WOOD PULP ~ DEPARTMENT

PULP WOOD—TREATMENT OF THE RAW MATERIAL IN THE LOG AND ITS MEASUREMENT.

By a Canadian Pulpmaker.

CHAPTER VI.—THE QUESTION OF YIELD, &c.

In view of the enormous demand for spruce and other woods for the manufacture of pulp, it is self-evident that the subject of supply, and its connection with the equally important question of yield, demands close attention from all those engaged in the operations of lumbering for pulp woods. The preservation of the natural resources of the forests is a subject of vital moment to the Government, which is directly interested in, and responsible for seeing that all necessary precautions are taken to prevent the extinction of such an asset and source of revenue.

Some very valuable information on this subject, written from an eminently practical standpoint, was obtained in the year 1897 by several interested experts operating in that well-known district in the States, "The Adirondacks." The results of the many observations recorded are given by Mr. Gifford Pinchot in an excellent book entitled "The Adirondack Spruce."

From this book we take the liberty of quoting one or two points which have a direct bearing on the subject of the yield of pulp wood.

Careful measurements of the stems of over 2,000 trees cut for pulp were made, and some 300 trees were cut into logs in order to furnish data for the compilation of tables showing the contents of standing trees. For this purpose tables were eventually calculated giving the number of standards, feet board measure, merchantable cubic feet, and cords. It is only with the two latter that we need concern ourselves.

The term merchantable cubic feet means that amount of wood in the tree actually used for the manufacture of pulp. The following table is given showing the contents of spruce trees for certain sizes.

VOLUME TABLE FOR SPRUCE (G. PINCHOT).

Diam. Breast High.	HEIGHT OF THE TREE FEET.								
	25	30	35	40	45	50	55	60	65
Inches.	MERCHANTABLE CUBIC FEET OF WOOD.								
5	1.1	1.2	1.3	1.4	1.5	1.6	1.7	..	..
6	1.6	1.8	2.1	2.4	2.8	3.2	3.6	4.0	..
7	2.1	2.5	3.0	3.6	4.2	4.8	5.4	6.0	6.6
8	...	3.1	3.9	4.8	5.6	6.5	7.3	8.0	8.8
9	...	3.8	4.9	5.9	6.9	8.0	9.0	9.9	11.0
10	..	...	6.0	7.2	8.4	9.6	10.9	12.2	13.5
11	...	...	7.1	8.6	10.1	11.6	13.1	14.6	16.1
12	...	...	...	10.0	11.7	13.5	15.2	17.0	18.8
13	...	...	...	....	13.4	15.4	17.3	19.4	21.5
14	...	...	...	....	15.1	17.3	19.5	21.8	24.2

The relation between the ordinary standard cord of piled wood measuring 128 cubic feet is determined by the use of a factor representing the difference between solid wood as given in the above table and the stacked wood as it would obtain in actual practice when brought into the mill for consumption.

Pinchot refers to the custom in Germany of taking this factor as 0.65, but he is inclined to think that this gives results somewhat too high. The factor selected is 0.7 as being more accurate.

Hence the conversion of the above into cords is effected by dividing the values for the respective trees by 128 and the result by 0.7.

Thus a tree 10 inches in diameter and 35 feet high would contain 0.067 cords of pulp wood.

By means of a table of this kind the extent of the operations necessary for the cutting of logs to ensure a stated quantity of pulp wood can easily be gauged.

For example, to produce a cord of wood of merchantable quality will require ten trees of the following dimensions : 55 feet high, and 9 inches diameter at the stump. Fifty trees 6 inches diameter at the stump 30 feet high would have to be cut to give one cord of merchantable pulp wood.

VOLUME TABLE FOR SPRUCE (PINCHOT).

Diam. Breast High.	HEIGHT OF TREE IN FEET.							
	25	30	35	40	50	55	60	
Inches.	MERCHANTABLE CORDS OF PULP WOOD.							
5	.012	.013	.014	.015	.016	.017	.019	
6	.019	.020	.023	.021	.030	.035	.040	
7	.023	.028	.033	.040	.047	.054	.060	
8	..	.35	.043	.041	.063	.072	.081	
9	....	.042	.055	.041	.078	.089	.100	
10	....	....	.067	.050	.94	.107	.122	
11	....	..	.079	.061	.112	.125	.148	
12	....	....	....	.111	.131	.150	.168	
13	....	....	....	..	.129	.171	.193	
14	....	....	....	..	.168	.193	.217	

In all operations of this nature a considerable portion of the total length of the tree has to be wasted and discarded as useless, viz., that part of the tree near the top, because this tapers very rapidly, is knots, and therefore cannot be handled profitably. In some cases where the cost of the wood is high, a larger portion of the tree is utilized for pulp wood, and the tree cut to a smaller diameter than is customary. When pulp wood is plentiful the logs cut will not measure less than four or five inches at the small end, with a scarcity of material logs of four and three inches would be accepted.

In the latter instance a greater proportion of the tree is taken for pulp wood.

The amount of pulp which can be obtained from a cord of wood is a question of some importance and that may be referred to at this point. The yield differs considerably in various mills according to the quality of the pulp and the manner in which the raw material is treated.

When spruce is simply ground into mechanical wood pulp the yield varies from 1,600 lbs. to 1,900 lbs. for a cord of wood consumed. A usual average obtained under ordinary conditions is 1,800 lbs. The fine grinder employed in the manufacture has a good deal to do with the yield, as some machines are so constructed as to produce a quantity of slivers or pieces untreated fibre, which cannot afterwards be dealt with.

When spruce is treated by the sulphite process and converted into sulphite pulp, the yield is from 1,000 to 1,300 lbs. of dry pulp from a cord of wood. Here again, there is plenty of scope for the skilful management