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FORESTRY AND ABOICULTURE.

BEING THE FOURTH CHAPTER OF THE REPORT OF THE ONTARIO AGRICULTURAL COMMISSION.

Planting Waste Lands.

For planting on waste lands, either inaccessible to cultivation or of a soil too poor to repay cultivation, the European larch has already been mentioned. Mr. Leslie, referring to this tree, says:—

"It is suited to our climate, being perfectly hardy, and very easy to transplant in the spring. It requires early transplanting, though later in the season it will thrive if transplanted, provided the roots are kept moist. As a rule, however, it should be planted as soon as the frost is out of the ground, or as late in the fall as possible before the permanent freezing of the ground. It can be imported at about the same price as the Norway spruce.

"I would not recommend planting them after they attain a height of more than eighteen inches or two feet; they are a little impatient of being moved after that time. There is not a large supply of them kept in this country; we keep a fair supply ourselves. If very large quantities were required, as for instance, if railway companies should go into their cultivation, they would have to be imported to meet the demand.

"The firm of Douglas & Co., Waukegon, in the States, grow them by the million. The prices in the old country, however, are less than those in the States, and in either case there is a duty on the trees when imported here."

For belts, Mr. Leslie would plant European larches three or four deep.

"Hitherto," he says, "the tree has been used more for shelter than anything else. I have no doubt of its success under good management. In our own place we have some trees thirty feet in height."

Cost of Tree Planting.

With regard to the cost of trees purchased from the nurserymen, Mr. Beadle says:—

"As to the cost per acre of such forest planting, young black walnut trees can be bought of the nurserymen who have been growing them, at about \$12.50 or \$12 per hundred for trees about four feet high. Chestnuts can be bought at about the same figure. I know of no plantations where the hard maple could be bought at any figure. Nurserymen have confined themselves mostly to the horse chestnut and mountain ash for tree planting."

Mr. Leslie says:—

"The American elm, the Scottish elm, and the English ash are also very desirable. Those that I have named I regard as the very choicest. In large numbers I imagine these trees could be got for about twenty-five cents apiece when about eight feet in height, which I regard as the proper size for planting. They would be trees

raised in this country, but they would have to be nursery grown, or transplanted from the woods."

Of the cost of Norway spruce Mr. Beadle says:—

"It is grown by nurserymen both in Europe and America by millions. They can be bought from one to two feet high for \$10 to \$15 a hundred, and if taken younger can be bought for still less."

Mr. Leslie, on the same point, says:—

"We sell these imported trees at from \$30 to \$40 a thousand—three or four cents apiece—that is to say the 15 inch ones. The 18-inch ones would be transplanted two years in this country and cannot be sold for less than \$60 a thousand. If large numbers were taken they could be sold at a much cheaper rate, say 25 per cent. off. If we could depend upon getting them every year in the same condition, they could be sold cheaper still, but we have to take an average."

The difference in age and size is, of course, an important factor in calculating the cost. Dr. James Brown in his evidence says, with regard to the cost of imported trees:—

"I have been just now at Leslie's nurseries, and find there that such plants as the Scotch pine and other sorts of pine would cost about five cents each. To plant an acre at that rate would cost \$50 for plants alone, independent of planting them. This rate is reckoned when planting the trees six feet apart. I think I would advise planting them as close as that. I don't think there is any reason why the price could not be greatly reduced by having extensive nurseries, in fact there is no doubt about it."

"Mr. Leslie said that if he had extensive orders for them he could afford to sell them cheaper, but at present he has no encouragement to do so. In the matter of re-planting the country with forest trees, the first thing essential is to establish large nurseries for the purpose of raising young trees. I think that trees suitable for replanting could be raised so as to sell on an average for \$3 a thousand.

"You can get the same plants in Scotland for a third of that. The difference between the price here and there would be owing to the difficulty of rearing them here on account of the severity of the winter. In Scotland they require no protection, but they would require to be protected here while they were young.

In reference to the question of cost, Mr. Leslie in his own evidence repeated the remark he had made to Dr. James Brown. There can be no doubt that trees can in large numbers be grown at a very small cost indeed, but, so far, in Canada, between the very limited amount of planting that has been going on and the accessibility of woodlands affording a cheap supply of trees of some sort or condition, the nursery demand has been comparatively insignificant, and no sufficient encouragement has been given

to induce nurserymen to raise forest trees in great numbers. As to the actual cost of planting a given area Mr. Leslie says:—

"The trees would cost about 5 cents each, say 6 cents with the planting. In other words, the north and west sides of the field could be protected at a cost of very little over \$8 an acre, or say \$7.50 with the planting."

In his evidence on general farming and other subjects, Professor Brown, of Guelph, gave the following as his estimate of the cost of planting out forest trees, and his opinion as to the mode of planting. He said:—

"Upon the subject of forestry, I will show you what it costs per acre to put down young trees taken from your own or a neighbor's bush, a method of replanting which can be adopted at the least possible expense, and I think with the greatest possible success.

"In selecting trees for replanting, it is best to keep on the small side. It is a great mistake to go into six or eight feet trees if you want rapid success. Two or three feet trees will ultimately do much better. I think it is an important point gained if we can show the Canadian farmer how he can be his own nurseryman and do his own replanting.

"There are thousands of young trees in every farmer's neighborhood which need cost him nothing but the expense of collecting them. If he has to pay ten cents to a nurseryman for every tree he plants, he will do very little in that way.

"I have been in the habit of planting one and a half million of trees a year and they did not cost more than ten shillings and sixpence a thousand and if our Government or private parties took the nursery management of such trees, I think they could be produced in Ontario at less than eight dollars a thousand.

"I have started an experiment upon this subject upon the Model Farm at Guelph, and I have found the cost to be as follows per acre:—

| | |
|--|---------|
| Clearing and preparing the ground..... | \$ 9 44 |
| Digging pits..... | 8 68 |
| Fencing..... | 4 75 |
| Planting..... | 11 50 |
| Pruning..... | 0 75 |
| Mulching..... | 2 25 |
| Taking trees from the forest..... | 14 50 |
| Heeling..... | 0 50 |
| Total cost..... | \$30 57 |

"If the farmer does not estimate the value of his own labour, and of the labour of his horses, you may reduce that about one half.

"I do not believe in manuring forest trees. I have never seen any good effect from it, and I am expressing not only my own experience, but the experience of others dating fifty years back.

"We have had evidence of great weight that trees should not be planted less than six or eight feet apart, and that gives about 900 trees to the acre. We planted that number this season, and there are now 713 alive and doing

well, showing an actual death rate of one fifth. The deaths, however, occurred principally among the pine and spruce, apart from these, the deaths were comparatively few.

"In planting strips of wood for the protection of crops, I cannot recommend anything but standard trees."

Effects of Forests on Moisture.

The effects of forests on rain and snow fall is a subject that has attracted much attention in some European countries, and is admitted to be one that is being practically illustrated in our own experience, although, up to the present time, no such system of experiments or inquiries have been adopted as to identify, with scientific accuracy, the relations of the clearing of the land to be diminished moisture. Still, everybody mentally attributes the latter result to the former cause. Something more may be said in regard to this matter when the evidence on meteorology in relation to agriculture is under review. Meantime, the following extracts from the report of Dr. Hough, already referred to, will describe, in a few words, the part played by forest trees in relation to this branch of nature's economy:—

"It is a matter of common remark that our streams diminish as the woodlands are cleared away, so as to materially injure the manufacturing interests depending upon hydraulic power, and to require new sources of supply for our State canals, and for the use of cities and large towns. Many streams once navigable are now entirely worthless for this use. The mode in which this influence operates will be readily understood when we consider the effects of forests upon the humidity and temperature of the air.

"A deciduous tree, during the season when in foliage, is constantly drawing from the earth, and giving off from its leaves a considerable amount of moisture, and in some cases this amount is very great. This change of state from a fluid to a gaseous condition, is a cooling process, and the air near the surface, being secured from the sun and from the winds, becomes, by this means, so humid that a rank, succulent vegetation often springs up and thrives, which in an open field would wither and perish in an hour. The air being thus charged with moisture and cooled, does not take up by evaporation the rains which fall, and the soil, being more open, readily allows the water from melting snows and from showers to sink into the earth, from whence a portion appears in springs and in swamps, which give rise to rills and streams.

"The air at all times holds more water vapour in suspension, and its capacity for water vapour is increased as the temperature rises, not by a steady gaining rate, but rapidly as the heat is increased. There is no evaporation when the air is saturated with