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Forest Planter's Handbook Michigan 4H Forest Rangers
Michigan State University Cooperative Extension Service
4-H Club Bulletin
R.F. Kroodsma, Extension Forester
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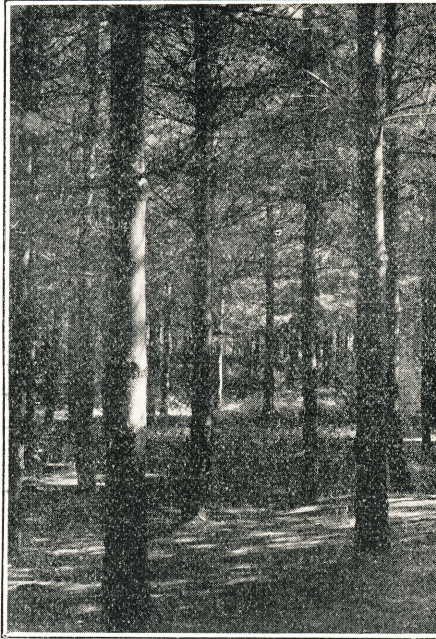
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Club Bulletin No. 19

April, 1929

FOREST PLANTER'S HANDBOOK

Michigan 4-H Forest Rangers



Planted Forest—20 years old.

**BOYS' AND GIRLS' CLUB WORK IN AGRICULTURE
AND HOME ECONOMICS**

**MICHIGAN STATE COLLEGE
Of Agriculture and Applied Science**

EXTENSION DIVISION

R. J. Baldwin, Director

Michigan State College of Agriculture and Applied Science and U. S. Department of Agriculture
co-operating.
Printed and distributed in furtherance of the purposes of the co-operative agricultural extension
work provided for in the Act of Congress, May 8, 1914.

MICHIGAN 4-H FOREST RANGERS

R. F. KROODSMA, EXTENSION FORESTER

FIRST YEAR—FOREST PLANTER

INTRODUCTION

Aim of the first year project:

The aim of the first year's work is to learn how to select forest trees and to plant them in the quickest and most efficient way.

Requirements:

1. Boys or girls between the ages of 12 and 20 are eligible to the rank of Forest Planter.
2. Each Ranger must plant at least 1,000 trees under directions furnished by the extension forester.
3. Each Ranger must exhibit at least four trees in the fall at a local, county, or state fair.
4. A map of the forest plot must be drawn showing the location of the trees with reference to the rest of the farm.
5. A written story and report on blank form must be submitted to the forest supervisor by November 15.
6. 4-H Forest Rangers must attend Ranger Station meetings.

Michigan 4-H Forest Rangers should follow carefully the directions for carrying on the forest planter work as outlined in this handbook.

Reasons for Planting Trees:

The main purpose in growing forest trees is to provide a profitable crop for poor land which otherwise would lie idle, producing only weeds or a poor grade of grass. Almost every farm has on it fields which are not used, because the soil is too poor, or because the land is too hilly, or because they are hard to get at or too far away to work. Such kinds of land should be planted to trees so that in time something useful may be taken off, thus helping pay a share of the taxes.

An acre of trees planted by a 4-H Ranger should produce at least 20,000 board feet in 40 years—enough to build a barn. In addition it will furnish other useful materials for the farm such as posts, poles and fuel before the end of the 40-year period. Farmers use about 50 per cent of all wood products—more than any other class of people; therefore they should be most interested in forest planting.

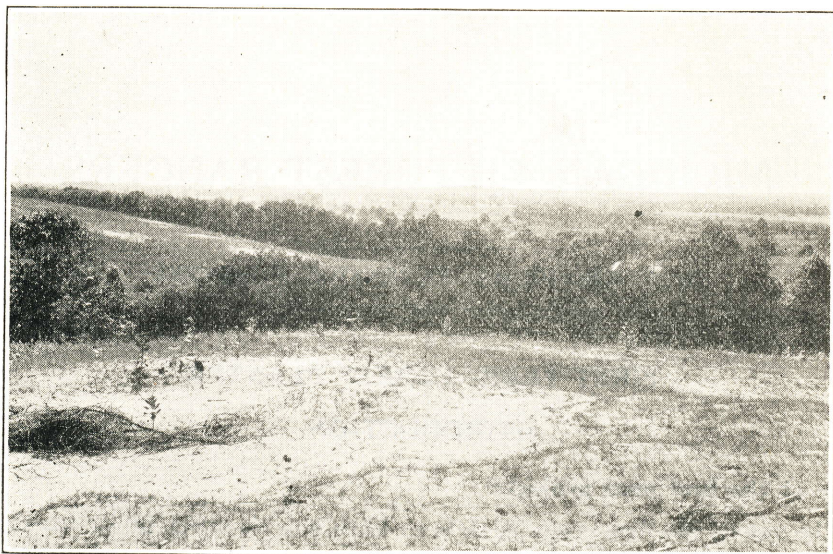


Fig. 1.—Type of field which should be planted to trees.

Besides providing returns from poor land, forests prevent the washing of soil on hilly ground, and afford a protection to bird and animal life.

PLANTING FOREST TREES

PART I

PRELIMINARY PREPARATIONS

Reconnaissance:

Every 4-H Ranger, before actually ordering trees, should first make a careful study of the farm, looking over various possible locations, so that the most suitable place may be selected. After a choice has been made, the soil should then be examined in order to determine the kind of tree to plant.

Selecting the Proper Trees

Species:

There are two groups of trees—evergreens (conifers) and hardwoods (broadleaves). Both groups are used for reforestation but evergreens are usually better and for the following reasons should be used in the majority of plantings.

1. They grow on the poorer soils.
2. They produce more board feet of logs to the acre.
3. They are easier to plant.

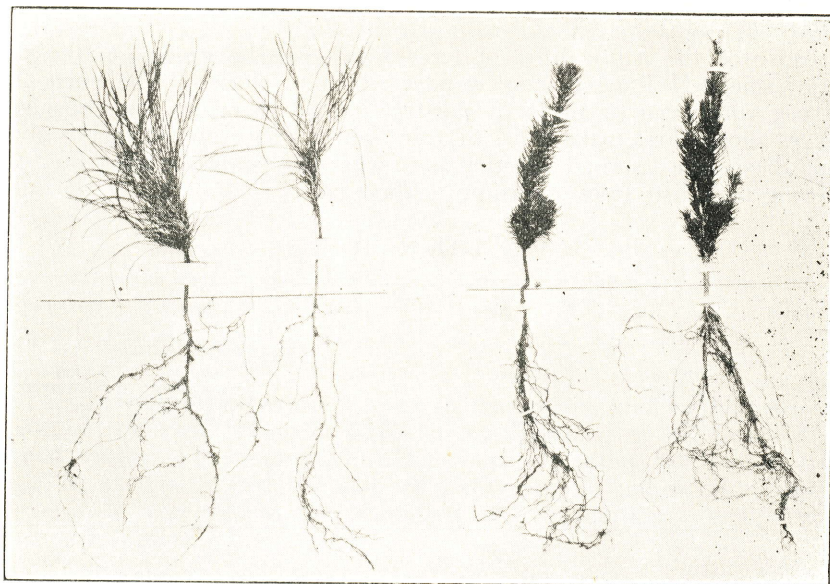


Fig. 2.—Two-year-old seedlings. Left to right: 1 and 2, White Pine; 3 and 4, Norway Spruce.

Size:

Trees come in two sizes: seedlings and transplants. A seedling is a tree which has been grown in a seed bed until it is ready to be shipped for planting. Seedlings are usually one, two, or three years old. Except in the case of hardwoods, which may be planted when one year old, two or three year old seedlings are generally used. These sizes have proved best for general purposes.

A transplant is a tree which is grown in a seed bed and then transplanted to another place where it is left one or two years more. Transplants cost more than seedlings and are used only where planting conditions are very unfavorable, such as in extra heavy sod. Transplants are also best for windbreaks.

The various kinds or species of trees which are planted in Michigan have been arranged in the following table according to the soil in which they grow. Rangers should select from this table the trees best suited to their own particular plot.

Table No. I

Poor soils	Fairly good soils	Good soils	*Wet soils	*Blow soils
Jack pine Red pine Norway spruce Red oak	White pine Red pine Norway spruce White spruce Larch Basswood Elm Red oak	White pine Red pine White spruce Norway spruce Basswood Elm Ash Black walnut Red oak Tulip poplar	Cedar Basswood	Jack pine Red pine Western yellow pine Pitch pine Scotch pine Black locust Cottonwood

*Write the extension forester, Michigan State College, East Lansing, Mich., before planting on this type.

Purpose:

Because of the many different trees which can be grown on the same type of soil, 4-H Rangers may wonder which to choose. The purpose or final use which can be made of the tree should therefore be considered. Rangers should first make a list of trees which will grow on their soil and should then make a second selection as to what they want the trees for. The following table lists trees according to their use.

Table No. II

Lumber	Ties	Posts	Fuel	Pulpwood	Christmas trees
White pine Red pine Norway spruce White ash Tulip poplar Red oak Elm Basswood Walnut	Jack pine Red oak Cedar Elm Larch Walnut	Jack pine Larch Cedar Walnut Black locust	Red oak Elm Ash Jack pine Red pine White pine	White spruce Norway spruce White pine Jack pine	Norway spruce White spruce

Deciding the Kind of Stand**Pure:**

There are two kinds of forests—pure and mixed. A pure forest is one made up of one kind of tree. A mixed forest consists of more than one kind of tree.

Mixed:

Nature usually grows several kinds of trees together, and it has been found that for many reasons this kind of stand is best. Rangers should therefore try to plant, if possible, a mixed forest. Very often a temporary tree is planted in mixture with a permanent one. Then in a few years time the temporary trees are cut and made use of, leaving the others to grow into large-sized trees. For example, white pine and Norway spruce can be planted together with the idea of taking the spruce out for Christmas trees a little later. Other combinations are as follows:

White pine—lumber
White spruce—pulpwood

White pine—lumber
Red pine—lumber

White spruce—pulpwood
Norway spruce—pulpwood, Christmas trees

Jack pine—pulpwood, posts
Norway pine—lumber

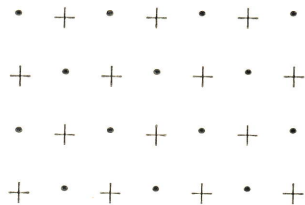
White ash—lumber
Basswood—lumber
Elm—lumber
Walnut—posts

White ash—lumber
White pine—lumber

White pine—lumber
Red pine—lumber
Norway spruce—Christmas trees

If in doubt as to a proper combination, write to the extension forester.

When two or more kinds of trees are planted together, the following method of spacing should be used:



• pine + spruce

This spacing arrangement is used so that if one kind of tree were to be removed for some reason or other, an even spacing of the remaining trees would result. For example, in a pine-spruce planting, it may be desirable in 20 years time to take out and sell the spruce for pulpwood. This would bring in a return from the plantation and in addition would benefit the trees which were left.

Spacing Distance:

Rangers, before ordering, will also have to decide as to the distance apart that they will set their trees. The following spacing table will give an idea as to the number of trees which can be planted on one acre:

Table No. III

Feet apart	No. of trees	Feet apart	No. of trees
3 x 3.....	4,840	6 x 7.....	1,037
4 x 4.....	2,722	7 x 7.....	881
5 x 5.....	1,742	8 x 8.....	680
6 x 6.....	1,210	9 x 9.....	537
6½ x 6½.....	1,031	10 x 10.....	435

There are no definite rules as to spacing distance. It has been found by experience in Michigan that about 1,000 trees per acre gives good results. Close spacing causes competition for light and the trees grow tall, straight, and free from lower branches. The wider spacings should be avoided except where temporary trees are interplanted. For example, a mixed forest of trees may be desired for lumber purposes. White and red pine can be used with a spacing of 6½ x 6½, or 6 x 7. This will take about 1,000 trees per acre. If, however, a temporary tree is also desired, a spacing of 8 x 8 can be selected for the permanent trees, which will require 340 red pines and 340 white pines. Spruce for Christmas trees can be interplanted to give a spacing of 4 x 4 feet for all trees. According to the table, an acre of 4 x 4 feet spacing requires 2,722 trees. Since 680 of these are to be permanent, it would be necessary to secure 2,042 spruce trees for "fillers."

Ordering Trees

Where Trees can be Procured:

Trees for forest planting can be secured from three sources:

1. The Forestry Department, Michigan State College, East Lansing, Michigan.
2. The State Department of Conservation, Lansing, Michigan.
3. Private nurseries.

It is advisable to order trees from either the State Department of Conservation or the State College. If unable to get stock from either of these two sources, 4-H Rangers should write the extension forester for further information.

How to Order:

Order blanks can be obtained from the forest supervisor, the district forester, or the extension forester. Each Ranger will be able to figure from Tables I, II, and III, the trees required for his plot. The numbers wanted should be entered on the order blank which is then turned in to the district forester.

PART II

PLANTING OPERATIONS

Care of Trees on Arrival:

Trees which have been ordered by Ranger Stations will be shipped from the nursery as soon as the ground thaws out. This is usually during the month of April. Ranger Stations in the northern part of the State and the Upper Peninsula will receive their stock in May.

Trees are usually tied up in bundles of 100 and the roots all carefully packed in wet sphagnum moss so that they will not dry out while being shipped. They are shipped from the nursery in boxes, crates or burlap bales. Rangers should secure their trees as quickly as possible after the shipment for their Station has arrived. The seedlings should then be taken immediately to the field where they are to be planted and heeled in, selecting a place which will be convenient.

For heeling in trees, a shallow "V" shaped trench having one side sloping more than the other should be dug. (See Figure 3.) The dirt is generally piled on the high side of the trench so that it will be handy when needed. The string should next be cut from a bundle of trees and the roots spread out slightly in the trench, tops sticking out on the low side. After all of the bundles have been taken care of in this way, the shovel is used to scrape the dirt back into the trench. The roots should be packed thoroughly, tramping with the feet afterwards to close air spaces.

Preparations for Planting:

Trees are different from other crops in that no special fitting of the soil, such as deep plowing and harrowing, is necessary. This has been proved in Michigan on thousands of acres.

In order to make planting easier, however, Rangers should plow very

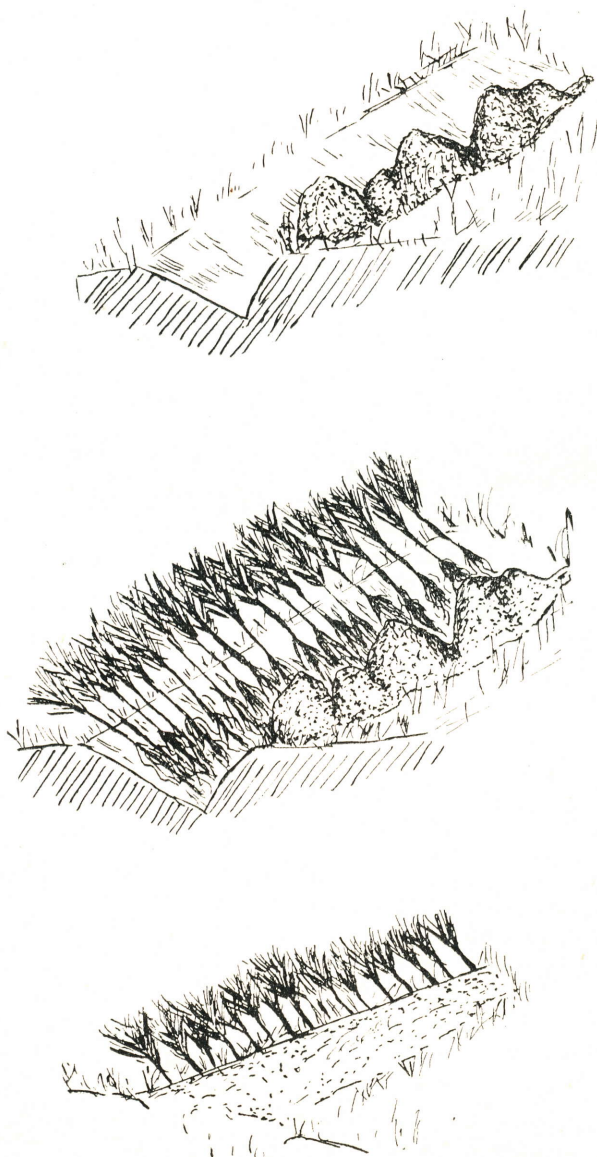


Fig. 3.—Top—Trench dug to receive trees. Center—Seedlings placed in trench. Bottom—Roots covered, tops sticking out.

shallow furrows where the rows are to be placed. Besides serving as a guide, these furrows (1) keep grass and weeds away from the little tree for at least two years, and (2) serve to collect and hold moisture.

If the rows are to be six feet apart, for example, a furrow two or three inches deep is struck across the field. Upon reaching the other side an offset of six feet is taken and the back trip is made. This is continued back and forth until the entire plot has been lined out. Rangers should be very careful in preparing a hilly site *not to plow down but around the hill*. Furrows which run down hill will cause bad washing.



Fig. 4.—Field in Barry county furrowed for trees.

Planting

Methods:

Two methods of planting forest trees are in common use today. They are by means of (a) the grub hoe or mattock and (b) the spade or shovel. The grub hoe or mattock is not advisable for most Michigan conditions. It is a heavy tool and suitable only where the ground is stony or very heavy.

The advantage of the spade or shovel, aside from being readily obtainable, is that it is an easy tool to handle. Mattock planting is best done by two people while the shovel planting requires only one.

Tools Needed:

Rangers who are ready to set their trees should have available the following tools:

1. Spade, shovel, or mattock.
2. Pail for carrying trees.
3. A measuring stick.
4. Four sharpened guide stakes six feet long. (Necessary only where there are no furrows.)

The fastest working tool is the short-handled, round-pointed shovel or the ditching spade. It must be strong enough not to bend and sharp enough to enter the soil easily.

The measuring stick should equal in length the spacing which will be used.

The pail should be tight enough so that water to moisten the tree roots can be carried in the bottom.

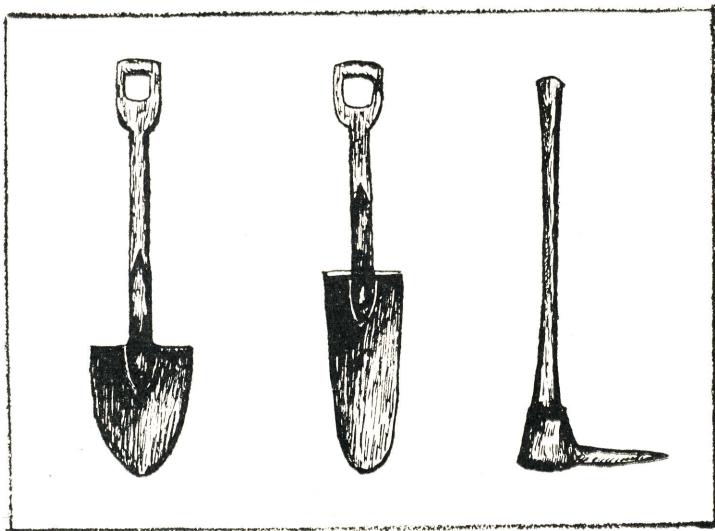


Fig. 5.—Planting tools. Left to right: Round pointed shovel, ditching spade, and mattock.

Planting Instructions:

Furrow Method:

First: From the "heeling in" trench take a bundle of trees and place in the pail, putting in just enough water to keep the roots moist.

Second: Stand in the furrow and holding the shovel *sideways* or *opposite* to the way it is ordinarily used, and strike it into the soil, using the foot if necessary.

Third: Move the shovel slightly back and forth so that a wedge-shaped slit is made in the soil.

Fourth: Take *one* tree out of the pail and place it *back* of the shovel, making sure that the roots go straight down to the same depth they were planted before. This is very important because it is the lower one-third of the roots that keep the plant alive in very dry weather.

Fifth: Remove the shovel so as not to disturb the roots and thrust into the ground again a few inches from the tree, bearing down slightly so as to pack the dirt around the bottom of the roots. Withdraw the shovel once more and firm around the seedling with the foot.

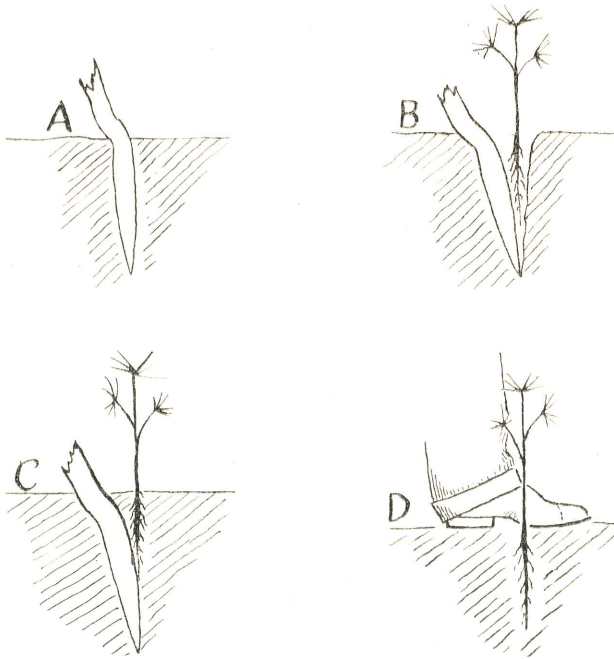


Fig. 6.—Setting seedlings. (a) Strike shovel into soil. (b) Set trees after slit has been made by moving shovel. (c) Pack roots by inserting shovel and crowding dirt over. (d) Firm with foot.

The same principles apply when using the mattock. To make a slit with this tool, it is necessary to strike into the soil, then to raise the handle and twist slightly at the same time. This forms an opening at one end of the blade in which to set the tree. After the tree has been set, the mattock is withdrawn and the soil firmed with the foot.

After setting the tree in the middle of the furrow, Rangers should use the measuring stick in order to locate the spot for the next tree. After measuring 10 or 20 trees in this manner, the distance can be measured by pacing. In moving down the furrow, it will be most convenient to carry the pail in the left hand, setting it down close by while the slit is being made.

Chipping:

Chipping is used in the absence of plowed furrows. The only difference in this method is that a place about the size of a dinner plate must be made in which to make the slit. This is done by holding the shovel in the usual way and using it to chip or peel off a slice of sod. After this, the procedure is exactly the same as in the furrow method. With the mattock as a planting tool, the sod can be removed by using it as a hoe.

The chipping method requires guide stakes, because there are no furrows to use as lines. Two guide stakes should be used for each line of trees, setting them up at the far end of the line. One stake should be placed at the end of the row and the second about 50 to 75 feet from the end in the same line. A handkerchief tied around each stake will make it easier to see.

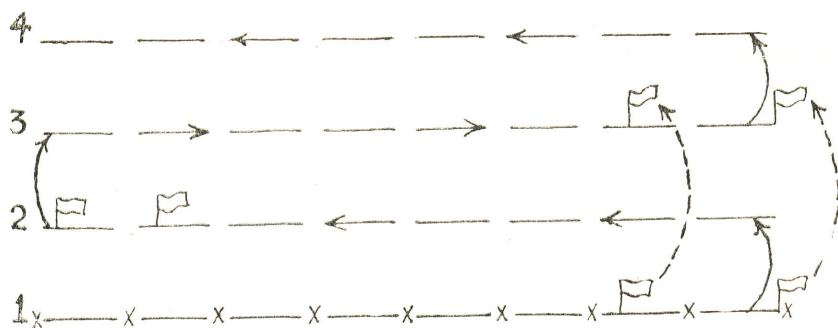


Fig. 7.—Method of lining and spacing trees. Row 1 has been planted and flags moved to row 3. Dotted arrows show placing of flags and solid arrows show directions of planting. Short, curved arrows between rows 1 and 2, 2 and 3, and 3 and 4 indicate the direction which should be taken by the planter. (Courtesy Cornell Extension Service.)

The second pair of stakes should be set up in the same manner, but at the opposite end of the next row. (See Figure 7.) After planting trees up to the stakes they are moved over two rows. The measuring stick should be used to determine distances between rows.

Testing the Work:

To determine whether or not seedlings are being properly planted, they should be tested occasionally. This is done by grasping the little tree and giving a slight pull. If the seedling remains firm, the work is being well done; if it loosens, more care should be taken to pack the soil.

Rate of Planting:

Rangers should be able to set about 1,000 trees a day when using the plowed furrow method. Five or six hundred trees a day can be planted the other way.



Fig. 8.—4-H Rangers planting trees, Kent Ranger district.

Care of Plantation:

Forest trees are one of the best crops to plant because they need very little, if any, care after they are once started. They will need protection, however, and Rangers should therefore take the following precautions: First, they must be sure that fire cannot burn over the ground where the trees are planted, because even a small grass fire will destroy the seedlings. Second, they must be sure that cattle are kept out of the forest plot. Animals destroy trees by browsing and trampling the tender shoots. Third, white pine is subject to a disease called white pine blister rust which spends part of its life on currants and gooseberries. For this reason currant and gooseberry bushes should be removed from around the plot for a distance of 300 yards so that there will be no danger from this disease.

PART III

RECORDS—EXHIBITS—RANGER STATION MEETINGS

Records:

Suggestions for keeping records:

“It is a good thing to begin well, but better to end well.”

1. The 4-H Forest Ranger report is a business account of the project work. Rangers should try to have it as accurate and neat as possible.
2. Answers should be put down for *all* of the blank spaces.
3. Rangers will notice in looking over the report sheet that many of the blanks can be filled out immediately.
4. Under question 11, give average heights for each kind of tree planted.
5. If the forestry plot is not on the farm, show on the map its location with reference to a highway.

Basis of Award:

1.	4-H Rangers Forest Plot		
	a. Number of living trees	50%	
	b. Location and arrangement	15%	
	c. General appearance	10%	
		75%	
2.	4-H Rangers Report		15%
3.	4-H Rangers Story		10%
		100%	

Exhibits:

All Michigan 4-H Forest Rangers who comply with the exhibit requirements of the Forest Planter project will have a share in the small forest which will result. A display of trees at the fair will be very attractive in itself and may be used to set off other 4-H projects.

Purpose:

Such an exhibit is held for the purpose of showing the community what has been accomplished during the year. It may also be the means of getting someone else to do some forest planting.

In order to make the exhibit as attractive as possible, rangers should try to have, of the same size, all of the pots or containers in which trees are to be planted. It is a good idea to have a committee from the Ranger Station appointed to look after this.

Potting the Trees:

The best way to pot the trees is to take the containers to the forest plot. A trowel makes the best tool to use for digging. After selecting four of the best trees, dig them up carefully one at a time, using the trowel to loosen all of the roots. The tree should then be held in the center of the pot and fresh dirt again filled in, firming at the same time so as to prevent air spaces. Flower pots about six inches deep make good containers in which to plant the trees. These can be obtained from greenhouses for a cent to two cents apiece. Tomato cans of about the same size may also be used but in order to have them look well, they should be covered afterwards with crepe paper.

Display Card:

Each exhibit should be accompanied by a large card stating where the trees were grown and who is putting on the display. The following example may serve as a suggestion:

FOREST PLANTATION
grown by
MICHIGAN 4-H FOREST RANGERS
Cedar Springs Ranger Station
KENT RANGER DISTRICT

Ranger Station Meetings:**Frequency:**

Ranger Station meetings should be held once a month in order to make a study of and receive as much benefit as possible from the project.

Divisions:

All Ranger Station meetings should be divided into three parts or sections:

- A. Business meeting.
- B. Discussion relating to Forest Planter project
- C. Social hour.

A. Business meeting:

1. Roll call.
2. Reading of minutes of last meeting.
3. Reports of committees.
4. Old or unfinished business.
5. Discussion of any social or business event the club may wish to hold.
6. Appointment of committees.
7. Short, appropriate program.

B. Discussion of Forest Planter project:

This may include any phase of this project including the additional activities as suggested in the general outline.

C. Social Hour:

Games, songs, and light refreshments if desired. Plan to hold a special event during the summer such as a hike to a point of forestry interest. A camp fire meeting is also enjoyable in the summer.

Program Suggestions for Ranger Station Meetings:

A. For roll call answer with:

1. Location of your forest plot.
2. Length of time it took to plant.
3. Per cent of stand you have thus far.
4. A quotation about trees.
5. The most important use for trees you know of.
6. A tree which grows in the swamp.
7. A tree which grows near your home.

Note:—Either the chief forester or the chairman of the program committee should announce which of these suggestions will be used at the next meeting.

B. Talks (by 4-H Rangers or others):

1. How to plant forest trees.
2. Care of trees in planting.
3. How to tell the height of a tree.
4. How to tell the age of a tree.
5. How to identify a certain tree.
6. Our original and present forests.
7. Where our forests have gone.
8. What is happening to our forests.

Note:—Other topics together with printed reference material can be obtained from the extension forester.

Suggested Outline for Ranger Station Meetings:

First meeting (organization):

Elect officers according to the general outline.
Appoint committees such as exhibit committee, program committee, membership committee.

MICHIGAN 4-H FOREST RANGERS REPORT RECORD

FOREST PLANTER PROJECT

Name of Ranger Age

P. O. Address

Name of Ranger Station

Ranger District

Forest Supervisor

District Forester

Basis of Award:

1. 4-H Rangers forest plot		
a. Number of living trees	50%	
b. Location and arrangement	15%	
c. General appearance	10%	
		75%
2. 4-H Rangers report		15%
3. 4-H Rangers story		10%
		100%

“It is a good thing to begin well, but better to end well.”

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FOREST PLOT RECORD

Description Record

1. Size of plot: Length..... Width.....
No. of square feet..... Fraction of acre.....
2. Soil: Poor, Fair, Good
3. Topography: Level, Rolling, Hilly
4. Previous use of Land

Planting Record

5. No. of trees planted
6. Kinds of trees planted
7. Date of planting..... Date of first rain.....
8. Method: (a) Furrows or chipping.....
(b) Tool used.....
9. Spacing

INSPECTION RECORD

Forest plot should be inspected July 1, Aug. 1, and September 1.

10. Per cent of live trees, July 1,, Aug. 1,, Sept. 1,.....
11. Average height Sept. 1.....
.....
.....
12. Which kind of tree did best?

COST RECORD

Note:—In determining costs, use rates common in your Ranger District.

1. Rent of land (figure at \$5 per acre)
 2. Cost of furrowing plot
 3. Cost of trees
 4. Cost of planting
- Total cost

MAP

In the space below draw a neat map, showing location of your plot in relation to farm buildings.

STORY

Write the story of your forestry project in the space below.
Suggestions for the story:

1. Why did you take up this project?
 2. Why did you select the trees you did?
 3. Did you have any difficulties?
 4. Tell how you carried on the work.
 5. Tell something about ranger station meetings and anything extra you did.
 6. A picture of your forest plot will add a great deal to this report.
-

Second meeting :

Attend planting demonstration and get allotment of trees.

Third meeting :

Arbor Day program, select topics from list given in hand book, have Arbor Day songs and poems.

Fourth meeting :

Select a forestry topic. Have rangers bring to meeting for discussion, maps of their plot (not on report blank). Rangers will in this way get ideas as to how maps should be drawn for the record blank.

Fifth meeting :

Campfire, forestry hike or club camp. Paul Bunyan story.

Sixth meeting :

Report of exhibit committee with discussion. Forestry talk. Have a talk on activities during previous month. Paul Bunyan story.

Seventh meeting :

Demonstration of potting trees to exhibit. Discussion of filling out record blanks. Forestry topic.

Eighth meeting :

Forestry tour of Ranger District.
Finish up records.