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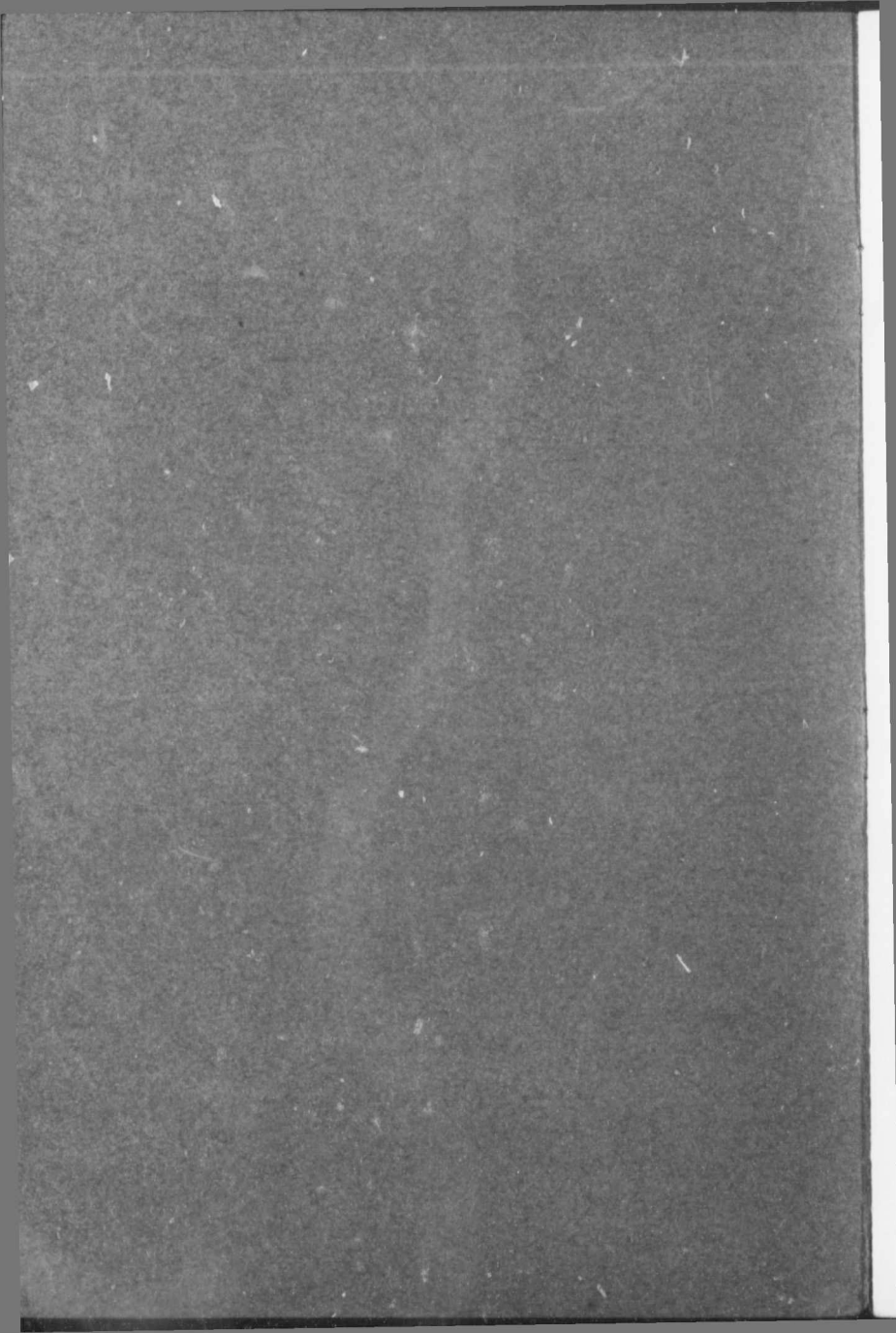
Planting and Care
of a
Forest of Evergreens

by

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Courtesy of N. Y. State, Fish and Game Commission.

A PLANTED FOREST (Four Years Old)

[Photo by A. KNECHTL

PLANTING AND CARE OF A FOREST OF EVERGREENS.

BY ABRAHAM KNECHTEL, INSPECTOR OF FOREST
RESERVES.

INTRODUCTORY.

Forest history repeats itself. There is first a period of forest destruction, then comes forest conservation, and lastly, generally too long delayed, forest restoration. Canada is now in the second period—that of conservation. Of course, the periods lap somewhat, and even now forest restoration is receiving considerable attention. Here and there through the country one can already find private plantations, some of them made many years ago. I received, three years ago, from Mr. E. G. Joly de Lotbiniere of Quebec, a section of black walnut tree that had grown to be eight inches in diameter in a plantation made by his father, Sir Henri, eighteen years previously.

Sir Wilfrid Laurier, in an address before the Canadian Forestry Convention, held at Ottawa in January, 1906, urged upon the convention the great necessity of restoring the forests.

In view of the increasing interest in this subject, it may be of some benefit to consider the method by which an evergreen forest is established and managed.

COLLECTING SEED.

The collection of seed is the first step in planting a forest. The seed of evergreens exists in the cones which hang at the tops of the trees. These are gathered about the end of September by men who climb the trees and knock them off. Or, if a lumbering job is conveniently located, as the trees are felled the cones are picked from their tops. The cones, or "burrs" as they are called by the lumbermen, are put into sacks and taken to a dry, open, airy room and spread out in a thin layer on the floor, or better on wide shelves, about three bushels on every sixteen square feet of space.

In every good cone are many seeds, two above nearly every scale. A bushel of cones will yield about a pound of seed when thoroughly cleaned. But when the cones are gathered the seed is imprisoned, for the scales are firmly closed and sealed with pitch. This is the reason why they need to be spread out on shelves. If the weather be dry, and the air passes freely over them and under them, in two or three weeks the pitch becomes brittle, and the scales loosen and open. Of course, the more the cones are moved about with the hand, the sooner will they open.

When the seed is sufficiently loose, it is thrashed out with

a flail. It is separated from the empty cones by shovelling it on to a screen stretched over a box, the screen having three meshes to the inch. As the material is moved about with the hand the seed passes through the screen and is caught in the box beneath, the empty cones remaining on top.

Each seed as it comes from the cone has a wing, by which, when falling from the tree, it is borne by the wind. This is one of Nature's methods of dispersing seed and clothing the earth with vegetation. In handling the seed, however, these wings, which in white pine are about an inch long, are not needed, and are even objectionable. So they are removed by rubbing the seed through a screen which has six meshes to the inch.

The seed is cleaned by putting it through a fanning mill with three screens, the upper one with two meshes to the inch, the middle one with four, and the lower with nine. It is then put away till spring in a cool, dry room free from vermin.

THE NURSERY.

In the spring, as soon as the soil is thoroughly thawed out, a piece of ground is prepared pretty much in the same way as for a vegetable garden. Good sandy loam is suitable soil, and upon this is put two inches of black muck, or other rich soil, and a bushel of fresh hardwood ashes for every fifty square yards of surface. The muck and ashes are thoroughly worked into the soil.

Then beds are made, usually four feet wide and twelve feet long, and a box is put around each, made of boards one and one-half inches thick and eight inches wide, set on edge. The box is placed so that it projects about five inches above the bed, the upper part being bored full of holes with an inch bit, so as to permit a free passage of air over the bed, and yet keep out the birds. Sometimes the box is made with its lower part a board three or four inches wide, and its upper part a frame with screen four or five inches wide stretched over it, the screen having a three-quarter inch mesh.

The surface of the bed is made convex and the soil is raked until it is very fine. Sometimes it is put through a sieve. If the weather is dry, it is watered thoroughly with a watering can. The seed is sown so that the grains will lie about one-fourth inch apart. This will take for each bed three-fourths of a pound of pine seed, or half a pound of spruce. The surface of the soil is then compacted with the back of the spade, and sand is sifted over the bed, just enough to put the seed well out of sight.

Then a screen with half-inch mesh is put over the bed to keep the birds from taking the seed, and over this is put a lath screen made by placing the pieces of lath the width of a lath apart to give the bed shade. Extra lath pieces are also laid



Courtesy of N.Y. State Forest, Fish and Game Commission.]

THE FOREST NURSERY

[Photo by A. KNECHTEL

into the spaces in the screen so that the bed is thoroughly darkened. As soon as the seed germinates, however, these extra pieces are removed, and on cloudy days the lath screen is lifted off entirely, but on bright days during the first summer it is kept on the bed.

The weeds must be kept out of the seed beds, and in the eastern provinces of Canada great care must be given the trees during the first two years lest they damp off. "Damping off," as it is called, is a fungus disease which, on close damp days, seems to rot off the little trees near the surface of the soil. On such days the trees must have constant care. Any device which will throw over the beds a constant current of dry air will save them. In absence of such device, charcoal powdered and heated should be sprinkled over the beds every quarter hour.

A short time before the snow falls the screens and the boxes are removed and the beds covered with burlap laid right down upon the trees. This keeps the trees from being heaved out during the winter. The burlap is removed in the following spring as soon as the danger from heaving is over.

The trees remain in the seed beds for two years. During the second summer the beds need only to be weeded and guarded against "damping off."

In the spring of the third year, as soon as the ground is thoroughly thawed out, the little trees are transplanted into other beds in the nursery. This causes them to throw out many fibrous roots so that later when the tree is set out in the field, its chances for living are very much increased. In transplanting, a spade is thrust under the plants, and they are lifted from the bed. The trees are shaken out very carefully so as not to tear off any of the roots, and are placed immediately in a pail containing thin mud. In handling the trees great care is taken not to permit the roots to become dry, not even for a second. It is astonishing how quickly the fine rootlets will become dry in the sun and wind.

The trees are set in the transplanted beds in rows, four inches apart, the trees placed also four inches apart in the row. A string is stretched along one side of the bed. A board four inches wide, with nicks cut every four inches along one edge, is laid across the bed to space the plants, one end of the board being brought to the string for every row. The soil is dug away from the edge of the board with a trowel, the plants are set opposite the nicks and the trench then filled in. White pine and spruce are left in the nursery until they are four years old. At this age they will be from nine to twelve inches high and will have cost where wages are \$1.75 a day, about \$2.50 per thousand.

The plants are then taken up with a spade, the roots puddled, and the trees packed into baskets or boxes lined with wet burlap and are taken to the planting field. When they arrive

there a trench is dug and the trees are taken from the boxes, dipped into water, and set in the trench in a thin row, tops up, the trench filled in, and the soil tramped thoroughly against the roots. They will stand thus "heeled in" for two weeks without suffering.

In setting them in the field, they are spaced five feet apart each way. This may seem close planting, but it is necessary to have the trees soon grow together, so that they will become tall and slender, lose their lower branches and make timber free of knots. One can easily see the effect of close planting by comparing trees growing in the dense forest with isolated individuals grown in the pasture field. The former have cylindrical trunks, often without branches for a height of eighty or one hundred feet; while the latter have short conical shafts with branches almost to the ground.

In planting, the men work in pairs, one with a grub hoe who makes the holes, the other with a pailful of plants who sets the trees. Two men can plant fourteen hundred trees in a day of eight hours. A force of sixty planters needs two men extra as foremen, two to set stakes over the field so that the men can plant in straight lines, two to carry plants, and one to carry water for the men to drink, and to keep water constantly in the planting pails. A time-keeper is also necessary.

To house these men comfortably on the field, there are needed two cooking tents, each 12 x 14 feet, provided with a range and cooking utensils; two dining tents 14 x 20 feet; six sleeping tents 14 x 20, each one provided with a stove, six spring mattresses, six straw mattresses and thirty-six good blankets; also a small tent for the foreman and time-keeper, furnished with proper bedding. This tent should have a floor as the time-keeper will spend much of his time in it, in keeping his accounts. In the eastern provinces, good board can be furnished the men for fifty cents a day, including the wages of the cook and his assistant.

After the forest is planted, a few trees, of course, die, and it is necessary for a few years to replace these with live ones from the nursery. With this exception the young planted forest needs but little care.

THINNINGS.

But when the forest reaches the age of about twenty years, it needs to be thinned, as the trees will be crowding each other so hard that each will be hindered in its growth—the struggle for existence will have become intense. More than half the stock is taken out in this first thinning. The trees can be used in Canada for Christmas trees. Then about every ten years after this, another thinning must be made. The second thinning may be used for pulpwood, and the third and subsequent ones for



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PLANTING A FOREST

[Photo by A. KNEPTEL

pulpwood and lumber. In these thinnings the poorest trees are taken, all the dead, diseased and crooked being also removed.

THE FINAL CUT.

The trees left for the final cut will remain until they are from eighty to one hundred years old. That is a long time in the life of a man, but in the life of a province or nation it stands close to zero. And that is a reason why forest planting should be done by the State, and not be left to the private citizen. Moreover, because of the long time it takes for the crop of trees to mature, it should be planted now, while we still have timber to tide over the period while the crop is growing. It is a long time to wait for a harvest, but when the time does come for the final cut, there will stand on every acre from 30,000 to 40,000 feet of the finest quality of timber, to say nothing of the thinnings removed, which, in European planted forests, often amount to almost as much as the final cut. The lumbermen of Canada know that the best forest we have in the eastern provinces will not cut more than 20,000 feet per acre. Even the fine Douglas fir of British Columbia will scarcely exceed that figure.

The natural forest has a few acres well stocked with trees, and these are often very poor ones, while many acres are only half stocked, and many are not stocked at all. The cultivated forest has every acre fully stocked with fine trees. Entering such a forest, one walks through it with a continuous leafy canopy over his head. A planted forest serves well all the purposes for which a forest should exist. It furnishes wood, feeds the springs, prevents floods, hinders erosion, shelters from the wind, gives health and recreation, protects the fish and game, and gives the country aesthetic features. And it serves all these purposes better than the natural forest. How much better would the streams be protected if the banks were all clothed with cultivated forests! Now we find, to be sure, the shores of rivers well protected in places, while in other places there are long stretches along the shores wholly unprotected.

The forest lumbered periodically and then left to itself will not restore itself with valuable timber any more than a flower garden will restore itself with beautiful flowers if, periodically, all the finest specimens are taken and the others are left to contend with the weeds. For two hundred years France and Germany hoped thus to have their forests restored, only to meet with disappointment. Canada has fine natural forests, and though she is wisely conserving them, they are still being used with amazing rapidity, and it might be well for us to consider if we had not better get started in time, as Sir Wilfrid suggests, along lines of restoration which European countries were finally forced to follow.

