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FOREST TREE PLANTING

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

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FOREST TREE PLANTING

Apr 23-

WHEN TO PLANT
WHERE TO PLANT
WHAT TO PLANT
HOW TO PLANT

By

John W. Keller,

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BULLETIN 28

PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT Y. STUART, Commissioner

1922

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INTRODUCTION

THERE are 13,000,000 acres of timberland in Pennsylvania. A large part of this area is not producing what it can and should. If fires are kept out, many acres of it will come back with a satisfactory growth of trees, but there are 3,000,000 acres that are absolutely idle and should be planted with trees at once. Without planting, it will require half a century for this idle land to be satisfactorily restocked with trees, and in this time the area is capable of producing enough timber to supply the entire State of Pennsylvania for twenty years at the present rate of consumption.

Wood is vitally essential to our people, and the rapidly growing industries of our State. None of us can get along without it. The country dweller can get along with less than the city dweller because it not only takes wood to grow food but, after it has grown, it must be packed in wooden boxes or barrels and transported in wooden cars or wagons before the city man can eat it. The lack of wood will mean physical and industrial decay to our own strong and properous commonwealth.

The State of Pennsylvania recognizes its responsibility in making every acre of idle forest land produce and will gladly supply you, free of charge, with trees for reforestation.

Forest tree planting methods that have been tried and are successful are discussed on the following pages.



FOREST TREE PLANTING

WHEN TO PLANT

FOREST tree seedlings should be planted in the spring after the frost has come out of the ground and before the new growth has started, or, in the fall before the ground is frozen. Whenever possible, planting should be done during the spring because the trees will begin to grow at once, and usually more of them succeed.

If labor is not available in the spring, planting in the fall can be undertaken with reasonable assurance of success under the following conditions:

First, when the soil is not heavy clay and the danger from heaving will be slight.

Second, when the area is not a "frost pocket," i. e., subject to severe frosts.

Third, when the planting site has a northern exposure and the frost leaves the ground late in spring.

Fourth, when the trees to be planted start to grow early in spring, such as American larch, European larch, Japanese larch and wild black cherry.

One tree-planting enthusiast wrote:

"I am planting for timber. It is better than bonds."

WHERE TO PLANT

IDLE lands that are not needed for, or not adapted to, agricultural or other more important uses, should be planted with forest trees. These lands usually come within one of the following classes:

Class 1. Cleared lands, such as abandoned fields and worn out pastures, eroding banks, slopes and gulleys, odd and unused corners about the farm, along highways and water ways.

Class 2. Worn out farm woodlots which are growing up with undesirable trees or do not support a satisfactory stand of valuable young growth.

Class 3. Areas on which a windbreak is needed to protect buildings, live stock, orchards and crops.

Class 4. Burned over areas covered with bracken, sweet fern, aspen and fire cherry upon which small seedlings of desirable trees are not coming in naturally.

Class 5. Scrub oak barrens on which growth of oak, chestnut or other valuable trees are not present in sufficient quantities to insure a satisfactory forest crop. These areas should be planted immediately after the fire has killed the scrub oak sprouts. If planting is done under sprout growth the planted trees will often be killed by the dense shade.

Class 6. Areas upon which the chestnut has been killed by the Chestnut Blight and a satisfactory stand of other valuable forest trees has not come in.

More than 34 million trees have been planted on State Forests during the last twenty-one years. The plantations now cover 22,500 acres.

COST OF PLANTING

A PLANTING crew of two men can usually set out from 1,200 to 1,600 trees in a ten hour day. If the trees are obtained from the Pennsylvania Department of Forestry the packing charges at the nursery will amount to approximately 75 cents per thousand trees, and the transportation charges will cost about 35 cents per thousand trees. Under average conditions the total cost of planting an acre with forest tree seedlings should not be more than \$12.00.

WHAT TO PLANT

IT is best to plant trees that grow naturally in a locality. These trees will usually thrive under similar conditions when properly transplanted. Large plantations of foreign trees should not be made unless experiments have proven that they will thrive in the places where they are to be set out. Thirty years of experience in planting European and Japanese larches, Norway spruce and Scotch pine in this State indicates that these trees can be planted on properly selected sites with reasonable assurance of success.

More evergreens will be planted than hardwoods, because they are more easily transplanted. They usually grow faster, are more attractive, produce a larger amount of lumber per acre, and their wood can be used for general purposes and is in large demand. Nevertheless, the wood of walnut, ash and oak is so valuable for special uses that planting of them is recommended on moist, fertile soils which are not more valuable for agricultural or other uses.

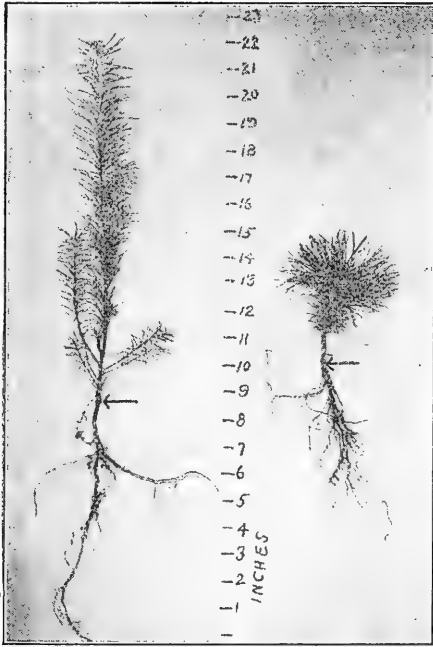
The most important factors in determining the kind of trees to plant are soil and moisture. The greatest care should be used in selecting the kind of trees that will thrive under the conditions existing on the proposed planting site. Any of the trees listed in this bulletin are recommended for planting in Pennsylvania.

AGE AND SIZE OF PLANTING STOCK

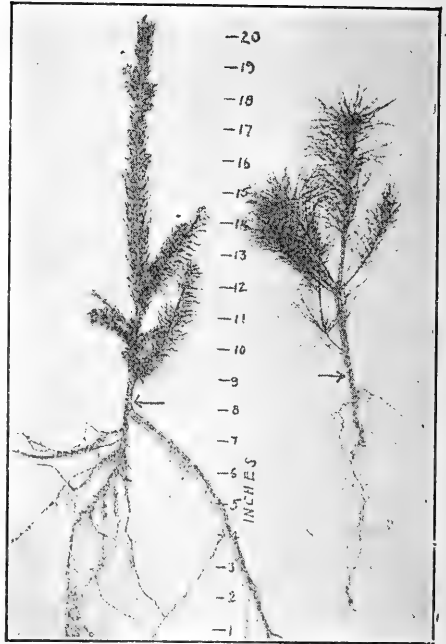
THE age and size of the planting stock depends largely upon the condition of the planting site. If no heavy sod, dense weeds, or sprouts grow on the area, trees from 4 to 8 inches in height may be planted. This will result in the largest number of living trees at the lowest planting cost. The larger the planting stock the greater will be the cost of planting, and the harder it will be to get the trees to grow. Consequently small planting stock should be used unless there is good reason for doing otherwise.

As a general rule, trees of the following ages are the right size for the usual planting site in Pennsylvania:

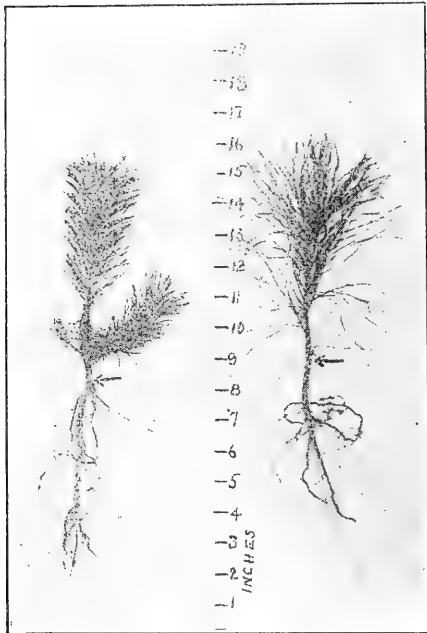
White pine	2 or 3 yrs.	Walnut	1 yr.
Pitch pine	2 yrs.	Ash	1 yr.
Red pine	2 or 3 yrs.	Black locust	1 yr.
Norway spruce	3 or 4 yrs.	Red oak	1 yr.
Larch (Japanese or European)	2 yrs.	Sugar maple	1 yr.



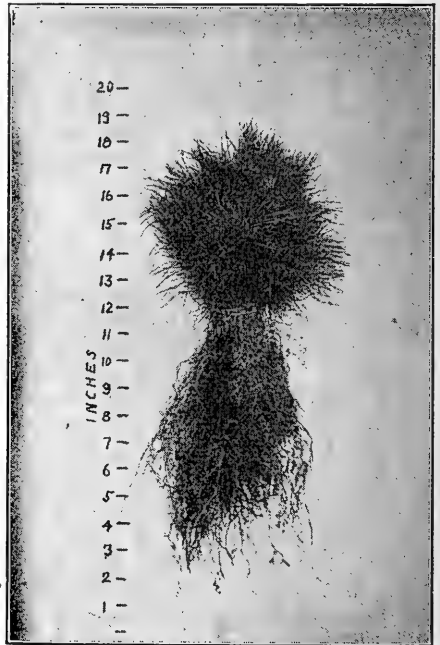
Japanese larch (left) and white pine (right), two years old.



Norway spruce (left) and white pine (right), three years old.



Pitch pine (left) and Scotch pine (right), two years old.



A bunch of 50 white pine seedlings, two years old, ready for packing and shipping.

HOW TO PLANT

IMMEDIATELY upon receipt, the trees should be taken to the place where they are to be planted. If they cannot be set out the same day they should be "heeled in." For this purpose select a place in well-drained soil which is not stony and where water is available. An open trench should be dug with one side almost vertical. Take bunches of trees from the shipping boxes and wet the roots thoroughly. Then cut the strings and place the trees upright in a thin layer against the vertical side of the trench. A bunch of trees should be spread over about six inches in the trench. Fine soil should be placed against the roots and lower part of the stems, and firmed with the foot.



Trees should be "heeled-in" if they cannot be planted the day they are received.

Fourteen additional forest tree nurseries were started in 1921 and 1922 at State institutions. The seedlings grown in those nurseries will be distributed free by the Pennsylvania Department of Forestry.

THE PLANTING OPERATION

THE roots must be kept moist at all times. If they are allowed to dry out the tree may die. Two persons make a good planting crew, a mattock man to dig the holes and a planter to set the trees. Dig the holes in rows. The distance between rows, and also the distance between trees in each row, is usually five to six feet. The spacing will depend upon the kind of trees used, the quality of soil, and on what is now growing on the area.

Where the ground is not stony nor the sod heavy, one stroke with the mattock will usually make a hole large enough to plant a 2-year-old seedling. The hole should be big enough to let the roots spread. Loose dirt is carefully drawn to the edge of the hole where it can be easily reached by the planter. If the sod is heavy at least one square foot should be turned back with the mattock, and a hole made in the loose earth.

The planter with a supply of trees in a pail follows the mattock man. The pail should contain about an inch of water to keep the roots moist. Holding a tree in his left hand the planter sets it in the hole as deep as it was in the nursery, as shown by the "collar" on the seedling. The roots should be spread out and loose earth pressed over and around them with the right hand. The remaining loose dirt is then drawn into the hole and packed firmly with a mallet, a stone, or the heel of the shoe. No grass, leaves, or stones should come in contact with the roots. When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

An annual demand for 20,000,000 forest trees and for 15,000 shade and ornamental trees is expected by the Department of Forestry officials by 1925.



Two persons make a planting crew, a mattock man to dig the holes and a planter to set the trees. Carry the trees in a bucket so that the roots may be kept moist at all times.



One stroke with the mattock will make a hole large enough to plant a tree. If the sod is heavy one square foot should be turned back with the mattock and a hole made in loose dirt.



Loose dirt, carefully drawn to the edge of the hole, can be easily reached by the planter.



With his left hand, the planter sets the tree in a hole as deep as it was in the nursery. The roots should be spread out and loose earth pressed around them.



Loose dirt is packed firmly around the roots with the heel of the shoe.



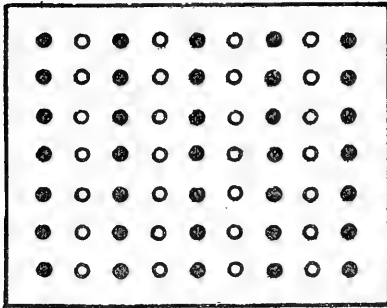
A stone is very effective in packing the dirt tightly around the roots.



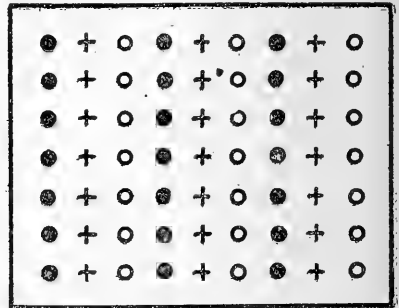
When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

PROTECTIVE MEASURES

AS a rule each destructive insect or disease attacks trees of one species only. Nearby trees of other species may not be affected. The chestnut blight attacks only the chestnut, the white pine weevil attacks chiefly the white pine and the locust borer works wholly in the black locust. To guard against loss from insect attacks or diseases, areas larger than an acre should be planted with a mixture of two or more kinds of trees that have the same needs for soil and light and the same rate of growth. This can most easily be done by alternate rows, as shown in illustration below:



Using two species



Using three species

ALTERNATING BY ROWS.

When white pine is planted all cultivated or wild currant and gooseberry bushes growing within 900 feet should be destroyed. The best way is to pull them up by the roots and hang the plants on nearby trees or brush so that they cannot take root again. This is to guard against the Blister Rust, a fungus disease that kills white pines. The Blister Rust cannot spread from pine to pine but must spend a part of its life on the under side of current and gooseberry leaves, from which spores spread to the pines and cause the rust.

Live stock will eat the leaves and tender twigs of hardwood seedlings and root up, break and tramp down small evergreens. No plantation can succeed when animals are allowed to graze over or root up the planted site.



Livestock will eat the leaves and tender twigs of hardwood seedlings and root up, break, and tramp down small evergreens.

PROTECTION AGAINST FIRE

FOREST fires have devastated more than one-third of the forest area of Pennsylvania. Even a very light burning will kill small trees. Hence, fires must be kept out. On a farm this danger is usually slight, and little need be done except, possibly, the posting of a few forest fire notices. When a plantation is made near large wooded areas where fires are likely to occur, or if the plantation is large and destruction would involve heavy loss, special precautions should be taken. In addition to posting fire warnings, this can best be done by cutting fire lines or by putting on a patrol during dry seasons.

During the last thirteen years, private planters have received from the Pennsylvania Department of Forestry 18,-250,000 young forest trees which were set out in all parts of the State.

GROWTH TO BE EXPECTED

THE following tabulation gives a summary of the number of years that will be required to mature some of our most important forest trees on sites best adapted to each of them. The most common uses of the wood produced by these trees are also listed:

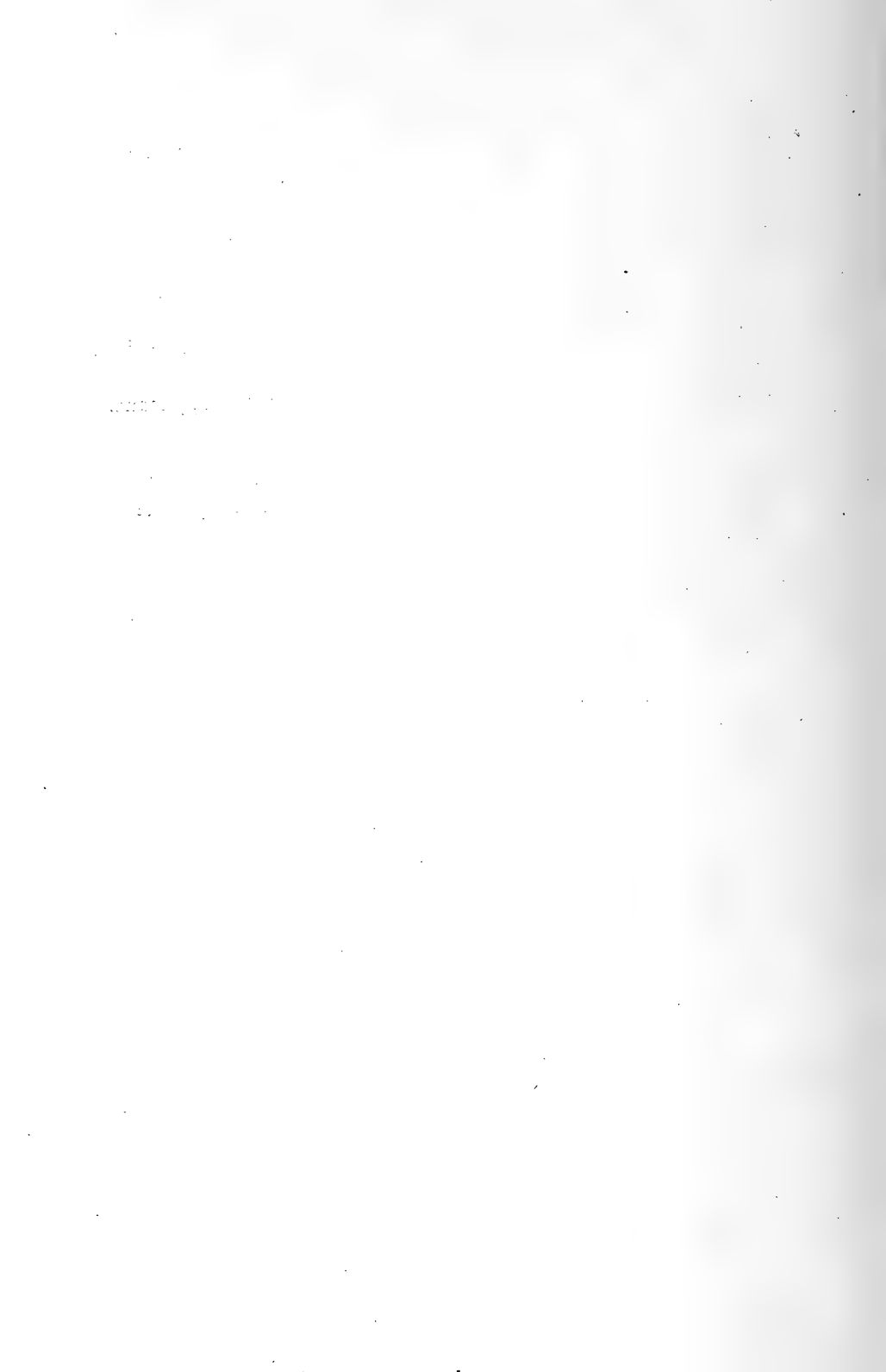
Kind	Where To Plant	Years To Mature On Best Sites	Uses of Wood
Carolina poplar	Moist fertile soil	25	Pulp, crates.
Black locust	Dry sterile soil to fertile loam	30	Posts, ties, insulator pins.
White ash	Rich moist soil	50	Implements, furniture, handles.
Red oak	Loam to sand or gravelly soil	75	Furniture, interior finishing, ties.
Black walnut	Rich, moist bottom lands	60	Furniture, gun stocks, veneer.
Sugar maple	Deep fertile soil to rocky hills	75	Furniture, interior finishing (maple sugar).
Larch (European or Japanese)	Well-drained medium fertile soil	40	Poles, posts, ties, mine timbers.
Pitch pine	Medium fertile soil to dry slopes	60	Construction timber, mine props, ties.
White pine	Fertile well-drained soil to gravelly hillsides	50	Lumber, wooden ware, excelsior.
Red pine	Deep loam to dry sand and gravel	60	Construction timber and lumber.
Norway spruce	Deep moist to thin cold soils (will not thrive in wet locations).	75	Construction lumber, pulp, thinning for Christmas trees in 8 years.

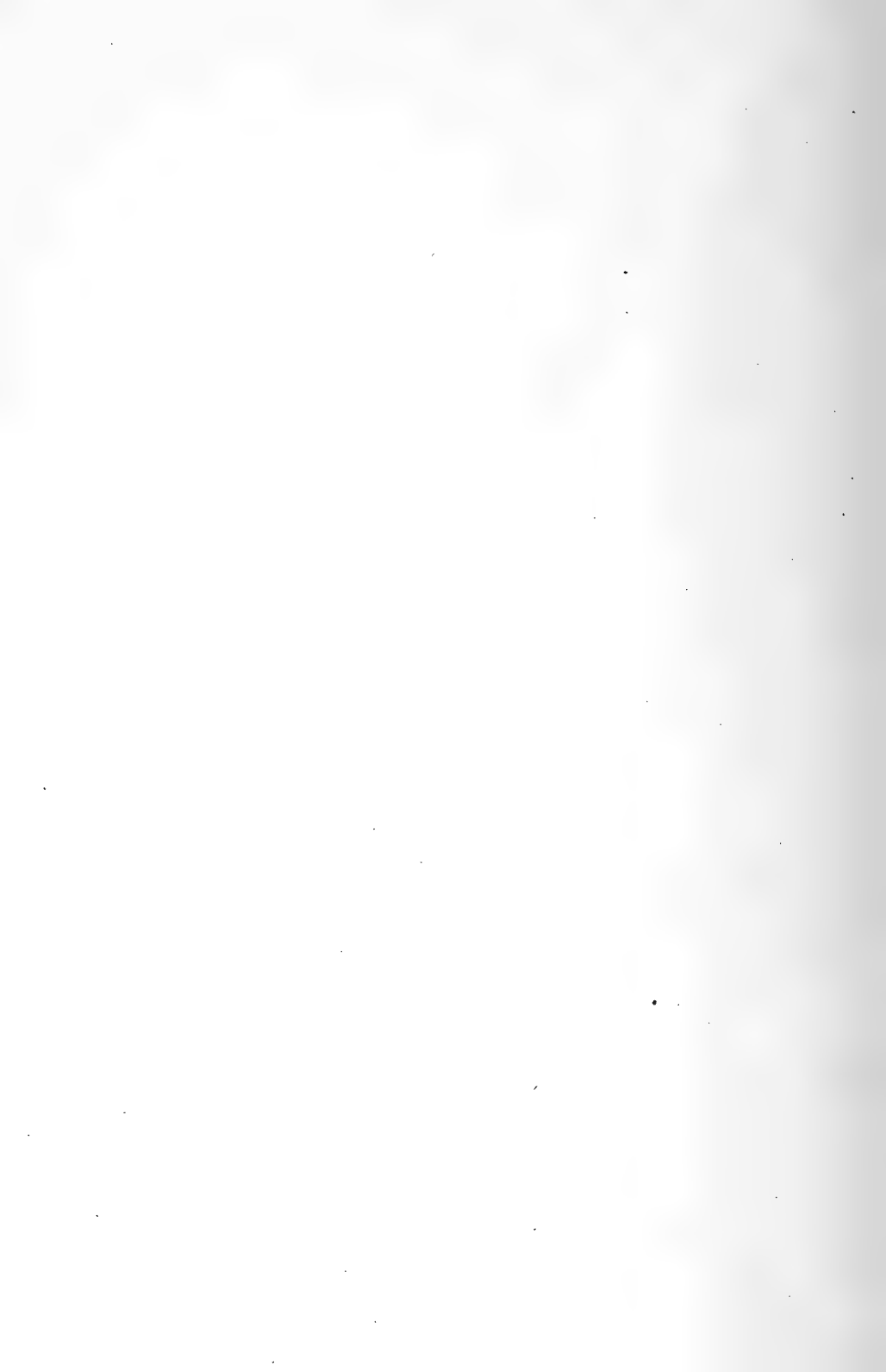
PLANTING STOCK

TREES for reforestation are distributed by the Pennsylvania Department of Forestry under the following conditions:

1. They must be planted in Pennsylvania.
2. They must be planted by the applicant or his representative, and may not be offered for sale or be sold.
3. They should be set out in accordance with the best and most practical modern methods.
4. The planted trees must be protected, as far as possible, from fire, grazing, trespass, and other destructive agents.
5. Fewer than 100 trees cannot be furnished to one applicant.

In the spring of 1922, the Pennsylvania Department of Forestry gave without cost 3,500,000 trees to 1,200 private planters in this State.







PREVENT FOREST FIRES—IT PAYS

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