4.05	5.10	6.30	7.65	9.10	10.7		47	
9	8.0	3.88	5.10	6.45	8.00	9.68	11.5	13.5	15.7	49	
10	8.9		6.3	8.0	9.8	11.8	14.1	16.6	19.2	43	
11	9.8			9.6	11.8	14.3	17.0	20.1	23.2	51	
12	10.8			11.2	13.9	17.0	20.0	23.8	27.5	45	
13	11.7			13.2	16.3	19.8	23.7	27.9	32.0	34	
14	12.7			15.4	18.9	22.8	27.5	32.2	37.2	15	
15	13.6			17.6	21.7	26.2	31.4	36.8	42.5	19	
16	14.5				24.6	29.6	35.5	41.8	48.2	12	
17	15.5				27.7	33.5	40.0	47.0	54.4	12	
18	16.4					37.5	44.2	52.5	60.8	7	
19	17.4					41.5	49.3	58.5	68.0	10	
20	18.3					46.0	55.0	65.0	74.0	6	
21	19.2					51.0	60.0	71.0	82.0	4	
22	20.1					55.0	66.0	78.0	90.0	3	
23	21.0					60.0	72.0	85.0	98.0		
Basis		6	75	57	79	111	102	76	30	1	537

Data collected by the Central States, Appalachian, and Allegheny Forest Experiment Stations in Conn., Md., N. Y., N. J., Ohio, Tenn., and W. Va. Volume of stump, stem, and top, without bark. Volumes by planimeter. Compiled by the alinement-chart method. Block indicates extent of data. Aggregate deviation, .7 per cent. Average deviation, ±8.2 per cent.

Table 77
SECOND-GROWTH RED OAK
(Quercus borealis)

VOLUME IN BOARD FEET
Eastern States

Buell, J. H. 1928 International $\frac{1}{4}$

Diameter breast high		Total height—feet								Basis
		30	40	50	60	70	80	90	100	
o. b.	i. b.	Volume—board feet								Trees
Inches										
7	6.2	2	6	12	16	22				16
8	7.2	8	14	22	28	35	43			29
9	8.0	14	23	31	40	49	60	71		40
10	9.0	22	31	42	52	65	79	94	113	34
11	9.9		39	52	66	82	100	118	142	25
12	10.8		49	64	81	100	121	144	172	31
13	11.8		59	77	97	119	145	172	208	21
14	12.7		70	90	114	141	179	204	245	22
15	13.7		81	106	132	163	198	235	285	13
16	14.6			122	152	190	228	273	326	15
17	15.6			139	174	217	261	311	375	9
18	16.6			157	197	244	294	353	425	7
19	17.6			176	222	272	333	398	480	7
20	18.5			198	248	304	369	443	532	4
21	19.5			219	274	337	411	489	588	3
22	20.5						453	536	647	
23	21.4						493	588	710	
24	22.3						534	641	778	1
25	23.3							697	842	
26	24.3							751	914	
27	25.4							815	991	
28	26.5							887	1081	1
29	27.4							950	1149	
Basis			9	60	103	50	39	16	2	279

Data collected by Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Va., and W. Va.
Stump height, 1.0 ft.
Top diameter inside bark, 5.0 inches.
Prepared by the alinement-chart method.
Original table, based on $\frac{1}{4}$ -inch kerf, reduced by 9.5 per cent.
Block indicates extent of data.
Aggregate deviation, 1.0 per cent.
Average deviation, ± 13.9 per cent.

Table 78
SECOND-GROWTH RED OAK
(Quercus borealis)

VOLUME IN BOARD FEET
Eastern States

Buell, J. H. 1928 Scribner

Diameter breast high		Total height—feet								Basis
		40	50	60	70	80	90	100	110	
o. b.	i. b.	Volume—board feet								Trees
Inches										
12	10.8	34	52	67	81	96	112			31
13	11.8	54	71	87	102	118	138	163		21
14	12.7	70	88	105	123	142	167	198		22
15	13.7	84	104	123	143	167	198	236		14
16	14.6		119	141	166	195	231	276		15
17	15.6		134	161	190	223	266	317		9
18	16.6		151	181	215	254	301	360		7
19	17.6		168	203	240	284	340	408	487	7
20	18.5		186	226	270	319	380	455	545	4
21	19.5		208	252	300	358	428	512	615	3
22	20.5					398	474	570	682	
23	21.4					440	528	633	760	
24	22.4					487	581	700	840	1
25	23.4						640	765	920	
26	24.4						700	840	1005	
27	25.4						765	920	1090	
28	26.5						830	995	1180	1
29	27.5						895	1070	1275	
Basis			7	41	37	32	16	2		135

Data collected by the Central States, Appalachian, and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Va., and W. Va.
Stump height, 1.0 ft.
Top diameter inside bark, 8.0 inches.
Prepared by the alinement-chart method.
Block indicates extent of data.
Aggregate deviation, 2.0 per cent.
Average deviation, ± 12.9 per cent.

Table 79
SECOND-GROWTH RED OAK
(Quercus borealis)
UNPEELED MERCHANTABLE VOLUME
Eastern States

Buell, J. H. 1928 Cubic feet

Diameter breast high	Total height—feet										Basis
	30	40	50	60	70	80	90	100	110		
	Volume—cubic feet										
Inches											Trees
4	.22	.57	.90	1.30							5
5	1.11	1.59	2.17	2.78							12
6	2.15	2.86	3.64	4.48							6
7	3.39	4.33	5.32	6.48	7.65						16
8	4.78	5.95	7.25	8.75	10.3	11.8					29
9	6.28	7.70	9.45	11.05	13.0	15.1	17.6				40
10	7.9	9.8	11.8	14.0	16.3	18.9	22.0				34
11	9.8	12.0	14.3	17.0	20.0	23.0	26.7				25
12	11.8	14.3	17.1	20.4	23.8	27.4	31.6	36.5			31
13		16.8	20.2	23.9	27.9	32.3	37.0	42.9			21
14		19.7	23.7	27.8	32.5	37.4	43.2	50.2			22
15		22.8	27.3	32.2	37.3	43.0	49.9	57.2			14
16			31.0	36.5	42.6	49.2	56.5	65.2			15
17			35.1	41.4	48.2	55.5	63.9	73.0			9
18			39.4	46.4	53.8	62.0	71.0	82.0			7
19			43.8	51.6	60.0	68.5	78.8	90.5	102.0		7
20			48.5	57.0	66.5	76.0	87.4	100.5	112.0		4
21			53.4	63.0	72.8	83.5	95.5	110.5	124.0		3
22						91.0	105.0	121.0	136.0		
23						100.0	115.0	132.0	148.0		
24						108.0	125.0	144.0	160.0		
25						117.0	135.0	156.0	174.0		1
26							145.0	168.0	188.0		
27							156.0	180.0	205.0		
28							168.0	195.0	232.0		1
29							180.0	218.0	262.0		
Basis	3	20	69	103	50	39	16	2			302

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Va., and W. Va.
Volume of stem with bark above a 1-foot stump to 4 inches outside bark.
Volumes by planimeter.
Prepared by the alinement-chart method.
Block indicates extent of data.
Aggregate deviation, .7 per cent.
Average deviation, ±8.1 per cent.

Table 80
SECOND-GROWTH RED OAK
(Quercus borealis)
PEELED TOTAL VOLUME
Eastern States

Buell, J. H. 1928 Cubic feet

Diameter breast high	Total height—feet										Basis
	20	30	40	50	60	70	80	90	100	110	
	Volume—cubic feet										
o. b. i. b.											Trees
2	1.8	.18	.27	.36							7
3	2.7	.40	.60	.80	1.01						16
4	3.6	.72	1.06	1.42	1.78	2.13					12
5	4.5	1.12	1.66	2.22	2.77	3.32					12
6	5.4		2.39	3.20	3.96	4.75					6
7	6.3		3.23	4.34	5.40	6.45	7.50				16
8	7.2		4.28	5.70	7.08	8.50	9.85	11.20			29
9	8.1		5.38	7.15	8.95	10.65	12.30	14.05	15.7		40
10	9.0		6.7	8.8	11.0	13.0	15.1	17.2	19.3		34
11	9.9		8.1	10.6	13.2	15.8	18.3	20.8	23.3		25
12	10.9		9.6	12.6	15.6	18.6	21.6	24.7	27.5		31
13	11.8			14.7	18.3	21.8	25.3	28.6	32.0	35.5	21
14	12.8			16.9	20.9	25.2	29.0	33.0	36.8	40.8	22
15	13.7			19.4	24.0	28.7	33.2	37.5	42.2	46.6	14
16	14.7				27.2	32.5	37.4	42.6	47.5	52.8	15
17	15.6				30.7	36.5	42.2	48.0	53.6	59.4	9
18	16.6				34.2	40.8	47.0	53.5	60.0	66.5	7
19	17.6				37.8	45.2	52.0	59.5	66.5	74.0	81
20	18.6				42.0	50.0	58.0	66.0	74.0	82.0	89
21	19.5				46.0	55.0	64.0	72.0	81.0	90.0	98
22	20.6							79.0	88.0	98.0	107
23	21.6							86.0	96.0	106.0	116
24	22.5							93.0	104.0	115.0	125
25	23.5							100.0	112.0	124.0	135
26	24.4								121.0	134.0	146
27	25.4								130.0	144.0	157
28	26.4								139.0	154.0	168
29	27.4								149.0	165.0	180
Basis	9	20	26	70	104	46	39	16	2		332

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Va., and W. Va.
Volume of stump, stem and top without bark.
Volumes by planimeter.
Prepared by the alinement-chart method.
Block indicates extent of data.
Aggregate deviation, .4 per cent.
Average deviation, ±7.7 per cent.

Table S1
SECOND-GROWTH SCARLET OAK
(Quercus coccinea)
VOLUME IN BOARD FEET
Eastern States

Clements, V. A.		1930					International $\frac{3}{4}$	
Diameter breast high	Total height—feet						Basis	
	40	50	60	70	80	90		
Volume—board feet								
Inches							Trees	
7.....	3	10	18	24	32		43	
8.....	8	23	33	42	51		32	
9.....	17	34	47	59	71	86	32	
10.....	26	47	62	77	92	112	41	
11.....	34	59	77	97	114	137	49	
12.....	43	71	94	116	136	167	70	
13.....	51	85	110	135	162	198	41	
14.....		99	127	158	190	230	28	
15.....		113	143	183	217	264	12	
16.....		127	167	208	248	300	11	
17.....		145	190	235	281	341	5	
18.....			212	262	312	380	1	
19.....			234	289	346	416	2	
20.....			260	321	383	462	2	
21.....			285	353	418	507		
22.....			310	385	454	552	1	
Basis.....	9	54	110	134	50	13	370	

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in N. J., Pa., Md., W. Va., Tenn., Ind., and Ohio.
 Stump height, 1 foot.
 Top diameter inside bark, 5 inches.
 Compiled by the alinement-chart method.
 Original table, based on $\frac{3}{8}$ -inch kerf, reduced by 9.5 per cent.
 Block indicates extent of data.
 Aggregate deviation, 0.5 per cent.
 Average deviation, ± 11.7 per cent (for trees 9 inches and over).

Table S2
SECOND-GROWTH SCARLET OAK
(Quercus coccinea)
VOLUME IN BOARD FEET
Eastern States

Clements, V. A.		1930					Scribner	
Diameter breast high	Total height—feet						Basis	
	50	60	70	80	90			
Volume—board feet								
o. b.	i. b.						Trees	
Inches								
10	6.2			20	32		57	
11	10.2	24	59	72	80	95	49	
12	11.1	41	78	92	109	135	70	
13	12.0	52	91	113	134	170	41	
14	13.0	62	108	134	160	208	28	
15	13.9	79	125	157	189	249	12	
16	14.8	76	141	180	220	290	11	
17	15.8	82	160	208	254	337	5	
18	16.7		182	237	290	390	1	
19	17.6		204	265	327	439	2	
20	18.6		229	299	370	500	2	
21	19.5		255	333	413	560		
22	20.4		280	367	458	630	1	
Basis.....		10	77	129	50	13	279	

Trees measured by the Central States and Allegheny Forest Experiment Stations in Conn., N. J., Pa., Md., W. Va., Tenn., Ind. and Ohio.
 Stump height, 1.0 foot.
 Top diameter inside bark, 8.0 inches.
 Compiled by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, 0.2 per cent.
 Average deviation, ± 15.4 per cent.

Table 83
SECOND-GROWTH SCARLET OAK
(Quercus coccinea)

UNPEELED MERCHANTABLE VOLUME

Clements, V. A.		Eastern States 1930								Cubic feet
Diameter breast high	Total height—feet								Basis	
	20	30	40	50	60	70	80	90		
	Volume—cubic feet									
Inches									Trees	
5	1.05	1.34	1.66	2.01	2.40	2.78			80	
6	1.68	2.24	2.91	3.65	4.41	5.17			39	
7	2.36	3.25	4.25	5.40	6.50	7.70	8.95		50	
8	3.13	4.40	5.75	7.40	9.10	10.90	12.40		33	
9	4.00	5.65	7.50	9.75	12.00	14.00	16.10	18.0	32	
10		7.0	9.4	12.0	14.8	17.1	19.7	22.0	41	
11		8.5	11.6	14.8	17.9	20.9	24.0	26.9	49	
12			13.8	17.5	21.2	24.9	28.5	32.1	70	
13			16.1	20.4	24.9	29.0	33.5	37.7	41	
14				23.8	29.0	34.0	38.8	44.0	28	
15				27.2	33.5	39.0	44.5	50.2	12	
16				31.0	37.7	44.0	50.5	57.0	11	
17				34.5	42.5	49.8	57.0	64.0	5	
18					48.0	55.5	64.0	71.0	1	
19					53.0	62.0	70.0	79.5	2	
20					58.5	68.0	77.5	87.0	2	
21					64.0	75.0	85.0	96.0		
22					70.0	82.0	93.5	104.0	1	
Basis	6	63	54	66	111	134	50	13	497	

Data collected by the Allegheny and Central States Forest Experiment Stations in Ind., Md., N. J., Ohio, Penn., Tenn., and W. Va.
Volume of stem with bark above a 1-foot stump to a top diameter of 4 inches outside bark.
Volumes by planimeter.
Compiled by the alignment-chart method.
Block indicates extent of data.
Aggregate deviation, .1 per cent.
Average deviation, ±7.1 per cent.

Table 84
SECOND-GROWTH SCARLET OAK
(Quercus coccinea)

PEELED TOTAL VOLUME

Clements, V. A.		Eastern States 1930								Cubic feet
Diameter breast high	Total height—feet								Basis	
	20	30	40	50	60	70	80	90		
	Volume—cubic feet									
o. b.	i. b.									Trees
Inches										
3	2.6	.49	.68	.85	1.04					13
4	3.6	.80	1.15	1.46	1.78	2.10				36
5	4.5	1.21	1.74	2.27	2.77	3.27	3.78			52
6	5.5	1.74	2.48	3.20	3.93	4.65	5.45			39
7	6.4	2.26	3.30	4.28	5.30	6.30	7.40	8.50		50
8	7.3	2.92	4.25	5.60	7.00	8.45	9.90	11.40		33
9	8.3	3.62	5.40	7.15	8.99	10.90	12.80	14.80	16.8	32
10	9.2		6.6	8.9	11.1	13.5	16.0	18.4	20.8	41
11	10.2		8.1	10.9	13.8	16.8	19.5	22.2	24.9	49
12	11.1			13.0	16.5	19.8	23.0	26.2	29.3	70
13	12.0			15.2	19.2	23.0	26.6	30.0	33.7	41
14	13.0				22.0	26.3	30.3	34.5	39.0	28
15	13.9				25.0	29.3	34.3	39.5	44.0	12
16	14.8				28.0	33.3	38.8	44.0	49.5	11
17	15.8				31.3	37.5	43.7	49.9	55.5	5
18	16.7					41.5	48.0	55.0	61.5	1
19	17.6					45.5	53.0	60.2	67.5	2
20	18.6					50.3	58.5	67.0	74.5	2
21	19.5						55.0	64.0	72.5	
22	20.4						59.5	69.0	78.0	1
Basis		14	75	55	66	111	134	50	13	518

Data collected by the Allegheny and Central States Forest Experiment Stations in Conn., Ind., Md., N. J., Ohio, Penn., Tenn., and W. Va.
Volume includes the stump, stem, top, without bark.
Volumes by planimeter.
Compiled by the alignment-chart method.
Block indicates extent of data.
Aggregate deviation, .5 per cent.
Average deviation, ±7.1 per cent.

Table 85
SECOND-GROWTH WHITE OAK
(*Quercus alba*)

VOLUME IN BOARD FEET
Eastern States

Day, R. K.	1928								International $\frac{1}{4}$	
Diameter breast high	Total height—feet								Basis	
	30	40	50	60	70	80	90	100		
Volume—board feet										
Inches									Trees	
7		1	5	13	18					72
8	2	3	18	25	32	38				72
9	5	19	28	35	44	53				43
10	14	26	37	48	59	71	82			41
11	21	33	47	60	74	89	103			33
12	26	41	58	74	91	110	128	146		38
13		49	69	89	110	132	154	176		30
14		59	82	106	131	158	184	209		23
15		69	97	125	156	186	215	247		12
16		80	111	145	179	214	251	284		15
17			129	167	206	246	290	330		12
18			147	190	235	282	330	376		2
19			165	215	267	320	373	425		2
20					299	350	420	480		
21						333	400	463	524	1
22						371	443	516	598	
Basis	2	52	165	30	31	52	19			401

Data collected by the Central States, Appalachian and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Pa., Tenn., and W. Va.
Stump height, 1.0 foot.
Top diameter inside bark, 5.0 inches.
Prepared by the alignment-chart method.
Original table, based on $\frac{1}{8}$ -inch kerf, reduced by 9.5 per cent.
Block indicates extent of data.
Aggregate deviation, .4 per cent.
Average deviation, ± 13.9 per cent (trees 8 inches and over).

Table 86
SECOND-GROWTH WHITE OAK
(*Quercus alba*)

VOLUME IN BOARD FEET
Eastern States

Day, R. K.	1928								Scribner	
Diameter breast high	Total height—feet								Basis	
	40	50	60	70	80	90	100	110		
Volume—board feet										
o. b.		i. b.								Trees
Inches										
10	9.1		1	9	22	33				41
11	10.0	2	16	34	46	57	67	77		36
12	10.9	14	36	53	66	80	93	105		33
13	11.8	31	53	71	88	103	122	138		33
14	12.8	44	68	90	111	133	156	175		29
15	13.7		83	109	137	163	190	213	241	15
16	14.6		98	130	162	192	224	252	287	15
17	15.5		116	154	192	226	264	297	338	13
18	16.4		134	178	219	260	303	342	390	5
19	17.3		154	203	252	298	350	395	449	2
20	18.3				287	342	400	450	510	
21	19.2				324	386	450	505	574	1
22	20.1				362	430	500	560	640	
Basis			33	76	24	47	40	3		223

Data collected by the Central States, Appalachian, and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Tenn., Va., and W. Va.
Stump height, 1.0 foot.
Top diameter inside bark, 8.0 inches.
Prepared by the alignment-chart method.
Block indicates extent of data.
Aggregate deviation, 0.9 per cent.
Average deviation, ± 16.0 per cent (trees 12 inches and over).

Table 87
SECOND-GROWTH WHITE OAK
(Quercus alba)
UNPEELED MERCHANTABLE VOLUME
Eastern States

Martell, E. R.		1928										Cubic feet	
Diameter breast high	Total height—feet										Basis		
	20	30	40	50	60	70	80	90	100	110			
Volume—cubic feet													
Inches											Trees		
4		.15	.62	1.16								74	
5	.42	1.16	1.76	2.37	3.02	3.68						59	
6	1.33	2.09	2.93	3.81	4.72	5.70						45	
7	2.14	3.20	4.32	5.52	6.72	8.04	9.40					63	
8		4.44	5.92	7.47	9.09	10.60	12.30					82	
9		5.84	7.72	9.60	11.50	13.50	15.60					52	
10			9.7	11.9	14.3	16.7	19.3	22.0				42	
11			11.7	14.5	17.3	20.1	23.3	26.4	30.0			36	
12			14.1	17.4	20.6	24.0	27.7	31.4	35.5			33	
13			16.5	20.3	24.1	28.0	32.3	36.4	41.2			33	
14				23.3	27.8	32.5	37.0	42.0	47.2	52.6		29	
15				26.8	31.8	36.8	42.3	47.8	54.0	59.9		15	
16				30.5	36.0	41.6	47.8	54.0	61.0	67.0		15	
17				34.0	40.0	46.5	53.2	60.0	68.0	75.0		13	
18				38.0	45.0	52.0	60.0	67.0	75.0	83.0		5	
19				42.0	50.0	58.0	66.0	74.0	83.0	92.0		2	
20							72.0	81.0	91.0	101.0			
21							78.0	88.0	100.0	110.0		1	
22							86.0	96.0	108.0	119.0			
Basis	1	73	102	159	143	30	48	40	3			599	

Data collected by the Allegheny, Appalachian and Central States Forest Experiment stations in Conn., Md., N. Y., Ohio, Penn., Tenn., and W. Va.
 Volume of stem with bark above a 1-foot stump to top diameter of 4 inches outside bark.
 Volumes by planimeter.
 Compiled by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, .2 per cent.
 Average deviation, ±8.7 per cent.

Table 88
SECOND-GROWTH WHITE OAK
(Quercus alba)
PEELED TOTAL VOLUME
Eastern States

Martell, E. R.		1928										Cubic feet	
Diameter breast high	Total height—feet										Basis		
	20	30	40	50	60	70	80	90	100	110			
Volume—cubic feet													
o. b.	i. b.											Trees	
Inches													
3	2.7	.44	.64	.83								75	
4	3.6	.76	1.09	1.43	1.76							66	
5	4.5	1.15	1.68	2.20	2.71	3.21						54	
6	5.4	1.63	2.40	3.12	3.81	4.54						44	
7	6.3	2.19	3.20	4.18	5.14	6.08	6.96					73	
8	7.2	2.83	4.12	5.40	6.62	7.82	9.04	10.2				72	
9	8.1	3.55	5.15	6.72	8.25	9.80	11.35	12.9				48	
10	9.1		6.3	8.2	10.2	12.1	14.1	16.0	18.1			41	
11	10.0		7.6	9.9	12.3	14.7	17.1	19.5	22.0			34	
12	10.9		9.0	11.8	14.6	17.6	20.4	23.3	26.2	29.0		38	
13	11.8			13.9	17.2	20.7	23.9	27.4	30.8	34.0		30	
14	12.8			16.2	20.0	24.1	27.9	31.8	35.5	39.4		23	
15	13.7			18.6	23.1	27.7	32.0	36.6	41.0	45.5		12	
16	14.6			21.2	26.4	31.6	36.5	41.6	46.5	52.0		15	
17	15.6				29.8	35.7	41.2	47.0	52.8	58.8		12	
18	16.5					33.3	39.9	46.2	52.7	59.2		2	
19	17.5					37.2	44.6	51.5	59.0	66.0		2	
20	18.4							57.5	65.5	74.5		82.0	
21	19.4							63.5	72.0	81.0		90.0	
Basis		46	105	123	185	80	31	53	19			642	

Data collected by the Central States, Appalachian, and Allegheny Forest Experiment Stations in Conn., Md., N. Y., Ohio, Tenn., Va., and W. Va.
 Volume of stump, stem and top without bark.
 Volumes by planimeter.
 Prepared by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, 0.3 per cent high.
 Average deviation, ±8.0 per cent.

Table 89
SECOND-GROWTH JACK PINE
(Pinus banksiana)
VOLUME IN BOARD FEET
Lake States

Wackerman, A. E.		1925													International $\frac{1}{4}$		
Diameter breast high	Total height—feet													Top cubic feet	Basis		
	30	35	40	45	50	55	60	65	70	75	80	85	90				
Volume—board feet																	
Inches	4	5	6	8	10	12	14	17	19						Trees		
6	4	5	6	8	10	12	14	17	19						1.6	242	
7	6	10	13	16	19	23	26	31	32						1.4	227	
8		15	19	23	27	31	35	38	43	47					1.3	218	
9			25	30	36	40	46	51	56	62					1.1	126	
10				38	45	52	58	65	71	78	86	96			1.0	74	
11					54	63	73	81	90	98	107	116	126			1.0	58
12						78	89	99	109	119	130	141	153			.9	46
13						93	107	119	131	143	156	169	182			.9	27
14							130	144	158	173	189	204	221			.8	8
15							152	168	185	203	220	239	257			.8	3
16							181	200	219	240	262	282	304			.8	3
Basis																	1032

Stump height, 1 foot.
 Top diameter inside bark, 5 inches.
 Top cubic feet is the merchantable volume in the top from 5 to 3 inches outside bark.
 Compiled at the Lake States Forest Experiment Station. Original table, based on a $\frac{1}{8}$ -inch kerf, reduced by 2.5 per cent.
 Block indicates extent of data.

Table 90
SECOND-GROWTH JACK PINE
(Pinus banksiana)
VOLUME IN BOARD FEET
Lake States

Gevorkiantz		1933				Scribner Decimal C	
Diameter breast high	Number of 16-foot logs				Basis		
	1	2	3	4			
Volume—board feet, tens							
Inches					Trees		
8	1.4				12		
9	2.1	3.6			15		
10	2.9	4.7	7.2	9.8	21		
11	3.7	5.9	8.9	12.1	25		
12	4.6	7.1	10.8	14.6	29		
13	5.6	8.5	12.6	17.2	19		
14	6.6	9.9	14.6	19.8	7		
15	7.6	11.2	16.4	22.5	3		
16	8.7	12.5	18.2	25.3	1		
Basis	29	67	32	4	132		

Preliminary table.
 Stump height, 1 foot.
 Top diameter variable, not less than 6 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Block indicates extent of data.
 Average deviation, ± 11.4 per cent.

Table 91
SECOND-GROWTH JACK PINE
(Pinus banksiana)
VOLUME IN BOARD FEET
Superior National Forest
Minnesota

LeBarron		1933						Scribner Decimal C	
Diameter breast high	Total height—feet						Basis		
	40	50	60	70	80	90			
	Volume—board feet								
Inches							Trees		
8	.9	2.0	3.4	4.4			26		
9	1.8	3.2	5.0	6.2	7.3		6		
10	2.7	4.3	6.2	7.9	9.1	10.4	6		
11	3.6	5.7	7.7	9.5	11.2	12.8	7		
12	4.5	7.1	9.5	11.6	13.6	15.4	12		
13	5.7	8.3	10.8	13.1	15.4	17.6	7		
14		9.5	13.1	15.7	18.1	20.5	4		
15		11.1	14.9	17.9	20.5	23.2	1		
16			16.9	20.4	23.6	26.9	1		
17			18.8	22.9	27.0	30.9			
18			20.9	25.4	30.5	35.0			
Basis	6	12	24	9	15	4	70		

Preliminary table.
 Data collected by Wackerman and Stott.
 Stump height, 1 foot; top diameter, 6 inches inside bark.
 Compiled at the Lake States Forest Experiment Station by plotting actual volumes over volumes from Table 89.

Table 92
SECOND-GROWTH JACK PINE
(Pinus banksiana)
VOLUME IN BOARD FEET
Lake States

Wackerman, A. E.		1925										Scribner Decimal C	
Diameter breast high	Total height—feet										Top cubic feet	Basis	
	40	45	50	55	60	65	70	75	80	85			90
	Volume—board feet, in tens												
Inches												Trees	
7	.2	.5	.8	1.3	1.6	1.9	2.1					2.7	227
8	1.3	1.8	2.4	2.8	3.3	3.8	4.3					2.4	218
9	1.6	2.2	2.8	3.5	4.2	4.7	5.2	5.7				2.2	126
10		3.0	3.7	4.5	5.2	5.9	6.6	7.1	7.7	8.2		2.0	74
11			4.8	5.7	6.5	7.3	8.0	8.8	9.6	10.3		1.8	58
12				7.0	8.0	8.9	9.9	10.8	11.8	12.6	13.6	1.7	46
13				8.2	9.2	10.3	11.3	12.5	13.6	14.5	15.7	1.5	27
14					11.3	12.5	13.8	15.1	16.2	17.6	18.6	1.4	8
15					13.1	14.6	15.9	17.5	18.6	20.2	21.4	1.3	3
16					15.0	16.8	18.5	20.3	21.8	23.5	25.4	1.3	3
Basis													790

Volume above a 1-foot stump to a top diameter of 6 inches inside bark.
 Top cubic feet is the merchantable volume in 8-foot lengths above 6 inches in the top to 3 inches outside of bark.
 Compiled at the Lake States Forest Experiment Station.
 Block indicates extent of data.

Table 93
OLD-GROWTH JACK PINE
(Pinus banksiana)
VOLUME IN BOARD FEET
Cass County, Minnesota

Hansen		1919										Scribner	
Diameter breast high	Number of 16-foot logs										Volume—board feet		
	1	1½	2	2½	3	3½	4	4½	5				
Inches													
7	20	30	40										
8	20	30	50										
9	20	35	50	65	80								
10	20	35	50	65	85	100							
11	20	40	60	80	100	120	140						
12		40	65	85	110	135	160						
13		50	75	100	125	150	175						
14			80	110	140	175	205	235	270				
15			90	130	165	200	235	270	310	350			
16				145	185	230	270	310	350				
17				155	200	245	290	340	390				
18				170	220	270	320	370	420				
19				180	230	280	330	380	430				
20				190	240	295	345	400	450				
21				205	260	315	370	425	480				
22					280	340	400	460	520				
23					305	370	440	500	570				
24					345	410	480	550	620				

Revised, 1926.
 Top diameter inside bark, 6 inches; stump height, 9 to 12 inches. Based on 305 trees. Trees scaled as felled.

Table 94
SECOND-GROWTH JACK PINE
(Pinus banksiana)
UNPEELED MERCHANTABLE VOLUME
Lake States

Wackerman, A. E.		1925																		Standard cords	
Diameter breast high	Total height—feet																		Basis		
	25	30	35	40	45	50	55	60	65	70	75	80	85	90							
Inches	Unpeeled volume—cords																		Trees		
	4	.01	.01	.02	.02	.02	.03	.03	.03												
5	.02	.02	.03	.03	.03	.04	.04	.04	.05	.05										221	
6		.03	.04	.04	.05	.05	.06	.06	.07	.07										242	
7		.04	.05	.05	.06	.06	.07	.08	.08	.09										227	
8			.06	.07	.08	.08	.09	.10	.11	.12	.13	.14								218	
9				.08	.09	.10	.11	.12	.13	.14	.15	.16								126	
10					.11	.12	.13	.15	.16	.17	.19	.20	.22							74	
11						.14	.16	.17	.19	.21	.22	.23	.25	.27						58	
12							.19	.21	.23	.24	.26	.27	.29	.31						46	
13								.22	.24	.26	.28	.30	.32	.34	.36					27	
14									.28	.30	.32	.34	.37	.39	.41					8	
15										.31	.34	.36	.39	.41	.44	.47				3	
16											.35	.38	.41	.44	.47	.50	.53			3	
Basis																				1404	

Standard cords 4x4x8 feet.
 Volume includes stem and bark above a 1-foot stump to a top diameter of 3 inches outside bark.
 Compiled at the Lake States Forest Experiment Station from the merchantable volume table in cubic feet by converting by the number of cubic feet of wood per cord—based on D. B. H.
 Block indicates extent of data.

Table 95
SECOND-GROWTH JACK PINE
(Pinus banksiana)
UNPEELED TOTAL VOLUME
Wisconsin

Gevorkiantz		1930								Cubic feet	
Diameter breast high	Total height—feet								Basis	Percentage of bark	
	10	20	30	40	50	60	70	80			
Volume—cubic feet											
Inches									Trees	Per-cent	
1.....	.04	.11	.18								
2.....	.13	.29	.45						1	24	
3.....	.20	.51	.81	1.11	1.42				2	24	
4.....		.81	1.32	1.84	2.35	2.84			9	23	
5.....		1.30	2.04	2.80	3.52	4.28			9	22	
6.....			2.80	3.90	5.00	6.09			6	21	
7.....			3.80	5.20	6.60	8.12	9.72		2	19	
8.....				6.80	8.70	10.7	12.6		4	17	
9.....				8.60	11.0	13.4	15.7		5	15	
10.....					13.6	16.4	19.1	21.7	1	13	
11.....					16.2	19.3	22.3	25.3		12	
12.....						22.5	25.9	29.0		11	
Basis.....		5	14	5	11	4			39		

Preliminary table.
Volume includes stump, stem, top, and bark.
Data collected in 1930 on cut-over lands by S. R. Gevorkiantz and T. Lotti.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by plotting actual volumes over volumes in Table 92.
Block indicates extent of data.
Aggregate deviation, .2 per cent.
Average deviation, ± 4.3 per cent.

Table 96
SECOND-GROWTH JACK PINE
(Pinus banksiana)
UNPEELED TOTAL VOLUME
Lake States

Wackerman, A. E.		1925														Cubic feet		
Diameter breast high	Total height—feet														Form factor	Basis		
	25	30	35	40	45	50	55	60	65	70	75	80	85	90				
Total unpeeled volume—cubic feet																		
Inches															Trees	Per-cent		
3.....	.8	1.0	1.2	1.3	1.5	1.7	1.8										.57	75
4.....	1.3	1.6	1.9	2.2	2.4	2.7	3.0	3.2									.52	151
5.....	2.0	2.4	2.8	3.2	3.5	3.9	4.3	4.7	5.1	5.5							.58	221
6.....		3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6							.55	242
7.....		4.2	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.7							.52	227
8.....			6.1	7.0	7.9	8.7	9.6	10.5	11.3	12.2	13.1						.50	218
9.....				8.7	9.7	10.8	11.9	13.0	14.1	15.2	16.2						.49	126
10.....					11.8	13.1	14.4	15.7	17.0	18.3	19.6	20.9	22.2				.48	74
11.....						15.5	17.1	18.6	20.2	21.7	23.3	24.8	26.4	27.9			.47	58
12.....							19.9	21.7	23.5	25.3	27.1	28.9	30.7	32.5			.46	46
13.....								22.8	24.9	27.0	29.1	31.2	33.2	35.2	37.4		.45	27
14.....									28.9	31.3	33.7	36.5	38.5	40.9	43.3		.45	8
15.....										32.4	35.1	37.8	40.6	43.2	46.0	48.6	.44	3
16.....											36.9	40.0	43.0	46.1	49.2	52.2	.44	3
Basis.....																		1479

Volume includes stump, stem, top, and bark.
Compiled at the Lake States Forest Experiment Station by the form-factor method.
Block indicates extent of data.
Aggregate deviation, .1 per cent.

Table 97
SECOND-GROWTH JACK PINE
(Pinus banksiana)
THE VOLUME TABLE
 Western Ontario

Diameter breast high	Total height (aver- age)	Age (aver- age)	Number of trees			Total	Equi- valent in board feet
			No. 1 7 x 11 x 8'	No. 2 6 x 8 x 8'	Cull, 5 x 8 x 8'		
10	58	48	0.3	0.8	1.1	1.9	37
11	61	53	1.3	2.0	1.0	3.3	74
12	66	52	2.2	1.8	.8	3.3	94
13	70	50	2.2	1.8	.8	4.3	119
14	74	48	3.6	1.3	.4	5.1	158
15	77	47	3.6	1.3	.3	5.4	158
16	81	47	4.0	1.2	.2	5.4	160

Basis, 100 trees.
 Table 9, Forest Quarterly, March, 1911.
 Table 28, U. S. Dept. of Agr. Bul. 820, The Jack Pine, 1920.

Table 98
SECOND-GROWTH JACK PINE
(Pinus banksiana)
PIECE-PRODUCT TABLE
 Superior National Forest
 1931

Diameter breast high	Total height—feet															Basis						
	30			40			50			60			70				80			90		
	Tim- bers	Poles	Lag- ging	Tim- bers	Poles	Lag- ging	Tim- bers	Poles	Lag- ging	Tim- bers	Poles	Lag- ging	Tim- bers	Poles	Lag- ging		Tim- bers	Poles	Lag- ging	Tim- bers	Poles	Lag- ging
Inches	Number of pieces																					Trees
5		0.3	3.4		0.4	4.0		0.5	4.6		0.6	5.9										8
6		1.0	3.0		1.2	3.3		1.5	3.6		1.8	4.0		2.0	4.5							17
7	0.4	1.2	2.3	0.5	1.5	2.4	0.6	2.1	2.5	0.7	2.6	2.7	0.8	3.2	2.8	0.8						20
8	0.6	0.9	1.8	0.9	1.2	2.2	1.2	1.9	2.2	1.3	2.5	2.1	1.5	2.8	2.3	1.8	3.1	2.5				6
9	1.1	0.5	1.5	1.7	1.1	1.6	2.3	1.7	1.6	2.4	2.1	1.5	2.7	2.4	1.8	3.2	2.8	2.2				6
10	1.2	0.4	1.1	2.0	1.0	1.3	2.9	1.2	1.5	3.6	1.5	1.3	4.2	1.8	1.7	4.8	2.1	1.9				6
11	1.8	0.4	0.9	2.6	0.9	1.2	3.5	1.1	1.2	4.5	1.3	1.1	5.2	1.4	1.5	5.6	1.5	1.6	6.2	1.8	1.7	6
12	1.9	0.3	0.8	2.8	0.7	1.2	3.8	0.9	1.0	5.0	1.0	1.1	5.7	1.1	1.3	6.5	1.4	1.3	7.0	1.5	1.8	11
13	2.0	0.3	0.8	3.0	0.5	1.1	4.0	0.7	0.9	5.4	0.9	0.9	6.0	1.0	1.2	6.9	1.1	1.2	7.6	1.1	1.6	9
14				3.2	0.3	1.0	4.2	0.6	0.9	5.5	0.7	0.9	6.4	0.8	1.2	7.1	0.9	1.2	7.8	0.9	1.4	3
15							4.2	0.4	0.8	5.9	0.5	1.0	6.4	0.7	1.2	7.2	0.7	1.2	7.9	0.8	1.3	1
16										6.0	0.3	1.0	6.4	0.5	1.2	7.3	0.5	1.0	8.2	0.6	1.1	1
17													6.5	0.4	1.1	7.6	0.3	1.0	8.5	0.2	1.0	0
18													6.7	0.3	1.0	7.7	0.3	0.9	8.6		1.0	0
Basis																						107

Stump height, 1 foot.
 Timbers 8 feet long to 7-inch top inside bark; poles 10 feet long to 5-inch top; lagging 6 feet long to 3-inch top.
 No cull deduction.
 Block indicates extent of data.
 Preliminary table.

Table 99
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)

VOLUME IN BOARD FEET

Wisconsin

Diameter breast high	Number of 16-foot logs											Basis			
	1	1½	2	2½	3	3½	4	4½	5	5½	6				
Volume—board feet												Trees			
Inches															
7	8	19	30	42								18			
8	10	22	33	46	58							23			
9	14	29	43	56	69	80						18			
10		36	50	63	78	92	109	130				27			
11		42	58	75	92	110	128	150				22			
12			68	90	114	136	157	177	195			14			
13			76	102	130	157	181	206	231	253		10			
14			86	121	154	185	217	244	272	299		11			
15				139	181	217	249	280	310	344	387	12			
16					160	208	249	288	321	353	394	443	9		
17					181	235	280	321	362	398	443	498	10		
18						308	353	398	443	493	543		7		
19							344	394	448	498	552	606	3		
20								439	493	543	606	670	7		
21									480	543	597	665	724	5	
22										525	588	652	719	787	2
Basis	4	10	41	27	11	17	17	21	22	22	6	198			

Data from Vilas, Oneida and Bayfield County Survey.
Stump height, 1 foot; top diameter inside of bark, 5 inches.
Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
Block indicates the range of data.
Aggregate deviation, .03 per cent.
Average deviation, ±8.4 per cent.

Table 100
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)

VOLUME IN BOARD FEET

Wisconsin

Diameter breast high	Total height—feet								Basis
	40	50	60	70	80	90	100	110	
Volume—board feet									Trees
Inches									
7	12	22	30	37					18
8	17	31	42	52	61				23
9	24	40	54	68	81	90			18
10	30	50	69	86	102	119	135		27
11	37	61	85	107	127	146	167		22
12	44	74	103	131	154	179	204		14
13	52	88	123	156	186	215	244		10
14		105	147	185	218	253	289		11
15		124	172	217	255	295	335		12
16		144	199	250	293	339	385	434	9
17		163	226	284	330	384	434	489	10
18			255	319	371	427	488	548	7
19			285	359	416	479	543	608	3
20			317	394	462	529	597	670	7
21				434	507	577	652	733	5
22				480	552	634	710	796	2
Basis	19	52	17	25	30	31	22	2	198

Data from Vilas, Oneida and Bayfield County Survey.
Stump height, 1 foot; top diameter inside of bark, 5 inches.
Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
Block indicates the range of data.
Aggregate deviation, .2 per cent.
Average deviation, ±7.8 per cent.

Table 101
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
 Form Class 75

Wisconsin

Gevorkiantz			1933			Scribner	
Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
Inches			Trees	Inches			Trees
8	1	12	1	17	1	100	
9	1	18	4		2	170	
					3	224	
10	1	25	5		4	271	1
	2	41	3	18	1	113	
					2	193	
11	1	32	2		3	256	
	2	54	2		4	307	
	3	68	1		5	346	
12	1	42	1	19	1	129	
	2	70	1		2	220	
	3	89	1		3	291	
					4	351	
13	1	51	1		5	393	
	2	85	1				
	3	112	1	20	1	144	
	4	132			2	246	
					3	325	
14	1	63			4	395	
	2	105			5	444	
	3	137	1				
	4	163		21	1	161	
					2	274	
15	1	75			3	366	
	2	126			4	439	
	3	164	1		5	499	1
	4	198					
16	1	86		22	1	177	
	2	140			2	304	
	3	191			3	402	
	4	231			4	487	
					5	551	
				Basis			28

*Girard form class.
 Volume above stump to point where stem divides into branches.
 Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.8 per cent.

Table 102
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
 Form Class 80

Wisconsin

Gevorkiantz			1933			Scribner	
Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
Inches			Trees	Inches			Trees
8	1	15	9	17	1	115	
9	1	23	9		2	195	
	2	35	6		3	255	1
					4	305	3
10	1	30	3		5	344	2
	2	49	2	18	1	131	
					2	222	
11	1	39			3	293	
	2	64	4		4	351	4
	3	81	6		5	398	1
12	1	50		19	1	148	
	2	82			2	259	
	3	109	4		3	331	
					4	398	2
13	1	61			5	450	2
	2	102	1				
	3	132	1	20	1	165	
	4	155	4		2	281	
					3	372	
14	1	74			4	445	5
	2	122	1		5	510	2
	3	158	2				
	4	189		21	1	185	
					2	314	
15	1	86			3	416	
	2	145			4	502	1
	3	189	3		5	569	
	4	224	2				
16	1	100		22	1	204	
	2	169			2	348	
	3	222	1		3	461	
	4	265	2		4	558	1
	5	299			5	630	1
				Basis			89

*Girard form class.
 Volume above stump to point where stem divides into branches.
 Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.8 per cent.

Table 103
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
 Form Class 85

Gevorkiantz		Wisconsin 1933		Scribner			
Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
<i>Inches</i> 8	1	19	<i>Trees</i> 2	<i>Inches</i> 17	1 2	131 222	<i>Trees</i>
9	1 2	27 43	1 6		3 4 5	292 355 402	3 1
10	1 2 3	36 59 73	1 2	18	1 2 3	150 254 335	
11	1 2 3	47 77 99	5		4 5	405 463	1 2
12	1 2 3 4	58 96 125 148	8 2	19	1 2 3 4 5	168 285 377 456 524	1 1
13	1 2 3 4	72 119 154 185	2 1	20	1 2 3 4 5	189 322 426 516 589	-1
14	1 2 3 4 5	84 140 183 222 249	3 2	21	1 2 3 4 5	213 361 476 578 663	1
15	1 2 3 4 5	99 166 220 261 299	1 4 3	22	1 2 3 4 5	234 398 526 637 731	2
16	1 2 3 4 5	115 195 254 307 351	4 1	Basis			61

*Girard form class.
 Volume above stump to point where stem divides into branches.
 Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.8 per cent.

Table 104
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
VOLUME IN BOARD FEET
 Wisconsin

Gevorkiantz		Wisconsin 1933					Scribner
Diameter breast high	Number of 16-foot logs					Basis	
	1	2	3	4	5		
	Volume—board feet						
<i>Inches</i>						<i>Trees</i>	
8	13					12	
9	20	35				25	
10	28	49				18	
11	36	64	88			21	
12	46	82	112			15	
13	57	102	140	166		13	
14	69	122	168	202		10	
15	81	144	201	238		15	
16	94	169	235	279	330	9	
17	109	195	269	324	376	11	
18	124	222	309	372	436	8	
19	140	250	348	420	493	6	
20	157	281	393	473	556	8	
21	175	314	440	532	623	3	
22	193	348	486	589	687	4	
Basis	37	29	43	48	21	178	
Average form class*	78	80	82	82	83		

* Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Volume above stump to point where stem divides into large branches.
 Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, for diameters over 18 inches.
 Block indicates extent of data.
 Aggregate deviation, .6 per cent.
 Average deviation, ±10.5 per cent.

Table 105
OLD-GROWTH NORWAY PINE
(Pinus resinosa)
VOLUME IN BOARD FEET
Minnesota, Wisconsin

Chapman
Bruce, E. S.
Woolsey

1913

Scribner Decimal C

Diameter breast high	Number of 16-foot logs										Basis					
	1	1½	2	2½	3	3½	4	4½	5	5½		6	6½	7		
	Volume—board feet, in tens															
<i>Inches</i>																<i>Trees</i>
8	2.0	3.0	4.0	5												127
9	2.0	3.4	4.8	6	8											144
10	2.0	4.1	5.7	7	9	10										213
11	2.0	4.2	6.2	8	10	12	14									256
12	2.0	5.2	7.4	9	12	14	16	19								315
13	2.0	5.6	8.3	11	13	16	18	21	24							351
14	2.0	6.3	9.6	12	15	18	21	24	27							345
15		7.1	11.0	14	17	20	23	27	30	34						362
16		7.8	12.0	15	19	23	26	30	34	38						338
17			13.0	17	21	25	30	34	39	43	48					297
18			14.0	19	23	28	33	38	44	49	55					278
19				20	26	32	38	43	49	55	62	68				233
20				22	29	35	42	49	55	62	68	75	82			202
21				31	39	47	54	61	68	75	82	88				178
22				34	43	52	60	68	75	82	89	95				156
23				38	48	57	66	74	82	89	96	103				114
24				42	53	63	73	82	90	97	104	111	98			100
25				60	70	79	89	98	106	113	120	100				
26				66	76	86	96	106	114	123	131	66				
27				72	83	94	104	114	124	133	143	55				
28				79	90	101	112	123	135	145	156	18				
29				96	108	120	133	145	158	170	14					
30				103	116	130	143	157	171	185	9					
31				110	124	139	153	169	184	200	5					
32				133	149	165	182	198	214	5						
33				142	159	177	195	213	230	2						
34				152	171	190	209	228	248	1						
Basis																4282

Beltrami, Cass, Hubbard, and Itasca Counties, Minn.; Bayfield County, Wis.

Height of stump, 2 feet. Top diameter inside bark, 6 inches. Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary.

Table 17, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 106
OLD-GROWTH NORWAY PINE
(Pinus resinosa)
VOLUME IN BOARD FEET
Minnesota, Wisconsin

Chapman
Bruce, E. S.
Woolsey

1913

Scribner Decimal C

Diameter breast high	Total height—feet										Basis	
	30	40	50	60	70	80	90	100	110	120		
	Volume—board feet, in tens											
<i>Inches</i>												<i>Trees</i>
8	1.0	1.3	1.7	3	3	4	5	6				127
9	1.4	2.0	2.8	4	5	6	8	9				144
10	2.0	2.8	4.0	5	7	8	10	12				213
11		3.8	5.3	7	9	11	13	15				256
12		4.8	6.7	9	11	13	15	18	21			315
13		6.0	8.1	10	13	16	18	21	24			351
14		7.0	9.6	12	16	19	21	25	28			345
15			11.0	15	18	22	25	29	32			362
16			13.0	17	21	25	29	33	36	39		338
17			14.0	19	24	29	33	37	41	44		297
18			16.0	22	28	33	38	42	46	50		278
19				26	32	38	43	48	52	56		233
20				29	36	43	49	4	59	63		202
21				40	48	55	61	67	71	78		178
22				45	54	62	69	75	80	86		156
23				50	60	68	76	83	89	94		114
24				55	66	76	85	92	99	103		100
25				60	72	84	94	102	109	114		
26				66	79	92	103	112	120	66		
27				86	100	112	122	131	55			
28				94	109	122	133	143	13			
29				102	117	132	144	156	14			
30				109	126	142	156	170	9			
31				136	153	169	185	5				
32				146	164	182	200	5				
33				155	175	195	216	2				
34				165	187	210	232	1				
Basis												4282

Beltrami, Cass, Hubbard, and Itasca Counties, Minn.; Bayfield County, Wis.

Height of stump, 2 feet. Top diameter inside bark, 6 inches. Based on taper curves, scaled mostly in 16.3-foot logs, with a few shorter logs where necessary.

Table 19, U. S. Dept. of Agr. Bul. 139, Norway Pine in the Lake States. 1915.

Table 107
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
VOLUME IN BOARD FEET
Wisconsin

Gevorkiantz		1931										Scribner Decimal C	
Diameter breast high	Number of 16-foot logs										Basis		
	1	1½	2	2½	3	3½	4	4½	5	5½		6	
	Volume—board feet												
Inches											Trees		
7	2											18	
8	2	3	4									23	
9	2	3	5	6	7							18	
10	3	4	5	7	8	10	11					27	
11		4	6	8	10	12	13					22	
12		5	7	9	11	13	15	17				14	
13			8	10	13	15	17	19	21	23		10	
14				12	15	18	20	23	25	27		11	
15				14	17	20	23	26	29	31	34	12	
16					19	22	26	30	33	36	39	9	
17					22	26	30	34	37	40	44	10	
18						29	33	37	40	44	48	7	
19							37	41	45	49	53	3	
20							41	46	50	54	59	7	
21						45	50	55	59	65		5	
22							54	59	65	70		2	
Basis	22	25	33	10	14	19	17	14	30	13	2	198	

Data from Vilas, Oneida and Bayfield County Survey.
 Stump height, 1 foot; top diameter inside bark, 6 inches.
 Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, 0.03 per cent.
 Average deviation, ±8.9 per cent.

Table 108
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
VOLUME IN BOARD FEET
Wisconsin

Gevorkiantz		1931										Scribner Decimal C	
Diameter breast high	Total height—feet										Basis		
	30	40	50	60	70	80	90	100	110	120			
	Volume—board feet												
Inches											Trees		
7			1	1	2	2						18	
8	1	2	2	3	4	5						23	
9	1	2	3	5	6	7	8					18	
10	2	3	5	6	8	9	10	12				27	
11	2	4	6	8	9	11	13	15				22	
12		5	7	9	12	14	16	18				14	
13		6	8	11	14	16	19	21				10	
14			10	13	16	19	22	25	28			11	
15			12	15	19	22	26	29	33			12	
16				13	17	21	26	30	33	37		9	
17			15	19	24	29	33	38	42			10	
18				22	27	32	37	42	47			7	
19				25	30	36	42	47	52			3	
20				27	34	40	46	52	58	64		7	
21					37	44	50	57	63	69		5	
22					40	48	55	62	69	75		2	
23					44	52	60	68	75	82			
Basis	5	14	52	17	25	30	31	22	2			198	

Data from Vilas, Oneida and Bayfield County Survey.
 Stump height, 1 foot; top diameter inside bark, 6 inches.
 Compiled at the Lake States Forest Experiment Station by the alinement-chart method.
 Block indicates extent of data.
 Aggregate deviation, .1 per cent.
 Average deviation, ±3.6 per cent.

Table 109
OLD-GROWTH NORWAY PINE
(Pinus resinosa)
UNPEELED TOTAL VOLUME
Minnesota, Wisconsin

Chapman, H. H.		1905										Cubic feet	
Diameter breast high	Total height—feet										Basis		
	40	50	60	70	80	90	100	110	120				
	Volume—cubic feet												
Inches	7.0	8.0	9.5	10.5	11.5						Trees		
7											5		
8	8.0	9.5	11.5	13.0	15.0						15		
9	10.0	12.0	14.0	16.0	18.5						17		
10	12.0	14.0	16.5	19.5	22.5	25.5					32		
11		17.0	20.0	23.0	27.0	30.5					29		
12		19.5	23.5	27.0	31.5	36.5					51		
13			27.5	31.5	36.5	43.0	49.5				47		
14			32.0	36.5	42.5	49.5	57.5				32		
15			37.0	42.0	49.0	59.5	65.0				34		
16			42.0	47.5	55.5	63.5	73.0				34		
17				53.5	62.0	71.0	81.0				30		
18					68.5	78.5	89.0	97.0			40		
19					76.0	86.5	97.0	105.0			36		
20					83.5	95.0	106.0	114.5			33		
21					92.0	103.0	115.0	125.0	139.0		34		
22					101.0	112.0	125.0	137.0	153.0		34		
23					111.0	122.0	135.0	150.0	167.0		19		
24					120.0	131.0	145.0	163.0	182.0		20		
25					129.0	142.0	157.0	177.0	197.0		28		
26					138.0	152.0	169.0	191.0	214.0		15		
27					148.0	162.0	181.0	205.0	230.0		10		
28						173.0	193.0	219.0	246.0		4		
29						183.0	205.0	233.0	262.0		2		
30						193.0	217.0	247.0	277.0		2		
Basis											613		

Itasca County, Minnesota, and Bayfield County, Wisconsin.
This table of volumes includes entire stem except a 1-foot stump.

Table 110
SECOND-GROWTH NORWAY PINE
(Pinus resinosa)
PEELED TOTAL VOLUME
Wisconsin

Gevorkiantz		1931										Cubic feet	
Diameter breast high	Total height—feet										Mer- chant- able vol- ume*	Basis	
	20	30	40	50	60	70	80	90	100	110			
	Total volume—cubic feet												
Inches											Per cent	Trees	
1	.054	.073										8	
2	.232	.302										7	
3	.510	.675	.86									5	
4	.857	1.12	1.49	1.84								58.5	
5	1.31	1.75	2.26	2.80	3.40							82.0	
6	1.81	2.48	3.20	4.10	5.00							86.0	
7	2.30	3.30	4.20	5.45	6.85	8.5						91.0	
8	2.85	4.25	5.55	7.12	8.90	11.0						92.5	
9	3.40	5.40	7.15	9.20	11.4	13.9	16.4					93.5	
10	4.00	6.75	9.00	11.4	14.0	17.1	20.2	23.0				94.2	
11	4.60	7.75	10.9	13.8	17.1	21.0	24.3	27.6				94.8	
12	5.20	8.75	12.8	16.1	20.1	24.4	28.2	32.0				95.2	
13	5.80	9.50	15.0	19.1	23.5	28.4	32.8	37.0	41.2	45.0		95.5	
14	6.40	10.25	17.5	22.2	27.2	32.7	38.0	42.9	47.7	52.0		96.0	
15	7.00	11.00	20.2	25.4	31.0	37.3	43.4	49.0	54.0	58.8		96.1	
16	7.60	11.75	23.6	29.6	36.0	43.1	48.7	55.0	61.0	66.5		96.3	
17	8.20	12.50	27.0	33.0	40.0	47.0	55.0	62.0	68.5	75.0		96.5	
18	8.80	13.25	30.5	37.5	45.0	52.0	61.0	69.0	76.8	84.0		96.7	
19	9.40	14.00	34.0	42.0	50.0	58.0	67.5	77.0	85.5	94.0		96.8	
20	10.00	14.75	38.0	47.0	56.0	64.8	74.9	85.3	95.0	104.0		96.8	
21	10.60	15.50	42.0	52.0	62.0	71.5	82.4	93.0	103.0	112.0		96.8	
22	11.20	16.25	46.0	57.0	68.0	78.0	90.5	102.0	112.0	120.0		96.8	
Basis	24	16	26	58	17	27	29	30	23	2		252	

*Merchantable volume above a 1-foot stump to a 3-inch top inside bark.
Data from Vilas, Oneida, and Bayfield County Survey.
Volume includes stump, stem and tip without bark.
Tree volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by the alignment-chart method.
Block indicates extent of data.
Aggregate deviation, 0.0 per cent.
Average deviation, ±6.3 per cent.

Table 111
SECOND-GROWTH WHITE PINE
(*Pinus strobus*)

VOLUME IN BOARD FEET

Wisconsin

Gevorkiantz **1929** International $\frac{1}{4}$

Diameter breast high	Number of 16-foot Logs											Basis				
	1½	2	2½	3	3½	4	4½	5	5½	6	6½		7			
Volume—board feet																
Inches												Trees				
7	23	33											8			
8	26	40	52										7			
9	31	45	60	76									5			
10	34	51	68	88	101								2			
11	40	57	76	101	122	147							4			
12	64	86	118	142	167	195							1			
13	71	96	132	159	189	219	246						2			
14		109	148	176	213	244	276						7			
15		120	164	202	238	276	310	349					5			
16			131	178	220	260	303	342	385	425			10			
17				199	244	289	335	380	425	475	523		11			
18					217	267	316	367	418	471	520	569	9			
19						237	292	343	403	461	516	570	10			
20							317	373	441	502	559	615	669	724	6	
21								407	484	543	602	670	724	786	7	
22									525	584	652	719	783	848	3	
23										629	698	774	842	911	1	
24											674	754	828	900	977	0
Basis																98

Stump height, 1 foot; top diameter inside bark, 5 inches.
Trees scaled in 8.15-foot lengths.
Compiled at the Lake States Forest Experiment Station by the alignment-chart method.
Data collected in well-stocked stands by S. R. Gevorkiantz and F. G. Wilson. H. C. Moser assisted in the computations.
Block indicates extent of data.
Aggregate deviation, .1 per cent.
Average deviation, ±6.9 per cent.

Table 112
SECOND-GROWTH WHITE PINE
(*Pinus strobus*)

FORM-CLASS* BOARD-FOOT VOLUME TABLE

Form Class 75

Wisconsin

Gevorkiantz **1933** Scribner

Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
Inches			Trees	Inches			Trees
8	1	12	2	18	1	113	
9	1	18	2	19	2	191	
10	1	25			3	240	
	2	40			4	306	
11	1	32	2	20	1	129	
	2	53			2	219	
12	1	42			3	275	1
	2	69	1		4	349	3
13	1	51		21	1	144	
	2	84			2	245	
	3	105	1		3	309	
14	1	63			4	392	1
	2	105			5	430	
	3	131	1	22	1	161	
	4	162			2	272	
15	1	75			3	347	
	2	125			4	441	1
	3	155			5	483	1
	4	197	1				
16	1	86		Basis			20
	2	144					
	3	182	1				
	4	232					
17	1	101					
	2	170					
	3	214					
	4	269	1				

*Girard form class.
Volume above stump to point where stem divides into branches.
Top diameter variable, not less than 6 inches inside bark.
Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
Aggregate deviation, .2 per cent.
Average deviation, ±4.5 per cent.

Table 113
SECOND-GROWTH WHITE PINE
(Pinus strobus)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
 Form Class 80

Wisconsin

Gevorkiantz 1933 Scribner

Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
<i>Inches</i>			<i>Trees</i>	<i>Inches</i>			<i>Trees</i>
8	1	15	2	17	1	115	2
9	1	23	3		2	193	
	2	35			3	240	
					4	306	
10	1	30	2	18	1	131	1
	2	48			2	219	
11	1	39	1		3	276	
	2	63			4	353	
					5	387	
12	1	50	1	19	1	148	2
	2	81			2	249	
	3	97			3	313	
					4	398	
			5		439		
13	1	61	1	20	1	166	1
	2	100			2	279	
	3	122			3	352	
	4	154			4	448	
			5		498		
14	1	74	3	21	1	185	3
	2	121			2	310	
	3	152			3	394	
	4	189			4	504	
			5		555		
15	1	86	4	22	1	204	1
	2	142			2	344	
	3	178			3	436	
	4	227			4	556	
			5		615		
16	1	101	4	Basis			58
	2	165					
	3	209					
	4	265					

*Girard form class.
 Volume above stump to point where stem divides into branches.
 Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
 Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.5 per cent.

Table 114
SECOND-GROWTH WHITE PINE
(Pinus strobus)
FORM-CLASS* BOARD-FOOT VOLUME TABLE
 Form Class 85

Wisconsin

Gevorkiantz 1933 Scribner

Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis	Diameter breast high	Number of 16-foot logs	Volume—board feet	Basis
<i>Inches</i>			<i>Trees</i>	<i>Inches</i>			<i>Trees</i>
8	1	19	1	17	1	131	1
9	1	27	2		2	219	
	2	42			3	273	
					4	352	
					5	392	
10	1	36	2	18	1	150	1
	2	58			2	251	
11	1	47	1		3	313	
	2	75			4	404	
	3	91			5	449	
12	1	58	1	19	1	168	1
	2	94			2	281	
	3	115			3	353	
	4	146			4	455	
		5	509				
13	1	72	1	20	1	189	1
	2	117			2	316	
	3	145			3	398	
	4	183			4	513	
		5	574				
14	1	84	1	21	1	213	1
	2	138			2	355	
	3	171			3	447	
	4	220			4	577	
		5	643				
15	1	99	2	22	1	234	1
	2	163			2	391	
	3	203			3	493	
	4	261			4	634	
		5	709				
16	1	115	6	Basis			24
	2	192					
	3	237					
	4	306					
	5	340					

*Girard form class.
 Volume above stump to point where stem divides into branches. Top diameter variable, not less than 6 inches inside bark.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, from 12 to 18 inches; 2 feet, over 18 inches.
 Compiled from Girard form-class taper tables.
 Aggregate deviation, .2 per cent.
 Average deviation, ±4.5 per cent.

Table 115
OLD-GROWTH WHITE PINE
(Pinus strobus)
VOLUME IN BOARD FEET
Minnesota

Frothingham
Barrows 1913 Scribner Decimal C

Diameter breast high	Number of 16-foot logs													Basis
	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7		
	Volume—board feet, in tens													
<i>Inches</i>														<i>Trees</i>
8	2.8	4.0	5.6	6										119
9	3.1	4.4	6.0	7										181
10	3.6	5.0	6.7	8	10	11								189
11	4.0	5.6	7.4	9	11	13								215
12	4.3	6.3	8.3	10	13	15	18	21						198
13	4.9	7.0	9.4	12	14	17	20	23						210
14	5.3	8.0	11.0	14	17	19	22	25						189
15	5.9	8.9	12.0	15	18	21	24	28						54
16	6.0	10.0	13.0	17	20	24	27	31	34					39
17	7.0	11.0	15.0	19	22	26	30	34	38					50
18	8.0	12.0	17.0	21	25	29	33	37	42	47				49
19	8.0	14.0	19.0	23	27	32	36	41	46	51				67
20	9.0	15.0	21.0	25	30	35	40	45	50	56				38
21		17.0	23.0	27	33	38	44	49	55	61				38
22		18.0	25.0	30	35	42	48	53	60	66				30
23			27.0	32	38	45	52	58	65	73				31
24			29.0	35	41	49	56	63	71	79				18
25				37	44	53	61	68	77	86				24
26				39	47	57	65	74	84	94				18
27					51	61	70	80	91	102				15
28					54	65	75	86	98	109				11
29					57	69	80	92	105	117				10
30					61	73	85	99	112	125	140			19
31						78	91	106	120	134	149			4
32						83	97	113	128	143	158	175		3
33						87	104	121	136	152	168	185		2
34						92	111	129	145	162	178	195		2
35							119	137	155	172	189	206		1
36							127	145	164	183	200	218		1
37							135	154	174	193	212	230		3
38							143	163	184	205	225	244		3
39							152	173	194	216	238	259		2
40							162	183	205	228	252	275		1
41							172	193	216	240	267	292		2
42							182	203	227	252	282	310		2
Basis														1884

Beltrami, Cass, and Itasca Counties, Minn.
Stump height, 1 foot. Top diameter inside bark, 6 inches.
Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary.
Table 6, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 116
OLD-GROWTH WHITE PINE
(Pinus strobus)
VOLUME IN BOARD FEET
Minnesota

Barrows 1913 Scribner Decimal C

Diameter breast high	Total height—feet								Basis	
	40	50	60	70	80	90	100	110		
	Volume—board feet, in tens									
<i>Inches</i>									<i>Trees</i>	
8	2.0	2.7	3.4	4.6	5	6			119	
9	2.8	3.5	4.3	5.8	7	8			181	
10	3.4	4.4	5.4	7.1	8	10	11		189	
11	4.1	5.4	6.8	9.0	10	12	13		215	
12	5.0	6.6	8.2	10.0	12	14	16	18	198	
13	5.8	7.9	9.8	12.0	14	17	19	21	210	
14	6.6	9.3	12.0	14.0	17	20	22	24	189	
15	7.4	11.0	14.0	16.0	19	23	25	28	54	
16	8.3	13.0	16.0	19.0	22	26	28	32	39	
17	9.3	15.0	18.0	21.0	25	29	32	36	50	
18	10.0	16.0	20.0	24.0	28	32	36	40	49	
19		18.0	23.0	27.0	31	36	40	45	67	
20		21.0	26.0	30.0	35	40	45	50	38	
21			29.0	33.0	39	44	49	55	38	
22			32.0	36.0	43	48	54	61	36	
23			35.0	40.0	47	53	60	67	31	
24			38.0	43.0	51	58	66	74	18	
25				47.0	55	64	72	80	24	
26				51.0	60	69	78	88	18	
27				55.0	65	75	85	95	15	
28				59.0	70	81	92	103	11	
29				63.0	75	87	99	112	10	
30				67.0	81	94	107	120	19	
31					87	101	115	129	4	
32					93	109	124	139	3	
33					100	117	133	149		
34					107	126	142	159	2	
35					114	135	152	170	1	
36						122	144	162	182	1
37							153	173	193	3
38							163	183	205	3
39							173	194	217	2
40							183	205	229	1
41							192	216	242	
42							202	228	255	2
Basis										1834

Beltrami, Cass, and Itasca Counties, Minn.
Stump height, 1 foot. Top diameter inside bark, 6 inches. Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary. Old-growth trees.
Table 11, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 117
SECOND-GROWTH WHITE PINE
(Pinus strobus)

VOLUME IN BOARD FEET

Wisconsin

Diameter breast high	Number of 16-foot logs					Basis
	1	2	3	4	5	
Volume—board feet, tens						
Inches						Trees
8	1.3					5
9	2.1	3.5				7
10	2.8	4.8				5
11	3.6	6.3				4
12	4.6	8.1	9.7			1
13	5.7	10.0	12.2	15.4		2
14	6.9	12.1	15.2	18.9		7
15	8.1	14.2	17.8	22.7		7
16	9.4	16.8	20.9	26.5		11
17	10.9	19.3	24.0	30.6		10
18	12.4	21.9	27.6	35.3	38.7	9
19	14.0	24.9	31.3	39.8	43.9	12
20	15.7	27.9	35.2	44.8	49.8	6
21	17.5	31.0	39.4	50.4	55.5	9
22	19.3	34.4	43.6	55.6	61.5	7
Basis	16	6	5	48	27	102
Form class	78	80	80	80	80	

Volume above stump to the point where the stem divides into large branches.

Stump height, 1 foot for trees less than 12 inches; 1.5 feet for 12 to 18-inch trees; 2 feet for trees over 18 inches.

Top diameter variable, not less than 6 inches inside bark.

Compiled at the Lake States Forest Experiment Station from Girard form-class taper tables.

Block indicates extent of data.

Aggregate deviation, .2 per cent.

Average deviation, ±10.4 per cent.

Table 118
SECOND-GROWTH WHITE PINE
(Pinus strobus)

VOLUME IN BOARD FEET

Wisconsin

Diameter breast high	Number of 16-foot logs											Basis	
	1½	2	2½	3	3½	4	4½	5	5½	6	6½		7
Volume—board feet, in tens													
Inches												Trees	
8	2.8	3.4	4.7										7
9	3.1	3.8	5.2	7.0									5
10	3.4	4.2	6.0	7.9	9.8								2
11		4.6	6.8	8.9	11.0	13.3							4
12		5.1	7.7	9.9	12.5	15.2	18.0						1
13		5.7	8.5	11.1	14.0	17.3	20.0	23.0					2
14		6.4	9.4	12.5	15.8	19.3	22.5	26.1					7
15			10.4	14.0	17.8	21.4	25.2	29.8	34.1				5
16			11.6	15.7	19.8	24.0	28.8	34.0	38.8	44.0			10
17				17.7	21.9	27.0	32.5	38.3	43.4	53.9	54.0		11
18				19.3	24.1	30.4	36.4	42.7	48.4	54.0	59.0		9
19				20.9	27.0	34.1	40.6	47.6	53.2	59.0	64.2		10
20					30.4	38.0	45.0	52.3	58.3	64.1	69.4	74.0	6
21					42.2	49.7	57.0	63.4	69.0	75.0	80.0		7
22						54.4	62.0	68.2	74.5	80.9	86.2		3
23							66.8	73.3	80.0	87.2	92.8		1
24								71.5	78.6	86.0	94.0	100.0	
Basis													90

Stump height, 1 foot; top diameter inside bark, 6 inches.

Trees scaled in 8.15-foot lengths.

Compiled at the Lake States Forest Experiment Station by the alinement-chart method.

Data collected in well-stocked stands by S. R. Gevorkiantz and F. G. Wilson.

H. C. Moser assisted the computations.

Block indicates extent of data.

Aggregate deviation, .1 per cent.

Average deviation, ±7.4 per cent.

Table 119
SECOND-GROWTH WHITE PINE
(Pinus strobus)

PEELED TOTAL VOLUME
Wisconsin

Gevorkiantz		1929											Cubic feet				
Diameter breast high	Inches	Total height—feet											Basis				
		20	30	40	50	60	70	80	90	100	110	120					
		Total volume—cubic feet															
2	.206	.310	.415														
3	.460	.720	.950	1.18													
4	.810	1.24	1.65	2.05	2.46												
5		2.00	2.56	3.14	3.73	4.31											
6		2.74	3.58	4.52	5.41	6.30	7.10										
7		3.63	4.82	6.10	7.22	8.26	9.40	10.5									
8			6.30	7.72	9.19	10.8	12.2	13.6	15.2								
9			7.82	9.63	11.6	13.6	15.4	17.2	19.3								
10			9.58	12.1	14.5	16.8	19.3	21.5	24.0								
11			11.7	14.5	17.5	20.4	23.0	26.0	29.0								
12			17.2	20.6	24.0	27.4	30.7	34.4	37.7								
13			20.3	24.3	28.4	32.3	36.2	40.3	44.2								
14			23.5	28.0	32.8	37.5	41.9	46.8	51.0								
15			32.3	37.6	42.7	48.0	53.0	58.1									
16				36.9	42.6	48.3	54.0	59.8	65.5								
17				41.5	47.8	54.5	60.5	66.6	73.0								
18				46.5	53.4	60.4	67.3	74.0	80.3	86.6							
19				51.5	59.2	67.3	74.6	81.7	88.6	95.2							
20					65.2	73.8	81.5	89.0	96.3	103.0							
21					71.2	80.0	88.5	96.0	103.0	110.0							
22					77.2	86.5	95.4	104.0	111.0	118.0							
23					83.5	93.5	103.0	111.0	118.0	125.0							
24					90.0	100.0	110.0	118.0	126.0	133.0							
Basis																	105

Volume includes stump, stem and top without bark.
Tree volumes by Smalian's formula.
Compiled at the Lake States Forest Experiment Station by alinement-chart method.
Data collected by S. R. Gevorkiantz and F. G. Wilson from well-stocked stands.
Block indicates extent of data.
Aggregate deviation, .4 per cent.
Average deviation, ±4.6 per cent.

Table 120
BLACK SPRUCE
(Picea mariana)

UNPEELED MERCHANTABLE VOLUME
Minnesota, Wisconsin

Gevorkiantz		1934													Standard cords			
Diameter breast high	Inches	Total height—feet													Basis			
		20	25	30	35	40	45	50	55	60	65	70	75					
		Volume—cords																
4	.008	.010	.011	.013	.015	.017												62
5	.013	.017	.020	.024	.028	.031	.035	.038	.042									100
6		.025	.030	.036	.041	.046	.052	.057	.062	.068								92
7			.044	.051	.058	.064	.071	.078	.085	.092	.099							54
8				.067	.076	.084	.093	.102	.111	.119	.128	.136						48
9					.094	.105	.115	.125	.135	.145	.154	.165						33
10						.114	.125	.138	.151	.162	.175	.187	.199					10
11							.148	.161	.176	.190	.203	.218	.231					8
12							.171	.187	.202	.219	.234	.250	.265					3
13							.208	.214	.232	.248	.273	.284	.300					1
Basis		4	36	38	42	66	67	59	44	34	13	4	4	4				411

Average stands.
Volume of unpeeled stem above a 1-foot stump to a 3-inch top diameter inside bark.
Volumes by planimter.
Block indicates range of data.
Compiled at the Lake States Forest Experiment Station by alinement-chart method.
Data collected in 1929-1934.
Aggregate deviation, —0.05 per cent.
Average deviation, ±7.9 per cent.

Table 121
BLACK SPRUCE
(*Picea mariana*)

UNPEELED MERCHANTABLE VOLUME*
Minnesota

Brown, R. M. Knudson, R.		1928								Standard cords	
Diameter breast high	Total height—feet								Basis	Cord- wood con- verting fac- tors	
	30	35	40	45	50	55	60	65			
Volume—cords										Cubic feet	
Inches									Trees		
4	.012	.014	.018	.022	.024					18	78
5	.022	.027	.032	.035	.040	.044				16	82
6		.039	.046	.052	.058	.064	.069	.075		20	84
7			.062	.069	.077	.084	.091	.099		19	86
8			.078	.087	.097	.105	.115	.125		10	87
9				.110	.120	.130	.140	.155		4	88
10				.130	.145	.155	.175	.185			89
11					.170	.190	.205	.220			90
12					.200	.220	.240	.260			90
Basis			7	12	22	21	19	6		87	

*Volume includes the stem with bark above a 1-foot stump to a 3-inch top diameter inside of bark.
Standard cords, 4x4x8 feet.
For even-aged, well-stocked stands.
Volumes computed from unpeeled merchantable table by dividing by the converting factors given in the last column of the table.
Data collected in 1928 by I. Taylor and T. Lotti at Cloquet Forest Experiment Station.
Block indicates the range of basic data.
Aggregate deviation, .01 per cent.
Average deviation, ± 4.4 per cent.

Table 122
BLACK SPRUCE
(*Picea mariana*)
UNPEELED MERCHANTABLE VOLUME

Fassett, P. J.		1932					Cubic feet	
Diameter breast high	Total height—feet					Basis	Trees	
	40	45	50	55	60			
Volume—cubic feet								
Inches								
5	1.93	2.35	2.77	3.18			45	
6	3.90	3.87	4.46	5.09			38	
7		5.82	6.48	7.18	7.91		17	
8		8.65	8.68	9.55	10.50		11	
9		10.28	11.21	12.27	13.44		5	
Basis	7	29	40	35	5		116	

These trees probably have better than average form. Editor's note.
Volume above a 1-foot stump to top diameter limit of 4 inches outside bark.
Data collected in Chippewa County, Michigan, by G. L. Brown, Carl Thoresen, and P. J. Fassett, in the summer and fall of 1932 from a very dense stand.
Table compiled by the frustum-form-factor method.
Block indicates extent of data.
Aggregate deviation, $+0.4$ per cent.
Average deviation, ± 2.5 per cent.

Table 123
BLACK SPRUCE
(Picea mariana)
UNPEELED MERCHANTABLE VOLUME*
Minnesota

Brown, R. M. Knudson, R.		1928								Cubic feet	
Diameter breast high	Total height—feet								Basis		
	30	35	40	45	50	55	60	65			
Volume—cubic feet											
Inches									Trees		
4	.9	1.1	1.4	1.7	1.9					18	
5	1.8	2.2	2.6	2.9	3.3	3.6				16	
6		3.3	3.9	4.4	4.9	5.4	5.8	6.3		20	
7			5.3	5.9	6.6	7.2	7.8	8.5		19	
8			6.8	7.6	8.4	9.2	10.0	11.0		10	
9				9.6	10.5	11.6	12.5	13.5		4	
10				11.5	13.0	14.0	15.5	16.5			
11					15.5	17.0	18.5	20.0			
12					18.0	20.0	21.5	23.5			
Basis			7	12	22	21	19	6		87	

*Volume includes the stem with bark above a 1-foot stump to a 3-inch top diameter inside of bark.
For even-aged, well-stocked stands.
Volumes by planimeter.
Compiled by the alinement-chart method.
Data collected in 1928 by I. Taylor and T. Lotti at the Cloquet Forest Experiment Station.
Block indicates the range of basic data.
Aggregate deviation, .04 per cent.
Average deviation, ±4.6 per cent.

Table 124
BLACK SPRUCE
(Picea mariana)
PEELED MERCHANTABLE VOLUME
Minnesota, Wisconsin

LeBarron Gevorkiantz		1934												Cubic feet	
Diameter breast high	Total height—feet												Basis		
	20	25	30	35	40	45	50	55	60	65	70	75			
Volume—cubic feet															
Inches													Trees		
4	.55	.67	.79	.91	1.01	1.13								62	
5	.95	1.20	1.44	1.71	1.94	2.21	2.44	2.72	2.95					100	
6		1.73	2.10	2.47	2.82	3.21	3.56	3.94	4.31	4.70				92	
7			3.28	3.78	4.30	4.80	5.33	5.81	6.33	6.84	7.35			54	
8			5.08	5.73	6.39	7.03	7.66	8.32	8.97	9.60	10.25			48	
9				7.24	8.02	8.79	9.58	10.33	11.08	11.87	12.62			33	
10					8.84	9.78	10.63	11.70	12.62	13.58	14.50	15.48		10	
11						11.67	12.77	13.87	14.89	16.01	17.11	18.20		8	
12						13.58	14.80	16.02	17.30	18.51	19.74	21.00		3	
12							17.21	18.59	19.97	21.32	22.68	24.10		1	
Basis	4	36	38	42	66	67	59	44	34	13	4	4	411		

Average stands.
Volume of peeled stem above a 1-foot stump to a 3-inch top diameter inside bark.
Volumes by planimeter.
Block indicates range of data.
Compiled at the Lake States Forest Experiment Station by alinement-chart method.
Data collected in 1929-1934.
Aggregate deviation, 0.02 per cent.
Average deviation, ±8.6 per cent.

Table 125
BLACK SPRUCE
(Picea mariana)
PEELED MERCHANTABLE VOLUME*
Minnesota

Brown, R. M.
Knudson, R.
1928
Cubic feet

Diameter breast high	Total height—feet						Trees
	30	35	40	45	50	55	
4	.8	1.0	1.2	1.5	1.7	1.7	18
5	1.6	1.9	2.3	2.6	3.0	3.3	16
6		3.0	3.5	3.9	4.4	4.8	20
7			4.8	5.3	5.9	6.5	19
8			6.1	6.8	7.6	8.3	10
9				8.6	9.5	10.5	4
10				10.5	11.5	13.0	15.0
11					14.5	16.0	18.0
12					16.5	18.0	21.0
Basis			7	12	22	21	19
							6
							87

*Volume includes the stem without bark above a 1-foot stump to a 3-inch top diameter inside of bark.
For even-aged, well-stocked stands.
Volumes by planimeter.
Compiled by the alignment-chart method.
Data collected in 1928 by I. Taylor and T. Lott at the Cloquet Forest Experiment Station.
Block indicates the range of basic data.
Aggregate deviation, .05 per cent.
Average deviation, ±4.4 per cent.

Table 126
BLACK SPRUCE
(Picea mariana)
Minnesota, Wisconsin
UNPEELED TOTAL VOLUME
1934

LeBarron
Gevorkiantz

Cubic feet

Diameter breast high	Total height—feet												Trees			
	10	15	20	25	30	35	40	45	50	55	60	65		70	75	
1	.048	.066	.084													34
2	.150	.209	.268	.328	.385											54
3		.438	.562	.679	.796	.915										50
4			.97	1.19	1.38	1.52	1.71	1.92								62
5			1.36	1.71	2.06	2.44	2.81	3.16	3.51	3.85	4.20					100
6				2.43	2.96	3.48	4.01	4.53	5.08	5.60	6.10	6.62				92
7					4.20	4.84	5.50	6.16	6.83	7.49	8.14	8.80	9.42			54
8						6.39	7.20	8.02	8.85	9.65	10.47	11.27	12.08	12.88		48
9							9.00	9.99	10.96	11.88	12.89	13.79	14.69	15.70		33
10							10.85	11.95	13.18	14.39	15.49	16.70	17.89	19.00		10
11								14.19	15.49	16.90	18.20	19.50	20.80	22.11		8
12								16.50	18.00	19.50	21.00	22.52	24.01	25.53		3
13								20.00	20.60	22.30	23.92	25.63	27.33	28.98		1
Basis: trees	38	47	42	51	38	42	66	67	59	44	34	13	4	4	449	

Average stands.
Volume of stump, stem, top, and bark.
Volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by alignment-chart method.
Block indicates range of basic data.
Data collected in 1929-1934.
Aggregate deviation, 0.05 per cent.
Average deviation, ±8.2 per cent.

Table 127
BLACK SPRUCE
(Picea mariana)
UNPEELED TOTAL VOLUME
Michigan

Fassett, P. J.		1932								Cubic feet	
Diameter breast high	Total height—feet										Basis
	20	25	30	35	40	45	50	55	60		
Volume—cubic feet											
Inches											Trees
2	0.23	0.35	0.40	0.61							58
3	0.56	0.70	0.83	1.03	1.25	1.60					71
4		1.11	1.34	1.68	2.07	2.56	3.20				41
5				2.58	3.12	3.68	4.34	5.10			46
6					4.34	5.09	5.83	6.68			38
7						6.90	7.71	8.60	9.52		17
8						9.10	9.92	10.79	11.72		11
9						11.49	12.40	13.18	14.23		5
Basis	3	22	37	38	60	46	41	35	5		287

These trees probably have a better than average form. Editor's note.
Volume includes the stump, stem, top, and bark.
Data collected in Chippewa County, Michigan, by G. L. Brown, Carl Thoresen, and P. J. Fassett, in the summer and fall of 1932 from a very dense stand.
Table compiled from a set of harmonized curves.
Block indicates extent of data.
Aggregate deviation, +1.1 per cent.
Average deviation, ±3.4 per cent.

Table 128
BLACK SPRUCE
(Picea mariana)
UNPEELED TOTAL VOLUME*
Minnesota

Brown, R. M. Knudson, R.		1928								Cubic feet	
Diameter breast high	Total height—feet										Basis
	30	35	40	45	50	55	60	65			
Volume—cubic feet											
Inches											Trees
3											4
4	1.5	1.7	2.0	2.3	2.5						18
5	2.4	2.7	3.1	3.5	3.8	4.2					16
6		3.9	4.4	4.9	5.4	5.9	6.4	6.9			20
7			5.8	6.5	7.2	7.9	8.5	9.2			19
8			7.5	8.3	9.2	10.0	11.0	11.5			10
9				10.5	11.5	12.5	13.5	14.5			4
10				12.5	14.0	15.0	16.5	17.5			
11						18.0	19.5	21.0			
12						21.0	23.0	25.0			
Basis	1	2	8	12	22	21	19	6			91

*Volume includes stump, stem, and top with bark.
For even-aged, well-stocked stands.
Volumes by planimeter.
Compiled by the alignment-chart method.
Data collected in 1928 by I. Taylor and T. Lotti at the Cloquet Forest Experiment Station.
Block indicates the range of data.
Aggregate deviation, .05 per cent.
Average deviation, ±3.7 per cent.

Table 129
BLACK SPRUCE
(Picea mariana)
PEELED TOTAL VOLUME
Minnesota, Wisconsin
1934

LeBarron
 Gevorkiantz

Cubic feet

Diameter breast high	Total height—feet													Basis		
	10	15	20	25	30	35	40	45	50	55	60	65	70		75	
Inches	Volume—cubic feet													Trees		
1	.041	.057	.072													34
2	.129	.180	.230	.283	.332											54
3		.383	.480	.584	.687	.790										50
4			.799	.972	1.14	1.31	1.48	1.65								62
5			1.17	1.48	1.78	2.10	2.38	2.70	3.01	3.32	3.63					100
6				2.10	2.56	3.01	3.44	3.88	4.34	4.79	5.24	5.71				92
7					3.62	4.18	4.76	5.32	5.90	6.47	7.01	7.56	8.16			54
8						5.51	6.22	6.92	7.64	8.34	9.03	9.72	10.42	11.12		48
9							7.77	8.60	9.43	10.26	11.09	11.90	12.72	13.55		33
10							9.38	10.38	11.39	12.42	13.40	14.40	15.40	16.40		10
11								12.25	13.40	14.55	15.66	16.81	17.99	19.00		8
12								14.23	15.56	16.83	18.16	19.47	20.78	22.10		3
13									17.88	19.30	20.73	22.18	23.59	25.10		1
Basis	38	47	42	51	38	42	66	67	59	44	34	13	4	4	549	

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Average stands.
 Total volume includes the stump, stem, and top without bark.
 Volumes by planimeter.
 Compiled at the Lake States Forest Experiment Station by alinement-chart method.
 Block indicates range of data.
 Data collected in 1929-34.
 Aggregate deviation, 0.01 per cent.

Table 130
BLACK SPRUCE
(Picea mariana)
PEELED TOTAL VOLUME*
Minnesota
1928

Brown, R. M.
 Knudson, R.

1928

Cubic feet

Diameter breast high	Total height—feet										Basis
	30	35	40	45	50	55	60	65			
Inches	Volume—cubic feet										Trees
3	1.3	1.5	1.8	2.0	2.2						4
4	2.1	2.4	2.8	3.1	3.4	3.5					18
5		3.5	3.9	4.4	4.8	5.3	5.7	6.2			16
6			5.2	5.8	6.4	7.0	7.6	8.2			19
7			6.7	7.5	8.2	9.0	9.7	10.5	10		10
8			9.2	10.0	11.0	12.0	13.0				4
9			11.5	12.5	13.5	14.5	16.0	17.5	19.0		
10				15.0	16.0	17.5	19.0	20.5	22.0		
11					17.5	19.0	20.5	22.0			
12											
Basis	1	2	8	12	22	21	19	6	91		

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*Volume includes stump, stem, and top without bark.
 For even-aged, well-stocked stands.
 Data collected in 1928 by I. Taylor and T. Lotfi at the Cloquet Forest Experiment Station.
 Volumes by planimeter.
 Compiled by the alinement-chart method.
 Block indicates the range of data.
 Aggregate deviation, .02 per cent.
 Average deviation, ±4.4 per cent.

Table 133
OLD-GROWTH WHITE SPRUCE
(Picea glauca)
UNPEELED MERCHANTABLE VOLUME
Minnesota
1926

Hansen, T. S.

Cubic feet

Diameter breast high	Total height—feet																	Basis				
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110		115	120		
<i>Inches</i>	Volume—cubic feet																	<i>Trees</i>				
6	2.9	3.4	3.9	4.4	4.8	5.3	5.8													1		
7	4.0	4.7	5.3	6.0	6.6	7.3	8.0	8.7	9.3											12		
8		6.1	6.9	7.8	8.7	9.5	10.4	11.3	12.2	13.0	13.9									29		
9		7.6	8.7	9.8	10.9	11.9	12.9	14.1	15.2	16.3	17.4	18.4								35		
10			10.6	11.9	13.3	14.6	15.9	17.2	18.5	19.9	21.2	22.5	23.8							42		
11				14.1	15.7	17.3	18.9	20.5	22.0	23.6	25.2	26.8	28.2							45		
12				16.5	18.4	20.2	22.1	23.9	25.8	27.6	29.4	31.2	33.2							19		
13				19.2	21.3	23.2	25.6	27.7	29.9	32.0	34.1	36.2	38.3	40.6						31		
14					24.3	26.7	29.2	31.6	34.0	36.5	39.0	41.2	43.7	46.6	48.5					22		
15					27.6	30.3	33.2	35.9	38.6	41.5	44.2	47.0	49.7	52.4	55.1					17		
16						34.3	37.4	40.5	43.6	46.7	49.7	52.8	56.0	59.1	62.2					10		
17							38.3	41.8	45.4	48.9	52.2	55.7	59.1	62.6	66.0	69.5	73.1			12		
18								42.4	46.5	50.2	54.1	58.0	61.8	65.7	69.5	73.4	77.1	81.1	85.0	12		
19								46.6	50.9	55.0	59.1	63.5	67.8	72.1	76.2	80.5	84.6	88.9	93.2	97.5	12	
20									55.6	60.4	65.0	69.6	74.4	79.0	83.6	88.2	92.9	97.7	102.2	107.0	111.1	3
21									60.2	65.5	70.4	75.4	80.5	85.6	90.6	95.6	100.9	105.8	110.9	116.0	120.9	7
22									65.5	71.0	76.4	81.8	87.2	92.4	98.0	103.6	109.0	114.7	120.2	125.6	131.2	321

Basis. Volume above a 1.5-foot stump to a 3-inch top diameter outside of bark. Compiled by expressing merchantable volume as a percentage of total volume and curving these values on D. B. H. Data collected in Beltrami County in 1917 by J. H. Allison. Block indicates extent of original data.

Table 134
OLD-GROWTH WHITE SPRUCE
(Picea glauca)
PEELED MERCHANTABLE VOLUME
Minnesota
1926

Hansen, T. S.

Cubic feet

Diameter breast high	Total height—feet																	Bark per cent	Basis			
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110			115	120	
<i>Inches</i>	Peeled volume—cubic feet																	<i>Trees</i>				
6	2.3	2.7	3.1	3.5	3.9	4.3	4.7														19.6	1
7	3.3	3.8	4.4	4.9	5.5	6.0	6.6	7.2	7.7												17.5	12
8		5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	10.9	11.7										16.0	29
9		6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.8	14.8	15.8									14.5	35
10			9.1	10.3	11.5	12.6	13.8	14.9	16.0	17.2	18.3	19.5	20.6								13.5	42
11				12.4	13.8	15.1	16.5	17.9	19.2	20.6	22.0	23.2	24.3								12.5	23
12				14.5	16.2	17.8	19.4	21.0	22.6	24.3	25.9	27.5	29.2								12.0	45
13				17.0	18.9	20.6	22.6	24.5	26.5	28.3	30.2	32.0	33.9	36.0							11.5	19
14					21.6	23.8	26.0	28.1	30.2	32.5	34.7	36.7	39.0	41.5	43.2						11.0	31
15					24.6	27.0	29.6	32.0	34.4	36.9	39.3	41.8	44.3	46.6	49.0						11.0	22
16						30.7	33.4	36.2	39.0	41.7	44.5	47.2	50.1	53.0	55.7						10.5	17
17						34.2	37.4	40.6	43.7	46.7	49.9	53.0	56.0	59.1	62.2	65.5					10.5	10
18						38.0	41.6	45.0	48.5	51.9	55.4	58.7	62.2	65.6	69.0	72.6	76.1				10.5	12
19						41.8	45.5	49.3	53.0	56.9	60.7	64.6	68.4	72.1	75.9	79.5	83.5	87.4			10.4	12
20						50.0	54.2	58.4	62.5	66.7	71.0	75.1	79.3	83.4	87.9	92.0	96.1	100.0			10.2	3
21						54.2	58.9	63.3	67.7	72.5	77.0	81.5	86.0	90.6	95.0	99.6	104.3	108.5			10.1	7
22						59.0	63.9	68.7	73.6	78.5	83.1	88.2	93.1	98.0	103.1	108.4	113.0	118.2			10.0	321

Basis. Peeled volume above a 1.5-foot stump to a 3-inch top diameter outside of bark. Compiled by reducing the unpeeled merchantable volume in cubic feet by means of bark percentages based on D. B. H. Data collected in Beltrami County in 1917 by J. H. Allison. Block indicates extent of data.

Table 135
OLD-GROWTH WHITE SPRUCE
(*Picea glauca*)
UNPEELED TOTAL VOLUME
Minnesota
1926

Hansen, T. S.

Cubic feet

Diameter breast high	Total height—feet																	Basis	
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110		115
<i>Inches</i>	Volume—cubic feet																	<i>Trees</i>	
6	3.3																		
7	4.4	5.1	5.9	6.6	7.3	8.1	8.8	9.5	10.3										
8		6.6	7.5	8.5	9.4	10.4	11.3	12.3	13.2	14.1	15.1								
9		8.2	9.4	10.5	11.7	12.9	14.0	15.2	16.4	17.5	18.7	19.9							
10			11.3	12.8	14.2	15.6	17.0	18.5	19.8	21.3	22.7	24.1	25.5						
11				15.1	16.8	18.5	20.2	21.9	23.5	25.2	26.9	28.6	30.1						
12				17.6	19.6	21.6	23.6	25.5	27.5	29.4	31.4	33.4	35.3						
13				20.4	22.7	25.0	27.2	29.5	31.9	34.2	36.4	38.6	40.8	43.2					
14					25.9	28.5	31.2	33.7	36.2	38.9	41.6	44.0	46.7	49.2	51.7				
15					29.4	32.4	35.4	38.3	41.2	44.2	47.1	50.1	53.1	55.9	58.8				
16						36.5	39.8	43.1	46.4	49.7	53.0	56.3	59.6	63.0	66.2				
17						40.7	44.5	48.2	52.0	55.6	59.3	62.8	66.6	70.2	74.0	77.7			
18						45.1	49.4	53.4	57.5	61.6	65.7	70.0	74.0	78.0	82.1	86.4	90.5		
19						49.6	54.1	58.5	62.9	67.5	72.1	76.6	81.2	85.6	90.0	94.5	99.2	103.9	
20							59.2	64.2	69.1	74.1	79.0	84.0	89.0	93.8	98.9	103.8	108.6	114.0	118.6
21							64.2	69.6	75.0	80.2	85.6	91.1	96.5	101.9	107.2	112.6	117.9	123.2	128.5
22							69.7	75.5	81.2	87.0	92.9	98.4	104.1	110.0	116.0	122.1	128.0	133.6	139.5
Basis																			321

Volume includes stump, stem, and bark.
Compiled by the form-factor method from data collected in Beltrami County in 1917 by J. H. Allison.
Block indicates extent of data. Aggregate deviation, .3 per cent.

Table 136
OLD-GROWTH TAMARACK
(*Larix laricina*)
VOLUME IN BOARD FEET
St. Louis County, Minn.
1905

Chapman

Scrubner Decimal C

Diameter breast high	Number of 16-foot logs					Basis
	1	2	3	4	5	
<i>Inches</i>	Volume—board feet, in tens					<i>Trees</i>
8	1.4	2.8	3.9	5.3	7	
9	1.8	3.6	4.6	6.0	8	
10	2.1	4.2	5.2	6.8	9	
11		5.8	7.6	10	10	
12		6.5	8.4	11	11	
13		7.2	9.3	12	12	
14		7.9	10.0	13	13	
15			11.0	14	14	
16			12.0	15	15	
17				17	17	
18				18	18	
19				21	21	
20				22	22	
				24	24	
				26	26	
				27	27	
				29	29	
				31	31	
				31	31	
				36	36	
				36	36	
				39	39	
				41	41	
Basis					432	

Close utilization to diameter of 5.5 inches inside bark at top. Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height, 1 foot.
Table 100, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States, Part II.

Table 137
OLD-GROWTH TAMARACK
(*Larix laricina*)

VOLUME IN BOARD FEET
St. Louis County, Minn.

Chapman Diameter breast high	1905						Scribner Decimal C Basis
	Total height—feet						
	50	60	70	80	90	100	
	Volume—board feet, in tens						
<i>Inches</i>							<i>Trees</i>
8.....	2.3	2.9	4	5	5		27
9.....	3.0	3.9	5	6	7		49
10.....	3.9	5.1	6	8	9	10	127
11.....	4.8	6.3	8	10	11	13	96
12.....	5.8	7.6	9	11	13	15	122
13.....	6.9	8.9	11	13	16	18	48
14.....	8.0	10.0	13	15	18	21	38
15.....		12.0	15	18	21	24	21
16.....		13.0	16	20	23	27	6
17.....			18	22	26	30	1
18.....			20	25	29	34	3
19.....				27	32	37	
20.....				30	35	41	
Basis.....				23	27		538

Close utilization to top diameter of 5.5 inches inside bark. Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height, 1 foot.

Table 101, U. S. Dept. of Agr. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 138
SECOND-GROWTH TAMARACK
(*Larix laricina*)

UNPEELED TOTAL VOLUME
Minnesota, Wisconsin

Gevorkiantz Diameter breast high	1930						Cubic feet Basis
	Total height—feet						
	10	20	30	40	50	60	
	Volume—cubic feet						
<i>Inches</i>							<i>Trees</i>
1.....	.05	.08					8
2.....	.15	.27	.39				9
3.....		.56	.81	1.08			9
4.....		.96	1.40	1.84			7
5.....		1.44	2.14	2.83	3.50		4
6.....			3.07	4.04	4.97	5.95	2
7.....			4.00	5.32	6.60	7.90	1
Basis.....	11	17	8	3	1		40

Preliminary table.

Total volume includes stump, stem, and top with bark.

Tree volumes by planimeter.

Compiled at the Lake States Forest Experiment Station by curving tree volumes over cylinder volumes.

Data collected by J. L. Averell, S. R. Gevorkiantz and T. Lotti.

Block indicates extent of data.

Aggregate deviation, .1 per cent.

Average deviation, ± 6.0 per cent.

Table 139
SECOND-GROWTH TAMARACK
(*Larix laricina*)

PEELED TOTAL VOLUME
Minnesota, Wisconsin

Gevorkiantz		1930						Cubic feet
Diameter breast high	Total height—feet						Basis	
	10	20	30	40	50	60		
Volume—cubic feet								
Inches							Trees	
1	.04	.06					8	
2	.11	.20	.30				9	
3	.21	.43	.64	.86			9	
4	.37	.76	1.12	1.47			7	
5	.55	1.14	1.72	2.30	2.87		4	
6		1.63	2.50	3.33	4.15	4.98	2	
7		2.20	3.30	4.42	5.53	6.68	1	
8			4.20	5.65	7.00	8.50		
Basis	11	17	8	3	1		40	

Preliminary table.
Total volume includes stump, stem, and top without bark.
Tree volumes by planimeter.
Compiled at the Lake States Forest Experiment Station by curving peeled volumes over unpeeled volumes.
Data collected by S. R. Gevorkiantz and T. Lotti.
Block indicates extent of data.
Aggregate deviation, .4 per cent.
Average deviation, ± 4.0 per cent.

Table 140
OLD-GROWTH TAMARACK
(*Larix laricina*)

TIE TABLE

St. Louis County, Minnesota

Chapman, H. H.		1905			Ties
Diameter breast high	Number of ties			Basis	
	7"x7"x8'	6"x6"x8'	Cull		
Inches				Trees	
8			2.00	17	
9	0.02	0.19	1.59	59	
10	.13	1.15	1.21	111	
11	.80	1.35	.90	121	
12	1.73	1.38	.65	115	
13	2.53	1.33	.48	64	
14	3.10	1.20	.34	41	
15	3.56	1.05	.43	22	
16	3.97	.91	.55	6	
17	4.34	.79	.68	1	
18	4.68	.68	.83	3	
Basis				560	

TAPER TABLES

Table 141

SUGAR MAPLE
(*Acer saccharum*)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz

1933

Form class 70

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
		Top diameters inside bark—inches				
Inches					Trees	
12	1	8.4				3
13	1	9.1				3
14	1	9.8				3
	2	9.8	8.5			3
15	1	10.5				3
	2	10.5	9.2			7
	3	10.5	9.5	8.1		
16	1	11.2				5
	2	11.2	9.8			1
	3	11.2	10.1	8.6		
17	1	11.9				5
	2	11.9	10.4			4
	3	11.9	10.8	9.2		
18	1	12.6				2
	2	12.6	11.0			7
	3	12.6	11.4	9.7		
19	1	13.3				5
	2	13.3	11.6			4
	3	13.3	12.0	10.3		
20	1	14.0				5
	2	14.0	12.2			
	3	14.0	12.7	10.8		
	4	14.0	12.9	12.1	8.2	
21	1	14.7				3
	2	14.7	12.8			5
	3	14.7	13.3	11.3		
	4	14.7	13.5	12.7	8.6	
22	1	15.4				1
	2	15.4	13.4			4
	3	15.4	13.9	11.9		
	4	15.4	14.2	13.3	9.0	
23	1	16.1				3
	2	16.1	14.0			7
	3	16.1	14.6	12.4		
	4	16.1	14.8	13.9	9.4	
24	1	16.8				2
	2	16.8	14.6			6
	3	16.8	15.2	13.0		
	4	16.8	15.5	14.5	9.8	

Table 141—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
		Top diameters inside bark—inches				
Inches					Trees	
25	1	17.5				3
	2	17.5	15.2			4
	3	17.5	15.8	13.5		4
	4	17.5	16.1	15.1	10.2	2
26	1	18.2				3
	2	18.2	15.9			4
	3	18.2	16.5	14.0		2
	4	18.2	16.8	15.7	10.6	
27	1	18.9				1
	2	18.9	16.5			4
	3	18.9	17.1	14.6		1
	4	18.9	17.4	16.3	11.0	
28	1	19.6				4
	2	19.6	17.1			2
	3	19.6	17.7	15.1		
	4	19.6	18.1	16.9	11.5	
29	1	20.3				1
	2	20.3	17.7			2
	3	20.3	18.4	15.7		1
	4	20.3	18.7	17.5	11.9	
30	1	21.0				3
	2	21.0	18.3			
	3	21.0	19.0	16.2		
	4	21.0	19.4	18.1	12.3	
31	1	21.7				1
	2	21.7	18.9			2
	3	21.7	19.6	16.7		
	4	21.7	20.0	18.7	12.7	
32	1	22.4				3
	2	22.4	19.5			
	3	22.4	20.3	17.3		
	4	22.4	20.6	19.3	13.1	
33	1	23.1				1
	2	23.1	20.1			
	3	23.1	20.9	17.8		
	4	23.1	21.3	19.9	13.5	
34	1	23.8				1
	2	23.8	20.7			
	3	23.8	21.5	18.4		
	4	23.8	21.9	20.5	13.9	
Basis						134

*Girard form class is the ratio of the top diameter inside the bark of the first log to D. B. H.
Data collected in Michigan and Wisconsin.
Stump height, 2 feet.
Trimming allowance, .3 of a foot.
Total basis, 462 trees.
Based on both second and old-growth trees.

Table 142
SUGAR MAPLE
(*Acer saccharum*)
GIRARD FORM-CLASS* TAPER TABLE

Lake States
1933 Form class 75
Gevorkiantz

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
Top diameters inside bark—inches						
Inches						Trees
11	1	8.2				6
12	1	9.0				8
13	1	9.8				3
	2	9.8	8.5			8
14	1	10.5				11
	2	10.5	9.1			
	3	10.5	9.4	8.0		
15	1	11.2				6
	2	11.2	9.8			
	3	11.2	10.0	8.6		
16	1	12.0				7
	2	12.0	10.4			
	3	12.0	10.7	9.2		
17	1	12.8				7
	2	12.8	11.1			
	3	12.8	11.4	9.8		
18	1	13.5				1
	2	13.5	11.7			
	3	13.5	12.1	10.3		
19	1	14.2				3
	2	14.2	12.4			
	3	14.2	12.7	10.9		
	4	14.2	12.9	12.0	8.2	
20	1	15.0				3
	2	15.0	13.0			
	3	15.0	13.4	11.5		
	4	15.0	13.6	12.6	8.6	
21	1	15.8				4
	2	15.8	13.7			
	3	15.8	14.1	12.1		
	4	15.8	14.3	13.3	9.1	
22	1	16.5				3
	2	16.5	14.3			
	3	16.5	14.7	12.6		
	4	16.5	15.0	13.9	9.5	
23	1	17.2				3
	2	17.2	15.0			
	3	17.2	15.4	13.2		
	4	17.2	15.7	14.5	9.9	

Table 142—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
Top diameters inside bark—inches						
Inches						Trees
24	1	18.0				3
	2	18.0	15.6			
	3	18.0	16.1	13.8		
	4	18.0	16.3	15.2	10.3	
25	1	18.8				3
	2	18.8	16.3			
	3	18.8	16.8	14.4		
	4	18.8	17.0	15.8	10.8	
26	1	19.5				3
	2	19.5	17.0			
	3	19.5	17.4	14.9		
	4	19.5	17.7	16.4	11.2	
27	1	20.2				1
	2	20.2	17.6			
	3	20.2	18.1	15.5		
	4	20.2	18.4	17.1	11.6	
28	1	21.0				1
	2	21.0	18.3			
	3	21.0	18.8	16.1		
	4	21.0	19.1	17.7	12.1	
29	1	21.8				1
	2	21.8	18.9			
	3	21.8	19.4	16.6		
	4	21.8	19.7	18.3	12.5	
30	1	22.5				1
	2	22.5	19.6			
	3	22.5	20.1	17.2		
	4	22.5	20.4	19.0	12.9	
31	1	23.2				2
	2	23.2	20.2			
	3	23.2	20.8	17.8		
	4	23.2	21.1	19.6	13.4	
32	1	24.0				1
	2	24.0	20.9			
	3	24.0	21.4	18.4		
	4	24.0	21.8	20.2	13.8	
33	1	24.8				1
	2	24.8	21.5			
	3	24.8	22.1	18.9		
	4	24.8	22.5	20.9	14.2	
34	1	25.5				1
	2	25.5	22.2			
	3	25.5	22.8	19.5		
	4	25.5	23.2	21.5	14.7	

Basis..... 149

*Girard form class.
Data collected in Michigan and Wisconsin.
Stump height, 2 feet.
Trimming allowance, .3 of a foot.
Total basis, 462 trees.

Table 143
SUGAR MAPLE
(*Acer saccharum*)

GIRARD FORM-CLASS* TAPER TABLE
Lake States

Gevorkiantz **1933** Form class 80

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
		Top diameters inside bark—inches				
Inches					Trees	
10	1	8.0				3
11	1	8.8				11
12	1	9.6				6
	2	9.6	8.3			5
13	1	10.4				17
	2	10.4	8.9			
14	1	11.2				8
	2	11.2	9.6			
	3	11.2	9.9	8.4		
15	1	12.0				11
	2	12.0	10.3			3
	3	12.0	10.6	9.0		
16	1	12.8				10
	2	12.8	11.0			7
	3	12.8	11.3	9.6		
17	1	13.6				6
	2	13.6	11.7			6
	3	13.6	12.0	10.2		
18	1	14.4				1
	2	14.4	12.4			4
	3	14.4	12.7	10.8		10
	4	14.4	12.9	11.8	8.1	1
19	1	15.2				1
	2	15.2	13.1			4
	3	15.2	13.4	11.4		3
	4	15.2	13.6	12.4	8.6	1
20	1	16.0				1
	2	16.0	13.8			4
	3	16.0	14.1	12.0		1
	4	16.0	14.3	13.1	9.0	
21	1	16.8				1
	2	16.8	14.4			9
	3	16.8	14.8	12.6		1
	4	16.8	15.0	13.8	9.5	
22	1	17.6				3
	2	17.6	15.1			6
	3	17.6	15.5	13.2		1
	4	17.6	15.7	14.4	9.0	

Table 143—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs				Basis
		1	2	3	4	
		Top diameters inside bark—inches				
Inches					Trees	
23	1	18.4				1
	2	18.4	15.8			7
	3	18.4	16.2	15.8		2
	4	18.4	16.4	15.1	10.4	
24	1	19.2				2
	2	19.2	16.9			5
	3	19.2	16.9	14.4		1
	4	19.2	17.1	15.7	10.8	
25	1	20.0				1
	2	20.0	17.2			2
	3	20.0	17.6	15.0		1
	4	20.0	17.9	16.4	11.3	
26	1	20.8				4
	2	20.8	17.9			1
	3	20.8	18.3	15.6		
	4	20.8	18.6	17.0	11.8	
27	1	21.6				1
	2	21.6	18.6			
	3	21.6	19.0	16.2		
	4	21.6	19.3	17.7	12.2	
28	1	22.4				2
	2	22.4	19.3			2
	3	22.4	19.7	16.8		
	4	22.4	20.0	18.3	12.7	
29	1	23.2				
	2	23.2	20.0			
	3	23.2	20.4	17.4		
	4	23.2	20.7	19.0	13.1	
30	1	24.0				1
	2	24.0	20.6			1
	3	24.0	21.1	18.0		
	4	24.0	21.4	19.6	13.6	
31	1	24.8				
	2	24.8	21.3			
	3	24.8	21.8	18.6		
	4	24.8	22.1	20.3	14.0	
32	1	25.6				
	2	25.6	22.0			
	3	25.6	22.5	19.2		
	4	25.6	22.8	21.0	14.5	
33	1	26.4				
	2	26.4	22.7			
	3	26.4	23.2	19.8		
	4	26.4	23.6	21.6	14.9	
34	1	27.2				
	2	27.2	23.4			
	3	27.2	23.9	20.4		
	4	27.2	24.3	22.3	15.4	
Basis						179

* Girard form class.
Data collected in Michigan and Wisconsin.
Stump height, 2 feet. Trimming allowance, .3 of a foot.
Total basis, 462 trees.
Compiled at the Lake States Forest Experiment Station.

Table 144

SECOND-GROWTH NORWAY PINE
(*Pinus resinosa*)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz 1933 Form class 75

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					
Inches							Trees
8	1	6.0					1
9	1	6.7					4
10	1	7.5					5
	2	7.5	6.5				3
11	1	8.2					2
	2	8.2	7.1				2
	3	8.2	7.4	6.1			1
12	1	9.0					1
	2	9.0	7.8				1
	3	9.0	8.0	6.6			1
13	1	9.7					1
	2	9.7	8.4				1
	3	9.7	8.7	7.2			1
	4	9.7	8.9	7.8	6.0		
14	1	10.5					
	2	10.5	9.0				
	3	10.5	9.4	7.7			1
	4	10.5	9.6	8.4	6.5		
15	1	11.3					
	2	11.3	9.7				
	3	11.3	10.1	8.3			
	4	11.3	10.3	9.0	7.0		1
16	1	12.0					
	2	12.0	10.3				
	3	12.0	10.7	8.3			
	4	12.0	11.0	9.6	7.5		

Table 144—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					
Inches							Trees
17	1	12.8					
	2	12.8	11.0				
	3	12.8	11.4	9.4			
	4	12.8	11.0	10.2	7.9		1
18	1	13.5					
	2	13.5	11.6				
	3	13.5	12.1	10.0			
	4	13.5	12.4	10.8	8.4		
	5	13.5	12.7	11.2	9.5	6.1	
19	1	14.3					
	2	14.3	12.3				
	3	14.3	12.7	10.5			
	4	14.3	13.1	11.4	8.8		
	5	14.3	13.4	11.8	10.0	6.4	
20	1	15.0					
	2	15.0	13.9				
	3	15.0	13.4	11.0			
	4	15.0	13.8	12.0	9.3		
	5	15.0	14.1	12.4	10.5	6.8	
21	1	15.8					
	2	15.8	13.5				
	3	15.8	14.1	11.6			
	4	15.8	14.4	12.5	9.8		1
	5	15.8	14.8	13.1	11.0	7.1	
22	1	16.5					
	2	16.5	14.2				
	3	16.5	14.7	12.1			
	4	16.5	15.1	13.1	10.2		
	5	16.5	15.5	13.7	11.5	7.4	
Basis						28	

*Girard form class is the ratio of the top diameter inside bark at the top of the first 16-foot log to D. B. H.

Data collected in Wisconsin.

Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between 12 and 18 inches; 2 feet, over 18 inches.

Trimming allowance, .3 of a foot.

Total basis, 178 trees.

Compiled at the Lake States Forest Experiment Station.

Table 145

SECOND-GROWTH NORWAY PINE
(*Pinus resinosa*)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz

1933

Form class 80

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					Trees
Inches							
8	1	6.4					9
9	1	7.2					9
	2	7.2	6.1				6
10	1	8.0					3
	2	8.0	6.8				2
11	1	8.8					4
	2	8.8	7.5				6
	3	8.8	7.7	6.4			
12	1	9.6					4
	2	9.6	8.2				
	3	9.6	8.4	7.0			
13	1	10.4					1
	2	10.4	8.9				1
	3	10.4	9.2	7.6			4
	4	10.4	9.4	8.2	6.4		
14	1	11.2					1
	2	11.2	9.5				3
	3	11.2	9.8	8.2			2
	4	11.2	10.1	8.8	6.9		
15	1	12.0					3
	2	12.0	10.2				2
	3	12.0	10.6	8.8			
	4	12.0	10.8	9.4	7.4		
16	1	12.8					1
	2	12.8	10.9				1
	3	12.8	11.3	9.4			2
	4	12.8	11.5	10.1	7.9		
	5	12.8	11.8	10.5	8.9	6.1	

Table 145—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					Trees
Inches							
17	1	13.6					1
	2	13.6	11.6				3
	3	13.6	12.0	9.9			2
	4	13.6	12.3	10.7	8.4		
	5	13.6	12.5	11.1	9.4	6.4	
18	1	14.4					4
	2	14.4	12.3				1
	3	14.4	12.7	10.5			
	4	14.4	13.0	11.3	8.9		
	5	14.4	13.3	11.8	10.0	6.8	
19	1	15.2					2
	2	15.2	12.9				2
	3	15.2	13.4	11.1			
	4	15.2	13.7	12.0	9.4		
	5	15.2	14.0	12.4	10.5	7.2	
20	1	16.0					5
	2	16.0	13.6				2
	3	16.0	14.1	11.7			
	4	16.0	14.4	12.6	9.9		
	5	16.0	14.8	13.1	11.1	7.6	
21	1	16.8					1
	2	16.8	14.3				
	3	16.8	14.8	12.3			
	4	16.8	15.2	13.2	10.4		
	5	16.8	15.5	13.8	11.6	8.0	
22	1	17.6					1
	2	17.6	15.0				1
	3	17.6	15.5	12.9			
	4	17.6	15.9	13.9	10.9		
	5	17.6	16.2	14.4	12.2	8.4	
Basis						89	

*Girard form class is the ratio of the top diameter inside bark at the top of the first 16-foot log to D. B. H.
Data collected in Wisconsin.
Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between 12 and 18 inches; 2 feet, over 18 inches.
Trimming allowance, .3 of a foot.
Total basis, 178 trees.

Table 146

SECOND-GROWTH NORWAY PINE

(Pinus resinosa)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz 1933 Form class 33

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
<i>Inches</i>							<i>Trees</i>
8	1	6.8					2
9	1	7.7					1
	2	7.7	6.5				6
10	1	8.5					1
	2	8.5	7.2				2
	3	8.5	7.4	6.2			2
11	1	9.4					1
	2	9.4	8.0				2
	3	9.4	8.2	6.9			5
12	1	10.2					1
	2	10.2	8.7				1
	3	10.2	9.0	7.5			8
	4	10.2	9.2	8.0	6.4		2
13	1	11.1					1
	2	11.1	9.4				1
	3	11.1	9.7	8.1			2
	4	11.1	9.9	8.7	7.0		1
14	1	11.9					1
	2	11.9	10.1				1
	3	11.9	10.4	8.7			1
	4	11.9	10.7	9.4	7.5		3
	5	11.9	10.9	9.7	8.3	6.1	2
15	1	12.7					1
	2	12.7	10.8				1
	3	12.7	11.2	9.4			4
	4	12.7	11.4	10.0	8.0		4
	5	12.7	11.7	10.4	8.9	6.6	3

Table 146—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
<i>Inches</i>							<i>Trees</i>
16	1	13.6					
	2	13.6	11.6				
	3	13.6	11.9	10.0			
	4	13.6	12.2	10.7	8.5		4
	5	13.6	12.5	11.1	9.5	7.0	1
17	1	14.4					
	2	14.4	12.3				
	3	14.4	12.6	10.6			
	4	14.4	13.0	11.4	9.1		3
	5	14.4	13.2	11.8	10.1	7.4	1
18	1	15.3					
	2	15.3	13.0				
	3	15.3	13.4	11.2			
	4	15.3	13.7	12.1	9.6		1
	5	15.3	14.0	12.5	10.7	7.9	2
19	1	16.1					
	2	16.1	13.7				
	3	16.1	14.1	11.9			
	4	16.1	14.5	12.7	10.1		1
	5	16.1	14.8	13.2	11.3	8.3	1
20	1	17.0					
	2	17.0	14.5				
	3	17.0	14.9	12.5			
	4	17.0	15.3	13.4	10.7		1
	5	17.0	15.6	13.9	11.9	8.7	
21	1	17.9					
	2	17.9	15.2				
	3	17.9	15.6	13.1			
	4	17.9	16.0	14.1	11.2		
	5	17.9	16.4	14.6	12.5	9.2	1
22	1	18.7					
	2	18.7	15.9				
	3	18.7	16.4	13.7			
	4	18.7	16.8	14.7	11.7		
	5	18.7	17.1	15.3	13.1	9.6	2
Basis						61	

*Girard form class is the ratio of the top diameter inside bark at the top of the tree to the diameter at the base of the tree.
 Data collected in Wisconsin.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between 12 and 18 inches; 2 feet, over 18 inches.
 Trimming allowance, .3 of a foot.
 Total basis, 17% trees.

Table 147

SECOND-GROWTH WHITE PINE

(Pinus strobus)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz 1933 Form class 75

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
<i>Inches</i>		<i>Top diameters inside bark—inches</i>					<i>Trees</i>
8	1	6.0					2
9	1	6.7					2
10	1	7.5					2
	2	7.5	6.4				
11	1	8.2					2
	2	8.2	7.0				
12	1	9.0					1
	2	9.0	7.7				
13	1	9.7					1
	2	9.7	8.3				
	3	9.7	8.7	6.5			
14	1	10.5					1
	2	10.5	9.0				
	3	10.5	9.4	7.0			
	4	10.5	9.7	8.3	6.4		
15	1	11.3					1
	2	11.3	9.6				
	3	11.3	10.0	7.5			
	4	11.3	10.4	9.0	6.8		
16	1	12.0					1
	2	12.0	10.2				
	3	12.0	10.7	8.0			
	4	12.0	11.1	9.6	7.3		

Table 147—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
<i>Inches</i>		<i>Top Diameters inside bark—inches</i>					<i>Trees</i>
17	1	12.8					1
	2	12.8	10.9				
	3	12.8	11.4	8.5			
	4	12.8	11.8	10.2	7.7		
18	1	13.5					1
	2	13.5	11.5				
	3	13.5	12.0	8.9			
	4	13.5	12.5	10.7	8.2		
19	1	14.3					3
	2	14.3	12.2				
	3	14.3	12.7	9.4			
	4	14.3	13.2	11.3	8.6		
20	1	15.0					1
	2	15.0	12.8				
	3	15.0	13.4	9.9			
	4	15.0	13.9	11.9	9.1		
	5	15.0	14.0	12.4	10.2	6.1	
21	1	15.8					1
	2	15.8	13.4				
	3	15.8	14.1	10.4			
	4	15.8	14.6	12.5	9.8		
	5	15.8	14.7	13.0	10.7	6.4	
22	1	16.5					1
	2	16.5	14.1				
	3	16.5	14.7	10.9			
	4	16.5	15.3	13.1	10.0		
	5	16.5	15.4	13.6	11.2	6.8	
Basis						20	

*Girard form class.
 Data collected in Wisconsin.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between
 12 and 18 inches; 2 feet, over 18 inches.
 Trimming allowance, .3 of a foot.
 Total basis, 102 trees.
 Compiled at the Lake States Forest Experiment Station.

Table 148

SECOND-GROWTH WHITE PINE

(*Pinus strobus*)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz		1933					Form class 30	
Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis	
		1	2	3	4	5		
		Top diameters inside bark—inches						
Inches							Trees	
8	1	6.4					2	
9	1	7.2					3	
	2	7.2	6.1					
10	1	8.0					1	
	2	8.0	6.7				2	
11	1	8.8					1	
	2	8.8	7.4					
12	1	9.6						
	2	9.6	8.1					
	3	9.6	8.4	6.2				
13	1	10.4						
	2	10.4	8.8					
	3	10.4	9.1	6.7			1	
	4	10.4	9.5	8.2	6.2			
14	1	11.2						
	2	11.2	9.4					
	3	11.2	9.9	7.3			3	
	4	11.2	10.2	8.8	6.7		3	
15	1	12.0						
	2	12.0	10.1					
	3	12.0	10.6	7.8				
	4	12.0	11.0	9.5	7.2		4	
16	1	12.8						
	2	12.8	10.8					
	3	12.8	11.3	8.3			1	
	4	12.8	11.7	10.1	7.7		4	

Table 148—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					
Inches							Trees
17	1	13.6					
	2	13.6	11.5				
	3	13.6	12.0	8.8			2
	4	13.6	12.4	10.7	8.2		6
18	1	14.4					
	2	14.4	12.1				
	3	14.4	12.7	9.3			
	4	14.4	13.2	11.4	8.6		
	5	14.4	13.3	11.8	9.6	6.2	4
19	1	15.2					
	2	15.2	12.8				
	3	15.2	13.4	9.9			
	4	15.2	13.9	12.0	9.1		6
	5	15.2	14.0	12.4	10.2	6.6	2
20	1	16.0					
	2	16.0	13.5				
	3	16.0	14.1	10.4			
	4	16.0	14.6	12.6	9.6		1
	5	16.0	14.8	13.1	10.7	6.9	3
21	1	16.8					
	2	16.8	14.1				
	3	16.8	14.8	10.9			
	4	16.8	15.4	13.3	10.1		2
	5	16.8	15.5	13.7	11.2	7.3	4
22	1	17.6					
	2	17.6	14.8				
	3	17.6	15.5	11.4			
	4	17.6	16.1	13.9	10.5		1
	5	17.6	16.2	14.4	11.8	7.6	1
Basis						58	

*Girard form class.
 Data collected in Wisconsin.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between 12 and 18 inches; 2 feet, over 18 inches.
 Total basis, 102 trees.

Table 149

SECOND-GROWTH WHITE PINE

(*Pinus strobus*)

GIRARD FORM-CLASS* TAPER TABLE

Lake States

Gevorkiantz 1933 Form class 85

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					
Inches 8	1	6.8					Trees 1
9	1	7.7					2
	2	7.7	6.4				
10	1	8.5					2
	2	8.5	7.1				
11	1	9.4					1
	2	9.4	7.8				
	3	9.4	8.2	6.0			
12	1	10.2					1
	2	10.2	8.5				
	3	10.2	8.9	6.5			
	4	10.2	9.3	8.0	6.1		
13	1	11.1					1
	2	11.1	9.2				
	3	11.1	9.7	7.1			
	4	11.1	10.1	8.7	6.6		
14	1	11.9					1
	2	11.9	9.9				
	3	11.9	10.4	7.6			
	4	11.9	10.8	9.4	7.1		
15	1	12.7					2
	2	12.7	10.6				
	3	12.7	11.1	8.2			
	4	12.7	11.6	10.0	7.7		
	5	12.7	11.7	10.4	8.5	6.0	
16	1	13.6					6
	2	13.6	11.4				
	3	13.6	11.9	8.7			
	4	13.6	12.4	10.7	8.2		
	5	13.6	12.5	11.1	9.1	6.4	

Table 149—Continued

Diameter breast high	Number of 16-foot logs per tree	Number of 16-foot logs					Basis
		1	2	3	4	5	
		Top diameters inside bark—inches					
Inches 17	1	14.4					1
	2	14.4	12.1				
	3	14.4	12.6	9.2			
	4	14.4	13.1	11.4	8.7		
	5	14.4	13.2	11.8	9.7	6.8	
18	1	15.3					3
	2	15.3	12.8				
	3	15.3	13.4	9.8			
	4	15.3	13.9	12.1	9.9		
	5	15.3	14.0	12.5	10.2	7.2	
19	1	16.1					1
	2	16.1	13.5				
	3	16.1	14.1	10.3			
	4	16.1	14.7	12.7	9.7		
	5	16.1	14.8	13.2	10.8	7.6	
20	1	17.0					1
	2	17.0	14.2				
	3	17.0	14.8	10.9			
	4	17.0	15.5	13.4	10.9		
	5	17.0	15.6	13.9	11.4	8.0	
21	1	17.9					1
	2	17.9	14.9				
	3	17.9	15.6	11.4			
	4	17.9	16.3	14.1	10.7		
	5	17.9	16.4	14.6	12.0	8.4	
22	1	18.7					1
	2	18.7	15.6				
	3	18.7	16.3	12.0			
	4	18.7	17.0	14.7	11.2		
	5	18.7	17.1	15.3	12.5	8.8	
Basis						24	

*Girard form class.
 Data collected in Wisconsin.
 Stump height, 1 foot for diameters less than 12 inches; 1.5 feet, between 12 and 18 inches; 2 feet, over 18 inches.
 Total basis, 102 trees.

Table 150

COMPOSITE GIRARD FORM-CLASS TAPER TABLE

Lake States Species

Gevorkiantz 1934 Relative diameters

Girard form class	Merchantable length—number of 16-foot logs	Number of 16-foot logs				Basis
		2	3	4	5	
		Ratio of top diameters inside bark to D. B. H.				
70	2	.510				Trees 136
	3	.630	.520			
	4	.645	.585	.410		
78	2	.645				218
	3	.670	.545			
	4	.687	.620	.448		
	5	.700	.625	.515	.320	
80	2	.680				409
	3	.705	.565			
	4	.727	.645	.487		
	5	.738	.655	.548	.368	
85	2	.715				187
	3	.743	.580			
	4	.765	.670	.520		
	5	.779	.682	.580	.418	
Basis					950	

Based on aspen, sugar maple and Norway and white pine taper measurements.

CORDWOOD CONVERTING FACTORS

Table 151
TREE CORDWOOD CONVERTING FACTORS
ASPEN
Minnesota

Gevorkiantz	1928	Standard cords
Diameter breast high	Volume Wood only	Basis
<i>Inches</i>	<i>Cubic feet</i>	<i>Cords</i>
5	61	1
6	64	2
7	68	4
8	71	2
9	74	1
10	76	1
11	78	1
12	79	
13	80	
14	82	
15	84	
16	85	
Basis		12

Four-foot bolts piled with bark on.
 Top diameter 4 inches outside bark.
 Compiled at the Lake States Forest Experiment Station by Gevorkiantz from data collected by T. S. Hansen.

Table 152
CORDWOOD CONVERTING FACTORS
SUGAR MAPLE AND YELLOW BIRCH
 Chemical Wood
Michigan

Gevorkiantz	1928	Volume		Standard cords
Middle diameter of bolts outside bark	Number of bolts	Wood and bark	Wood only	Basis
<i>Inches</i>		<i>Cubic feet</i>		<i>Cords</i>
5	93	50	39	6
6	75	50	46	
7	61	66	52	
8	50	70	56	
9	42	74	60	10
10	35	77	62	
11	30	80	64	
12	26	82	66	
14	20	84	69	9
16	15	86	71	
18	12	87	72	
20	10	88	73	
Basis				25

Compiled at the Lake States Forest Experiment Station.
 Bolts piled with bark on.
 Chemical wood: poor logs; and branches not less than 4 inches.

Table 153
TREE CORDWOOD CONVERTING FACTORS
WHITE AND BLACK SPRUCE, AND BALSAM FIR

Minnesota

Gevorkiantz **1933** Standard cords

Diameter breast high	Middle diameter of bolt outside bark	Number of bolts	Volume		Basis
			Wood and bark	Wood only	
<i>Inches</i>	<i>Inches</i>		<i>Cubic feet</i>		<i>Cords</i>
5	4.5	92	81.2	72.3	9
6	5.2	71	83.6	74.4	17
7	5.8	58	85.6	75.2	18
8	6.5	47	87.2	77.6	36
9	7.1	40	88.6	78.9	139
10	7.7	35	89.9	80.0	11
11	8.2	31	91.0	81.0	18
12	8.7	28	91.9	81.8	2
13	9.3	24	92.7	82.5	2
14	9.7	23	93.4	83.2	7
15	10.2	21	94.0	83.7	
Basis					250

Compiled at the Lake States Forest Experiment Station.
 Based on piles of 8-foot bolts. Bolts piled with bark on.
 Standard error of estimate: 3 cubic feet per cord.
 Stump height, 1 foot.
 Top diameter inside bark: spruce 3 inches, balsam 4 inches.

YIELD AND STAND TABLES

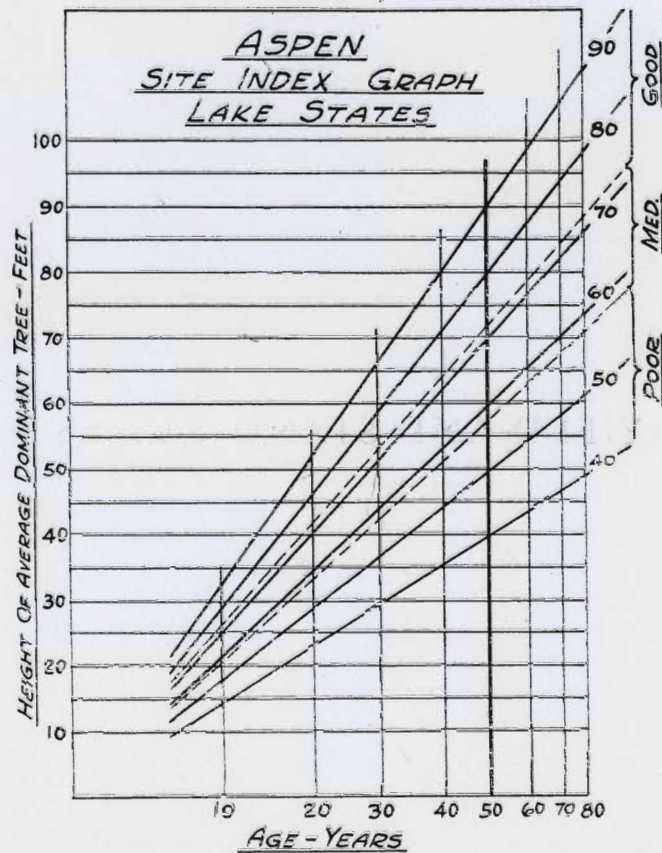


Fig. 1. Graph for determining the site index of fully-stocked, pure, even-aged stands of aspen in the Lake States

Table 154
NORMAL YIELD TABLE
Fully-stocked, Pure, Even-aged Stands

ASPEN
(*Populus tremuloides*)

Lake States

TOTAL YIELD
1 inch and over

Gevarkiantz		1929		Cubic feet				
Age	Total height of dominant trees	Total height of all trees	Diameter breast high	No. of trees per acre	Stand, basal area per acre	Total peeled volume per acre	Av. annual growth	Basis
Years	Feet	Feet	Inches		Sq. ft.	Cu. ft.	Cu. ft.	Plots
Site index* 80 feet								
20	46	36	3.3	1,490	88	1,540	77	
30	59	50	4.8	880	110	2,550	85	1
40	71	62	6.3	600	129	3,650	91	
50	80	74	8.1	400	143	4,720	94	1
60	87	84	10.3	265	153	5,320	94	
70	93	91	12.6	185	161	6,290	96	
80	98	96	14.3	148	165	6,780	85	
Basis:								2
Site index 70 feet								
20	40	34	3.0	1,800	83	1,340	67	7
30	51	46	4.3	1,065	102	2,180	73	5
40	62	57	5.4	760	120	3,160	79	4
50	70	68	7.0	495	133	4,060	81	2
60	76	76	9.0	330	144	4,840	80	3
70	82	82	10.9	235	151	5,420	77	3
80	86	86	12.6	180	155	5,750	72	1
Basis:								25
Site index 60 feet								
20	34	29	2.5	2,300	76	1,080	54	6
30	44	40	3.5	1,400	94	1,760	59	17
40	53	49	4.5	980	110	2,450	61	6
50	60	58	5.9	645	122	3,220	64	12
60	66	65	7.3	422	133	3,820	64	13
70	70	70	9.3	295	139	4,290	61	
80	74	74	10.6	234	143	4,600	57	
Basis:								56
Site index 50 feet								
20	29	23	1.9	3,200	60	710	36	5
30	37	32	2.7	1,910	75	1,170	39	4
40	44	39	3.5	1,300	88	1,620	41	4
50	50	47	4.6	856	98	2,140	43	4
60	55	52	5.8	580	105	2,520	42	3
70	59	57	7.1	400	109	2,820	42	
Basis:								20
Site index 40 feet								
20	23	19	1.3	4,100	38	360	18	
30	29	27	1.9	2,420	46	600	20	1
40	35	33	2.4	1,560	54	850	21	2
50	40	39	3.2	1,110	60	1,100	22	
Basis:								3
Total:								100

* At 50 years.

Table 155
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands

ASPEN
 (*Populus tremuloides*)

Lake States
MERCHANTABLE YIELD
 4 inches and over

Gevorkiantz		1929		Standard cords	
Age	Diameter breast high	Stand, basal area per acre	Peeled volume per acre†	Mean annual growth per acre	
Years	Inches	Sq. ft.	Cords‡	Cords‡	
Site index‡ 80 feet					
20	3.3	88	9	0.45	
30	4.8	110	32	1.07	
40	6.3	129	50	1.25	
50	8.1	143	63	1.26	
60	10.3	153	71	1.18	
70	12.6	161	76	1.08	
80	14.3	165	80	1.00	
Site index‡ 70 feet					
20	2.9	83	5	0.25	
30	4.2	102	25	0.83	
40	5.4	120	43	1.07	
50	7.0	133	55	1.10	
60	9.0	144	63	1.05	
70	10.9	151	67	0.96	
80	12.6	155	69	0.86	
Site index‡ 60 feet					
30	3.5	94	12	0.40	
40	4.5	110	30	0.75	
50	5.9	122	44	0.88	
60	7.6	133	51	0.83	
70	9.3	139	55	0.79	
80	10.6	143	57	0.71	
Site index‡ 50 feet					
40	3.5	83	11	0.27	
50	4.6	98	26	0.52	
60	5.8	105	33	0.55	
70	7.1	109	37	0.53	

* Stump height, 1 foot; top diameter inside of bark, 3 inches.

† Standard cord 4x4x8 feet, close piling. Volumes in cords were obtained by applying the factors used for conversion of merchantable volumes in cubic feet to cords to corresponding average diameters at breast height. As a check, the same results were obtained from curved distributions of stems of different sizes per acre for a given age. The latter curves were also used for obtaining volumes in cords for stands with average diameter less than 4 inches.

‡ At 50 years.

Table 156
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands

ASPEN
 (*Populus tremuloides*)

Lake States
YIELD IN BOARD FEET
 6 inches and over

Gevorkiantz		1929		International ¼			
Age	Total height of trees	Diameter breast high	No. of trees per acre	Stand, basal area per acre	Volume per acre*	Mean annual growth	Basis
Years	Feet	Inches		Sq. ft.	Bd. ft.	Bd. ft.	Plots
Site index‡ 80 feet							
30	64	6.4	228	50	5,000	167	1
40	68	7.0	365	101	11,500	288	
50	72	8.3	369	138	19,000	380	1
60	84	10.3	265	153	27,000	450	
70	91	12.6	185	161	34,000	486	
80	96	14.3	148	165	38,000	475	
Basis.....							2
Site index‡ 70 feet							
30	63	6.0	170	33	3,500	117	5
40	66	6.7	319	80	8,500	212	4
50	70	7.6	403	124	15,000	300	2
60	76	9.0	320	143	21,500	358	3
70	82	10.9	235	151	27,000	386	3
80	86	12.6	180	155	31,500	394	1
Basis.....							18
Site index‡ 60 feet							
30	59	5.8	80	14	1,500	50	17
40	60	6.3	215	45	4,500	112	8
50	62	6.9	358	96	9,500	190	12
60	66	7.9	378	127	15,000	250	13
70	70	9.3	290	138	19,500	279	
80	74	10.6	234	143	22,500	281	
Basis.....							50
Site index‡ 50 feet							
40	53	6.1	74	13	1,500	38	4
50	54	6.4	200	42	4,000	80	4
60	55	7.0	306	81	7,500	125	3
70	59	7.6	327	102	10,500	150	
Basis.....							11

* Stump height, 1 foot; top diameter inside of bark, 5 inches. Bark is not included in volume.

† At 50 years.

Table 157
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands

ASPEN

(*Populus tremuloides*)

Lake States

YIELD IN BOARD FEET

7 inches and over

Gevorkiantz **1929** Scribner

Age	Total height of trees	Diameter breast high	No. of trees per acre	Stand, basal area per acre	Volume per acre*	Mean annual growth†	Basis
Years	Feet	Inches		Sq. ft.	Bd. ft.	Bd. ft.	Plots
Site index ‡ 80 feet							
30	70	7.5	79	24	1,500	46	1
40	73	7.9	216	74	5,500	142	
50	77	8.7	304	124	14,000	284	1
60	84	10.4	255	149	23,500	388	
70	91	12.6	185	161	30,000	426	
80	96	14.3	148	165	33,000	411	
Basis							2
Site index 70 feet							
30	69	7.3	35	10	500	17	5
40	70	7.6	167	52	3,500	84	4
50	72	8.1	297	105	9,500	192	2
60	77	9.3	290	137	17,500	288	3
70	82	10.9	235	151	23,500	338	3
80	86	12.6	180	155	27,500	342	1
Basis							18
Site index 60 feet							
40	65	7.5	68	21	1,000	25	8
50	66	7.7	213	69	4,500	86	12
60	68	8.3	300	112	10,500	172	13
70	71	9.5	268	132	16,500	234	
80	74	10.6	229	140	19,500	246	
Basis							33
Site index 50 feet							
50	58	7.4	68	20	1,000	20	4
60	59	7.6	174	55	3,000	53	3
70	60	8.0	240	84	6,500	94	
Basis							7

* Stump height, 1 foot; top diameter inside of bark, 6 inches.
 † Computed before yields were rounded off. University of Minnesota Agricultural Experiment Station Technical Bulletin 60.
 ‡ At 50 years.

Table 158
NORMAL STAND TABLE

Fully-stocked, Pure, Even-aged Stands

Average number of trees by diameter classes as a percentage of total number of trees.

ASPEN

(*Populus tremuloides*)

Lake States

Gevorkiantz **1933**

Diameter breast high	Average diameter breast high of stand—inches											Basis
	2	3	4	5	6	7	8	9	10	11	12	
Percentage of total number of trees												
Inches												Plots
1	33.2	8.2	2.2	1.0	.5							
2	46.8	33.6	13.0	5.0	1.8	.4						
3	18.0	34.6	29.3	12.5	5.7	1.8	.2					
4	2.0	15.9	27.5	23.5	13.0	5.5	1.3	.5	.2			
5		6.2	17.0	27.0	22.6	12.8	6.0	2.5	1.2	.4		
6		1.5	8.0	18.2	24.7	22.0	13.5	7.4	3.4	1.3	.2	
7			2.4	9.1	18.3	24.0	22.2	13.5	7.0	3.1	1.4	
8			.6	2.7	8.8	18.7	23.4	20.5	12.4	6.8	3.6	
9				.8	2.8	9.6	17.6	22.6	18.6	12.4	8.0	
10				.2	1.2	3.2	9.3	16.5	22.0	19.0	12.8	
11					.5	1.2	3.8	9.8	18.0	21.5	18.2	
12					.1	.6	1.7	4.5	10.5	17.9	21.0	
13						.2	.7	1.5	4.8	10.5	16.3	
14							.2	.4	1.2	4.0	9.3	
15							.1	.2	.4	1.7	4.6	
16								.1	.2	.8	2.6	
17									.1	.4	1.4	
18										.2	.5	
19											.1	
Total	100 per cent											
Basis	3	12	27	16	17	13	14	9	2	4	2	119

Compiled at the Lake States Forest Experiment Station. Technical Note 71.

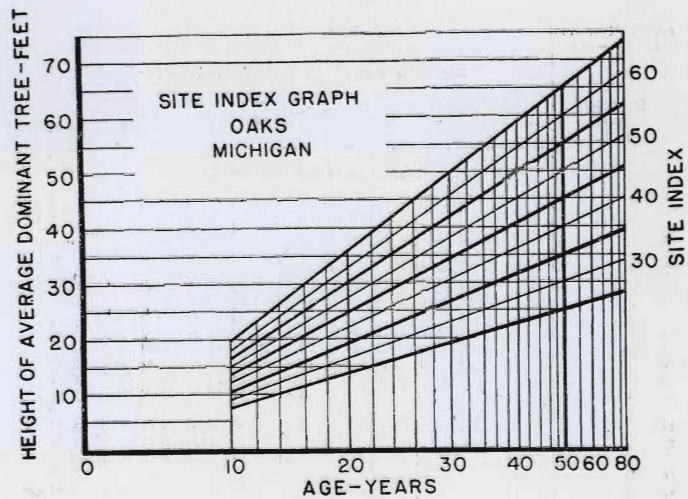


Fig. 2. Graph for determining the site index of fully-stocked, pure, even-aged stands of mixed oaks in the Lake States

Table 159
MIXED OAKS
(*Quercus sp.**)

DIAMETERS BY AGE CLASSES

Well-stocked Stands
Northern Michigan

Kittredge

1929

Age	Diameter breast high	Average dominant or maximum average diameter breast high
<i>Years</i>	<i>Inches</i>	<i>Inches</i>
10	1.3	1.4
20	2.5	2.7
30	3.7	4.0
40	4.6	5.2
50	5.5	6.4
60	6.3	7.4
70	7.0	8.4
80	7.7	9.4
90	8.4	10.3

* *Quercus ellipsoidalis*, *Q. alba*, *Q. borealis*, *Q. velutina*.

The figures in the second column are based on all the trees of the given age in each stand. The average trend of increase of diameter with age was read from the curve fitted to these points. The third column contains the average diameters of all the trees in the better stands. The figures may also be taken to represent the diameters of the average dominant trees in average stands. As the stands approach merchantable size, the better stands or the dominant trees are one to two inches larger in diameter than the average tree in the average stand.

Compiled at the Lake States Forest Experiment Station.
Michigan State College Agr. Expt. Sta. Bul. No. 190.

Table 160
MIXED OAKS
(Quercus sp.)*
HEIGHTS BY AGE CLASSES
 Well-stocked Stands
 Northern Michigan

Kittredge 1929						
Age	Red, white, black and jack oaks			White oak		
	Maximum	Average	Minimum	Maximum	Average	Minimum
	Total height—feet			Total height—feet		
Years						
10	18	13	8	13	11	7
20	32	23	15	23	20	14
30	45	32	20	32	28	20
40	53	38	24	39	34	24
50	58	42	27	45	39	28
60	61	44	28	48	42	31
70	64	46	29	51	45	33
80	65	48	30	53	46	35

* *Quercus borealis*, *Q. alba*, *Q. velutina*, *Q. ellipsoidalis*.
 The average figures correspond to the heights attained on an average site. The maximum figures correspond to a very good site and the minimum to a poor site. On the sandy soils, the oaks rarely exceed 55 or 60 feet in height at any age.

Michigan State College Agr. Expt. Sta. Bul. No. 190.

Table 161
MIXED OAKS
(Quercus sp.)*
STAND BASAL AREA
 Well-stocked Stands
 Northern Michigan

Kittredge 1929		
Age	Good sites	Poor sites
	Basal area—square feet†	
Years		
10	11	6
20	26	15
30	57	30
40	74	50
50	86	68
60	92	77
70	97	
80	101	
90	104	

* *Quercus ellipsoidalis*, *Q. alba*, *Q. borealis*, *Q. velutina*.

† One inch and over.

As in the case of number of trees, however, the majority of the stands are not as well-stocked as the above figures would indicate. On the good sites, basal areas at 40 years as low as 40 sq. ft. and at 60 years as low as 50 sq. ft. are not unusual. On the poor sites at 60 years, there may be only 30 sq. ft. of basal area per acre. Occasional areas had exceptionally large basal areas per acre as, for example, one 40-year stand with 86 sq. ft., and a 65-year stand with 110 sq. ft. These figures, which stand out above the values for most of the better-stocked stands which were measured, suggest that it will be possible to grow stands of oak in the future under forest management which will yield higher volumes than can be expected from the present stands.

Michigan State College Agr. Expt. Sta. Bul. No. 190.

Table 162
MIXED OAKS
(Quercus sp.)*
NUMBER OF TREES PER ACRE
 Well-stocked Stands
 Northern Michigan

Kittredge

1929

Age	Diameter limit		
	One inch and over	Six inches and over	Ten inches and over
	Number of trees per acre		
Years			
5	3000		
10	1900		
15	1200		
20	900		
25	740	20	
30	650	50	
40	500	160	10
50	390	200	30
60	310	200	35
70	250	180	40
80	200	150	50
90	150	130	50
100	120	110	50
110	90	50	50

* *Quercus ellipsoidalis*, *Q. alba*, *Q. borealis*, *Q. velutina*.
 These figures represent rough averages of the better stands that were measured and indicate the number of trees that are found in existing well-stocked stands of corresponding ages.
 Michigan State College Agr. Expt. Sta. Bul. No. 190.

Table 163
MIXED OAKS
(Quercus sp.)*
TOTAL YIELD AND ANNUAL GROWTH PER ACRE
 Average and Well-stocked Stands
 Northern Michigan

Kittredge

1929

Age	Average stands			Well-stocked stands		
	Total yield one inch and over	Mean annual growth one inch and over	Total yield four inches and over	Total yield one inch and over	Mean annual growth one inch and over	Total yield four inches and over
	<i>Cu. ft.</i>	<i>Cu. ft.</i>	<i>Cords</i>	<i>Cu. ft.</i>	<i>Cu. ft.</i>	<i>Cords</i>
Years						
20	320	16.0	4	450	22.5	7
30	600	20.0	7	820	27.3	11
40	510	20.3	11	1200	30.0	16
50	1000	20.0	13	1550	31.0	19
60	1170	19.5	15	1800	30.0	22
70	1330	19.0	16	1980	28.3	24
80	1480	18.5	18	2120	26.5	25
90				2200	24.4	26

* *Quercus ellipsoidalis*, *Q. alba*, *Q. borealis*, *Q. velutina*.
 The second, third, and fourth columns represent the average stands which were measured excluding only those which were exceptionally poor. The fifth, sixth, and seventh columns give the corresponding figures for the better stands including those which grew on better sites or which were more nearly well-stocked or had been less frequently damaged by fire.
 Michigan State College Agr. Expt. Sta. Bul. No. 190.

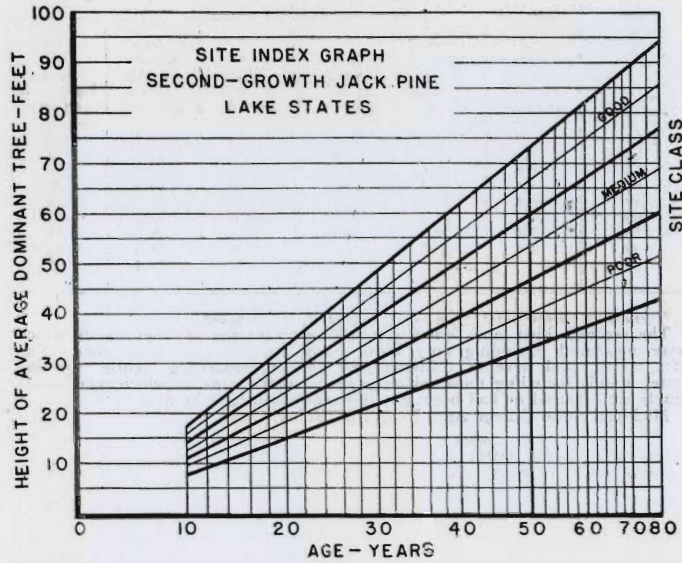


Fig. 3. Graph for determining the site index of fully-stocked, pure, even-aged stands of jack pine in the Lake States

Table 164
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands

JACK PINE
(Pinus banksiana)

Lake States

TOTAL YIELD
 1 inch and over

Brown, R. M. 1929 Cubic feet

Age	Total height of dominant trees	Total height of all trees	Diameter breast high	Number of trees per acre	Stand, basal area per acre	Total unpeeled volume per acre	Basis
Years	Feet	Feet	Inches		Sq. ft.	Cu. ft.	Plots
Good Site							
20	31	29	3.5	1,380	94	1,650	2
30	44	42	5.0	930	126	2,950	10
40	56	55	6.5	590	132	3,950	7
50	66	65	7.9	395	135	4,450	5
60	75	73	9.1	300	136	4,800	2
70	81	79	10.1	245	136	5,050	
80	86	84	10.9	210	137	5,250	
Basis							26
Medium Site							
20	25	23	2.8	2,000	85	1,250	12
30	35	34	3.9	1,375	115	2,350	20
40	45	44	5.1	850	120	3,100	26
50	53	52	6.2	585	123	3,500	15
60	60	58	7.2	440	124	3,750	8
70	65	63	8.0	360	124	3,950	2
80	69	67	8.6	310	124	4,100	
Basis							83
Poor Site							
20	18	17	2.2	2,940	79	950	3
30	27	26	3.2	1,980	106	1,650	8
40	34	33	4.1	1,225	111	2,250	5
50	40	39	5.0	840	113	2,550	2
60	45	44	5.8	630	114	2,750	3
70	49	48	6.4	515	114	2,900	
80	52	50	7.0	445	115	3,000	
Basis							21
Total							130

Compiled at the Lake States Forest Experiment Station by R. M. Brown from data collected by A. E. Wackerman.
 Good site—site index 66 feet at 50 years.
 Medium site—site index 53 feet at 50 years.
 Poor site—site index 40 feet at 50 years.
 From Yield of Jack Pine in the Lake States, University of Wisconsin Research Bulletin 90.

Table 165
NORMAL YIELD TABLE

Fully-stocked, Pure, Even-aged Stands

JACK PINE
(*Pinus banksiana*)

Lake States

MERCHANTABLE YIELD

4 inches and over

Brown, R. M.		1929		Cubic feet and cords		
Age	Diameter breast high	Number of trees per acre	Stump basal area per acre	Yield*—per acre		Basis
				Unpeeled	Unpeeled	
Years	Inches		Square feet	Cubic feet	Standard cords	Plots
			Good Site			
20	4.4	645	67	800	10	2
30	5.3	790	124	2,250	26	10
40	6.6	555	131	3,400	37	7
50	7.9	395	125	4,050	43	5
60	9.1	300	126	4,450	46	2
70	10.1	245	136	4,650	43	
80	11.0	210	137	4,550	50	
Basis						26
			Medium Site			
20	4.2	345	34	250	5	12
30	4.6	815	94	1,400	17	20
40	5.4	730	116	2,350	27	26
50	6.4	555	122	3,000	32	15
60	7.2	430	123	3,350	36	8
70	8.0	360	124	3,600	38	2
80	8.6	310	124	3,750	40	
Basis						83
			Poor Site			
20	4.0	115	10	50	1	3
30	4.2	655	63	650	8	3
40	4.7	760	91	1,350	16	5
50	5.3	690	107	1,900	22	2
60	6.0	580	112	2,250	25	3
70	6.5	490	113	2,450	27	
80	7.0	430	114	2,600	28	
Basis						21
Total						130

* Stump height, 1 foot; top diameter, 3 inches.
From Yield of Jack Pine in the Lake States, University of Wisconsin Research Bulletin 90.

Table 166
NORMAL YIELD TABLE
Fully-stocked, Pure, Even-aged Stands

JACK PINE
(*Pinus banksiana*)

Lake States

YIELD IN BOARD FEET

6 inches and over

Brown, R. M. 1929 International 1/4

Age	SITE QUALITY						Basis
	Good		Medium		Poor		
	Lumber*	Additional† pulpwood	Lumber	Additional	Lumber	Additional	
	per acre	per acre	per acre	per acre	per acre	per acre	
Years	Board feet	Cords	Board feet	Cords	Board feet	Cords	Plots
20	500	9	1,000	14	500	7	17
30	2,500	16	3,000	16	1,000	13	33
40	8,500	12	7,000	11	2,500	14	22
50	14,500	7	10,500	8	4,000	11	10
60	18,500	5	13,500	6	6,000	8	2
70	21,500	4	15,000	5	7,000	8	
80	23,500	4					
Basis							130

* Stump height, 1 foot; top diameter, 5 inches inside bark.
† Pulpwood from trees 4 and 5 inches in diameter and from tops above a 5-inch top diameter.
Cordwood converting factor for pulpwood, 84 cubic feet.
From Yield of Jack Pine in the Lake States, University of Wisconsin Research Bulletin 90.

Table 167
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
JACK PINE
(Pinus banksiana)
YIELD IN BOARD FEET
 7 inches and over

Brown, R. M. 1929 Scribner

Age	SITE QUALITY						Basis
	Good		Medium		Poor		
	Lumber* per acre	Additional† pulpwood per acre	Lumber per acre	Additional pulpwood per acre	Lumber per acre	Additional pulpwood per acre	
Years	Board feet	Cords	Board feet	Cords	Board feet	Cords	Plots
20		10		5		1	17
30	1,000	22		17		8	38
40	5,500	20	1,000	22		16	38
50	11,500	14	4,500	19	500	19	22
60	15,500	10	7,500	16	2,000	18	13
70	18,000	9	10,500	12	3,500	16	2
80	20,000	9	12,000	10	5,000	14	
Basis	26		83		21		130

* Stump height, 1 foot; top diameter, 6 inches inside bark.
 † Pulpwood from trees 4 to 6 inches in diameter and from tops above a 6-inch top diameter.
 Cordwood converting factor for pulpwood, 84 cubic feet.
 From Yield of Jack Pine in the Lake States, University of Wisconsin Research Bulletin 90.

Table 168
STAND TABLE
 Average number of trees by diameter classes as a percentage of total number of trees.
JACK PINE
(Pinus banksiana)
 Fully-stocked, Pure, Even-aged Stands
Lake States

Diameter breast high	Average diameter breast high of stand—inches									Basis
	2	3	4	5	6	7	8	9	10	
	Percentage of total number of trees									
Inches										Plots
1	26.20	8.00	2.58	.90	.44	.16	.07	.03	.01	
2	52.90	29.50	12.42	4.80	1.86	.76	.32	.13	.05	
3	18.50	37.90	27.50	13.40	5.80	2.18	.86	.27	.10	
4	2.35	18.60	29.90	24.30	13.40	6.85	2.68	1.27	.30	
5	.05	5.40	18.75	26.90	22.70	13.55	7.57	3.60	1.50	
6		.54	6.85	18.30	24.40	20.50	13.25	7.70	4.00	
7		.06	1.70	7.70	17.40	23.20	19.25	13.00	8.00	
8			.26	2.85	9.25	16.60	22.00	18.50	13.00	
9			.04	.70	3.35	9.30	16.30	20.50	17.44	
10				.14	1.05	4.78	10.30	16.00	19.80	
11				.01	.28	1.47	4.40	9.80	15.10	
12					.06	.49	2.10	5.40	10.40	
13					.01	.12	.66	2.40	5.80	
14						.04	.18	1.05	2.40	
15							.05	.26	1.45	
16							.01	.07	.45	
17								.02	.18	
18									.01	
19									.01	
Total	100 per cent									
Basis	1	20	34	54	60	49	26	8	2	254

Lake States Forest Experiment Station. Technical Note 70.

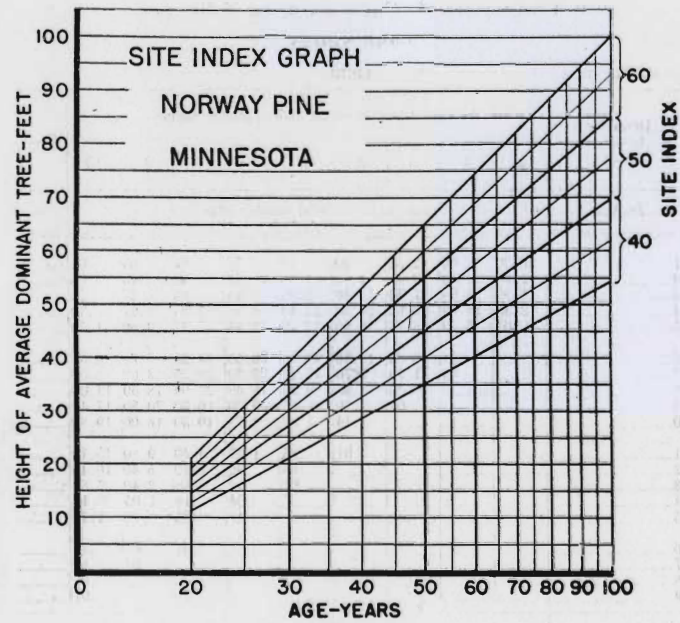


Fig. 4. Graph for determining the site index of fully-stocked, pure, even-aged stands of Norway pine in Minnesota

Table 169
NORMAL YIELD TABLE
Fully-Stocked, Pure, Even-Aged Stands
Average Site
SECOND-GROWTH NORWAY PINE
(*Pinus resinosa*)
Minnesota

Brown, R. M. 1934 Site Index 52

Age	Average height of dominant trees	Average height of stand	Diameter breast high of all trees 1 inch and over	Number of trees per acre 1 inch and over	Spacing per tree	Total stand basal area per acre	Yield per acre		Basis	
							Total yield 1 inch and over	One-inch lumber		
Years	Feet	Feet	Inches	Trees	Feet	Square feet	Cubic feet	Board feet	Plots	
30	31	28	3.4	2,715	4 x 4	171	2,200		9	
40	43	40	5.0	1,390	5½ x 5½	189	3,100	6,000	5,000	4
50	52	49	6.4	905	7 x 7	202	4,200	13,000	11,000	6
60	60	58	7.6	679	8 x 8	214	5,300	21,000	18,000	
70	67	65	8.5	566	9 x 9	223	6,400	29,000	25,000	
80	72	70	9.4	481	9½ x 9½	232	7,300	36,000	31,000	1
90	76	74	10.1	430	10 x 10	239	8,100	42,000	36,000	
100	80	78	10.6	398	10½ x 10½	244	8,800	47,000	40,000	3
Basis										24

* In trees 7 inches and larger.
Preliminary table.

Table 170
STAND TABLE

Average number of trees by diameter classes as a percentage of total number of trees

NORWAY PINE
(Pinus resinosa)

Fully Stocked, Pure, Even-Aged Stands
Minnesota

Brown, R. M. 1934

Diameter breast high	Average diameter breast high of stand—inches				Basis
	3	6	9	12	
	Percentage of total number of trees				
<i>Inches</i>					<i>Plots</i>
1	17	1			
2	33	5	1		
3	26	10	1		
4	15	14	2		
5	7	17	4	1	
6	2	20	8	1	
7		15	11	2	
8		8	16	4	
9		5	21	7	
10		3	15	10	
11		2	11	16	
12			5	22	
13			3	17	
14			1	12	
15			1	5	
16				2	
17				1	
Total			100 per cent		
Basis	12	8	2	2	24

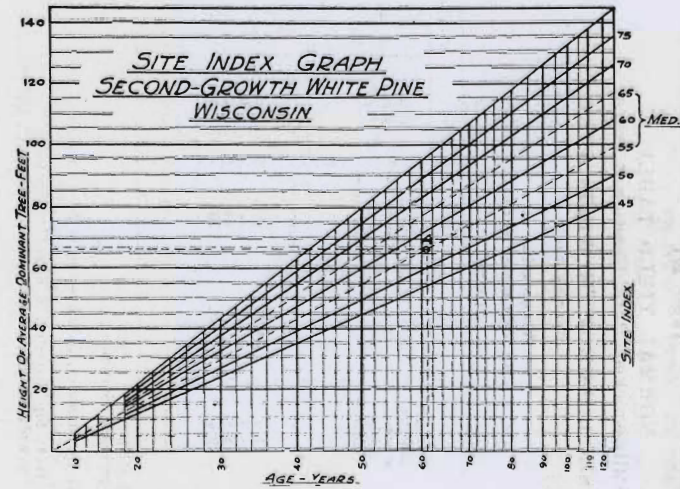


Fig. 5. Graph for determining the site index of fully-stocked, pure, even-aged stands of white pine in the Lake States

Table 171
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
SECOND-GROWTH WHITE PINE
 (*Pinus strobus*)

Wisconsin*
EXCELLENT SITE

Gevorkiantz

1933

Site index 75'

Age	Height of average dominant tree	Average height 1" and over	Average diameter at breast height 1" and over	Number of trees 1" and over	Total basal area 1" and over	Yield—per acre			
						Total yield 1" and over	Board feet		Basis
							International $\frac{3}{4}$ " 7" and over	Scribner Decimal C 8" and over	
Years	Feet	Feet	Inches		Square feet	Cubic feet			Plots
30	41	37	4.5	1680	190	3200			
40	59	56	7.0	840	224	5600	1700	8100	1
50	75	73	8.8	578	246	7900	35500	22000	
60	89	87	10.3	450	259	9900	53000	37500	
Basis.....									1
Total.....									92

* Applicable to stands in Minnesota and Michigan. Compiled at the Lake States Forest Experiment Station. Volume in cubic feet without bark. International rule: Stump height, 1 foot; top diameter, 5 inches inside bark. Original figures for a $\frac{3}{8}$ -inch kerf reduced by 9.5 per cent. Scribner Decimal C: Stump height, 1 foot; top diameter, 6 inches inside bark. Table XVII University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

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Table 172
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
SECOND-GROWTH WHITE PINE
 (*Pinus strobus*)

Wisconsin*
GOOD SITE

Gevorkiantz

1933

Site index 70'

Age	Height of average dominant tree	Average height 1" and over	Average diameter breast height 1" and over	Number of trees 1" and over	Total basal area 1" and over	Yield—per acre			
						Total yield 1" and over	Board feet		Basis
							International $\frac{3}{4}$ " 7" and over	Scribner Decimal C 8" and over	
Years	Feet	Feet	Inches		Square feet	Cubic feet			Plots
30	38	34	4.3	1800	188	2900			
40	55	52	6.7	890	221	5150	14000	6500	2
50	70	68	8.5	613	242	7200	31000	18000	4
60	82	80	9.9	475	255	9000	46500	31500	2
70	93	91	11.2	368	263	10570	59500	40000	1
80	103	101	12.3	327	271	11900	69500	57500	
90	110	109	13.3	284	275	12950	77000	66500	1
100	115	114	14.2	255	280	13750	83000	74000	
110	120	119	14.9	235	283	14400	87500	79500	1
120	123	122	15.4	220	285	14900	90500	84500	
Basis.....									12
Total.....									92

* Applicable to stands in Minnesota and Michigan. Volume in cubic feet without bark. International rule: Stump height, 1 foot; top diameter, 5 inches inside bark. Original figures for a $\frac{3}{8}$ -inch kerf reduced by 9.5 per cent. Scribner Decimal C: Stump height, 1 foot; top diameter, 6 inches inside bark. Table XVII University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

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Table 173
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
SECOND-GROWTH WHITE PINE
(Pinus strobus)
 Wisconsin*
MEDIUM SITE

Site index 60'

Age	Height of average dominant tree	Average height 1" and over	Average diameter breast height 1" and over	Number of trees 1" and over	Total basal area 1" and over	Yield—per acre			Basis
						Total yield	Board feet		
							International 7/8" and over	Scribner Decimal C 8" and over	
<i>Years</i>	<i>Feet</i>	<i>Feet</i>	<i>Inches</i>		<i>Square feet</i>	<i>Cubic feet</i>			
30	32	28	3.9	2150	179	2250			3
40	47	44	6.1	1040	210	4200	9500	4000	6
50	60	57	7.6	725	230	5800	21000	10700	20
60	71	68	9.0	546	242	7200	33000	20500	14
70	80	77	10.1	447	250	8470	44500	31300	1
80	88	85	11.1	384	257	9500	53500	49900	1
90	94	92	11.9	337	262	10400	60000	48500	2
100	99	97	12.6	303	265	11100	65000	55000	1
110	103	101	13.2	273	267	11700	69500	60500	2
120	106	104	13.7	263	270	12200	73000	65000	4
Basis									54
Total									92

* Applicable to stands in Minnesota and Michigan. Volume in cubic feet without bark.
 International rule: Stump height, 1 foot; top diameter, 5 inches inside bark. Original figures for a 1/8-inch kerf reduced by 9.5 per cent.
 Scribner Decimal C: Stump height, 1 foot; top diameter, 6 inches inside bark.
 Table XVII University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

Table 174
NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
SECOND-GROWTH WHITE PINE
(Pinus strobus)
 Wisconsin*
POOR SITE

Site index 50'

Age	Height of average dominant tree	Average height 1" and over	Average diameter breast height 1" and over	Number of trees 1" and over	Total basal area 1" and over	Yield—per acre			Basis
						Total yield	Board feet		
							International 7/8" and over	Scribner Decimal C 8" and over	
<i>Years</i>	<i>Feet</i>	<i>Feet</i>	<i>Inches</i>		<i>Square feet</i>	<i>Cubic feet</i>			
30	27	23	3.2	2800	156	1750			1
40	39	35	5.0	1360	184	3100	3500	1250	2
50	50	47	6.3	930	201	4250	16500	4500	7
60	59	56	7.3	730	212	5350	15000	9100	6
70	67	64	8.2	605	219	6300	25500	14500	3
80	74	71	9.0	510	224	7000	33000	20500	
90	79	77	9.8	440	229	7700	39500	26500	
100	83	81	10.5	385	232	8200	44500	32000	
110	86	84	11.0	356	235	8600	48000	36500	1
120	88	86	11.5	330	237	8900	50500	40000	2
Basis									22
Total									92

* Applicable to stands in Minnesota and Michigan. Volume in cubic feet without bark.
 International rule: Stump height, 1 foot; top diameter, 5 inches inside bark. Original figures for a 1/8-inch kerf reduced by 9.5 per cent.
 Scribner Decimal C: Stump height, 1 foot; top diameter, 6 inches inside bark.
 Table XVII University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

Table 175
 NORMAL YIELD TABLE
 Fully-stocked, Pure, Even-aged Stands
 SECOND-GROWTH WHITE PINE
 (*Pinus strobus*)

Wisconsin*
 VERY POOR SITE

Gevorkiantz

1933

Site index 45'

Age	Height of average dominant tree	Average height 1" and over	Average diameter breast height 1" and over	Number of trees 1" and over	Total basal area 1" and over	Total yield 1" and over	Yield—per acre		Basis
							Total basal area 1" and over	Total yield 1" and over	
Years	Feet	Feet	Inches		Square feet	Cubic feet	International 7" and over	Scribner Decimal C 8" and over	Plots
30	24	21	3.0	3060	150	1450	2000	550	
40	35	31	4.6	1510	171	2600	7000	2050	2
50	45	43	5.8	1020	187	3550	12500	5840	1
60	53	50	6.7	810	197	4490			3
Total									92

* Applicable to stands in Minnesota and Michigan.
 Volume in cubic feet without bark.
 International rule: Stump height, 1 foot; top diameter, 5 inches inside bark. Original figures for a 1/4-inch kerf reduced by 9.5 per cent.
 Scribner Decimal C: Stump height, 1 foot; top diameter, 6 inches inside bark.
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Table 176
 STAND TABLE
 Fully-stocked, Pure, Even-aged Stands
 SECOND-GROWTH WHITE PINE
 (*Pinus strobus*)
 Wisconsin*

Age	Minimum diameter limit—inches				
	1	4	7	8	10
Years	Number of trees per acre in and above the minimum diameter breast high				
Poor Site Site index 50					
50	930	368	354	158	52
60	720	718	438	285	62
70	665	600	454	357	139
80	516	508	423	357	134
90	440	456	386	339	211
100	385	385	357	324	227
110	356	355	335	310	235
120	330	330	315	297	234
Medium Site Site index 60					
50	725	715	471	326	94
60	546	544	453	382	197
70	447	447	405	362	239
80	384	384	363	338	255
90	337	337	325	308	248
100	365	363	295	285	241
Good Site Site index 70					
50	613	610	472	368	162
60	475	475	423	373	245
70	386	386	365	340	259
80	327	327	317	302	252

* Applicable to stands in Minnesota and Michigan.
 Compiled at the Lake States Forest Experiment Station.
 Table XXIII University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

Table 177
PERCENTAGE STAND TABLE
 Well-stocked, Pure, Even-aged
WHITE PINE STANDS
 (*Pinus strobus*)
Lake States

Gevorkiantz

1930

Diameter expressed as a percentage of the average diameter of the stand	Number of trees in each diameter class	Number of trees in and below each diameter class
<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
30	.10	.10
40	.78	.88
50	2.62	3.50
60	6.00	9.50
70	9.50	19.50
80	13.00	32.00
90	15.00	47.00
100	16.00	63.00
110	13.50	76.50
120	10.00	86.50
130	6.70	93.20
140	3.80	97.00
150	2.00	99.00
160	.67	99.67
170	.26	99.93
180	.07	100.00
Total.....	100.00	

Data collected in Wisconsin. Based on 92 plots.
 Table XXIV University of Wisconsin Agricultural Experiment Station Research Bulletin 98.

Table 178
PERCENTAGE DIAMETER-HEIGHT CURVE
 Pure, Even-Aged, Fully-Stocked Stands
ASPEN, JACK AND WHITE PINE

Gevorkiantz

1934

Diameter breast high	Age class—years		
	20-40	41-80	81-120
	Percentage of average height		
<i>Per cent</i>			
50	70	75	80
75	88	90	92
100*	100*	100	100
150	114	112	110
200	123	118	113

* 100 is the average D. B. H. or average height of the stand.
 Preliminary table. For use in modifying normal yield tables.