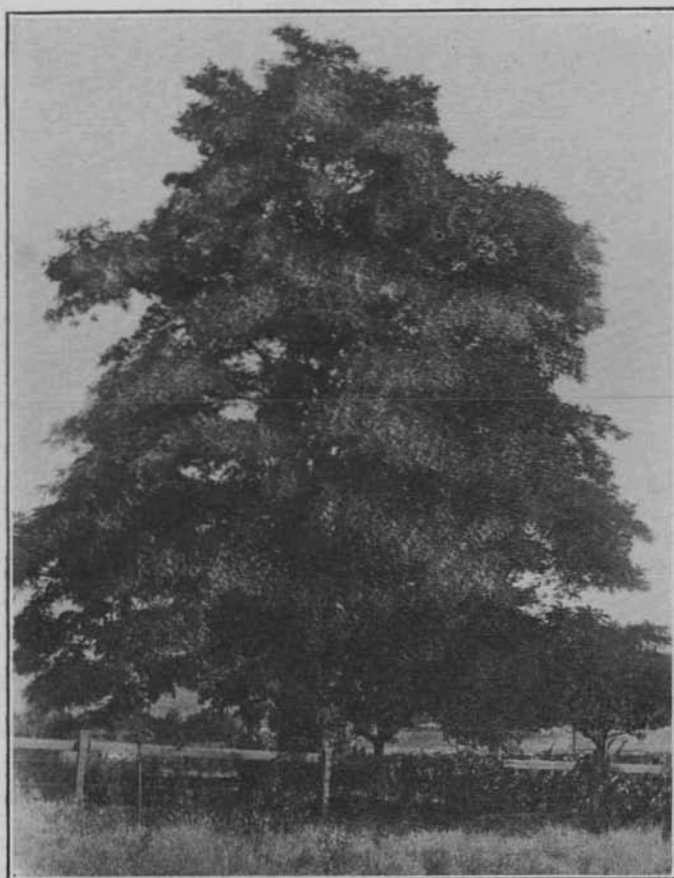


UNIVERSITY OF IDAHO  
AGRICULTURAL EXPERIMENT STATION

DEPARTMENT OF FORESTRY

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# TREES—What, Where, When and How to Plant



BY

C. H. SHATTUCK and I. W. COOK

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\* On leave, Oct. 1, 1917

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## SUMMARY

This bulletin is the result of eight years of careful study and experimentation on the part of the authors with the view of determining what trees are best suited for various purposes in different parts of the State, how best to use them, when they should be planted and where they may be employed most advantageously in serving our needs or in contributing to our wealth and comfort. The following conclusions are considered to be sufficiently well established to warrant publication.

1. A number of our native species have proved to be of great value for ornamental uses, for windbreaks or for woodlots and several for reforestation purposes. (See list on page 10.)
2. Some of the best species of our eastern hardwoods grow well in Idaho and are here recommended for various purposes. (See page 10.)
3. A number of eastern and European conifers grow quite as well in Idaho as our native species and are of value for all sorts of uses, subject to the limitations of the local climatic conditions.
4. Some of our older cities have made commendable progress in tree planting; but many villages in Idaho are sadly in need of trees and lack the public spirit necessary to make such places more attractive and comfortable. Nothing could help more than trees properly selected and appropriately planted. This applies to streets, parks, school grounds and railroad stations.
5. Many farmers in the State who should be growing trees for windbreaks, woodlots, and shade are neglecting to do so. We trust the suggestions and recommendations relative to what species are best suited to their needs will be helpful. The directions as to how they should be put out and cared for have been made as complete as possible at this time.
6. The suggestions for decorative planting and planting plans for various purposes have been prepared with special reference to the needs of the State, and it is hoped they may serve as a guide to those who would "do their bit" toward making the State more attractive to homeseekers and more comfortable for all.
7. The tables of data, found in the back of the bulletin, and the curves of height-growth in the text will serve as valuable guides to those who would plant trees in any part of the State for any purpose.

N.B.—Much credit is due Mr. C. L. Price, whose able and faithful service as nurseryman contributed greatly to the success of this project.

THE AUTHORS.

## INTRODUCTION

The Department of Forestry at the University of Idaho was established in September, 1909. One of the main lines of effort in mind by those in charge of the department was the growing of forest and shade trees experimentally. A thoro study of such trees as had already been planted in various parts of the State has also been made with the view of determining what species among these to recommend for various purposes. In the great range of elevations, rainfall, latitude and other climatic conditions to be found in Idaho this work has been as difficult as it has been important. We have a very wide range of three great factors influencing tree-growth in Idaho, viz: rainfall, altitude and latitude.

The rainfall varies from ten inches or less in the extreme southwestern part of the State to probably more than sixty inches in the higher mountainous regions in the extreme north.

The altitude varies from approximately 700 feet at Lewiston to more than 12,000 in some of the higher mountains. Many large areas of highly productive land lie at elevations of from 3000 to 5000 feet and are now practically treeless, yet it has been demonstrated that a number of species of trees valuable for shade, shelter, fuel, posts, etc., can be grown in such localities.

Few states have so great a range of latitude as does Idaho, extending as it does almost halfway across the United States. When to these factors we add a highly variable soil it becomes evident that Idaho is an inviting field for one who would grow trees experimentally. And also one in which much valuable aid can be rendered to those who desire to know just what to plant in any part of the State.

The aim of this bulletin is to present the results not only of the efforts of the Department of Forestry in growing trees, but of various citizens of this region who have been successful with tree species of value to the localities where grown or to other parts of the State, both for commercial and ornamental purposes.

## MIX NURSERY

Figures 1 and 2 are of trees now growing in this nursery and were about twenty-four years old when these pictures were taken.

About the year 1888 Mr. F. E. Mix established a nursery at Moscow, the output of which was largely fruit trees, but he also grew a large number of forest and shade trees for windbreaks and ornamental purposes. The species grown included some of our most ornamental evergreens as: Eastern balsam (*Abies balsamea*), Norway spruce (*Picea excelsa*), Scotch pine (*Pinus sylvestris*), Eastern arborvitae (*Thuja occidentalis*), and also some of the standard eastern hardwoods, as: Black walnut (*Juglans nigra*), Butternut (*Juglans cinera*), Boxelder (*Acer negundo*), Norway maple (*Acer platanoides*), Silver maple (*Acer saccharinum*), White elm (*Ulmus americana*), White ash (*Fraxinus americana*), and several members of the cottonwood family.



FIG. 1. The Norway spruce is a rapid grower in all parts of Idaho at all elevations below 6000 feet: It is highly ornamental and is also valuable for all purposes. It is especially recommended for windbreaks, the ones here shown, from the Mix nursery, being forty feet in height at twenty-four years of age. Our native Engelmann spruce will do equally as well for all purposes. Both require considerable moisture.



FIG. 2. The black walnut does well at Moscow and lower elevations. The trees here shown are being used as an effective windbreak on the west side of an orchard. They are from twenty to twenty-five feet in height and from six to eight inches in diameter at twenty-four years of age.

Other forest trees may have been planted in this nursery and the seedlings wholly disposed of, but the ones listed above were left to survive as best they could when Mr. Mix decided, in 1893, to quit the nursery business and abandon these trees. After growing in rows as they



were planted, and with practically no care for the past twenty-three years the following results speak for themselves relative to the adaptability of these species to the Palouse country. In the opinion of the writers the trees have been grown under rather adverse conditions and the results here obtained may be easily duplicated by anyone planting any of the species named and bestowing reasonable care upon them.

Table 1. Average size of various trees grown in the Inland Empire.

COMMON AND SCIENTIFIC NAMES	Age	Diameter at breast height, inches	Height feet	Spread feet	No. of trees measured
<b>MIX'S NURSERY</b>					
Silver maple ( <i>Acer saccharinum</i> ).....	24	6.7	44.2	19.6	4
Norway maple ( <i>Acer platanoides</i> ).....	24	6.5	32.0	20.7	8
Black walnut ( <i>Juglans nigra</i> ).....	24	7.5	31.85	22.3	20
White elm ( <i>Ulmus americana</i> ).....	24	7.5	38.9	17.5	10
White ash ( <i>Fraxinus americana</i> ).....	24	5.1	28.3	11.4	11
Norway spruce ( <i>Picea excelsa</i> ).....	24	6.0	35.0	15.0	14
Scotch pine ( <i>Pinus sylvestris</i> ).....	24	6.7	32.3	15.3	15
Arborvitae ( <i>Thuja occidentalis</i> ).....	24	4.0	21.9	12.75	10
<b>PULLMAN PLANTATION</b>					
Red oak ( <i>Quercus rubra</i> ).....	22	6.3	42.0	18.0	3
English white oak ( <i>Quercus pedunculata</i> )...	22	10.2	35.0	21.0	6
Chestnut oak ( <i>Quercus prinus</i> ).....	22	6.5	35.0	19.0	2
Chestnut ( <i>Castanea dentata</i> ).....	22	4.0	30.0	18.0	6
Eastern white pine ( <i>Pinus strobus</i> ).....	22	9.3	37.0	22.0	6
Eastern larch ( <i>Larix laricina</i> ).....	22	7.5	31.0	15.0	4
Western larch ( <i>Larix occidentalis</i> ).....	22	11.5	41.5	22.0	4
<b>MOSCOW, IDAHO, CITY PARK</b>					
Rock elm ( <i>Ulmus pubescens</i> ).....	22	8.7	32.0	21.5	4
Basswood ( <i>Tilia americana</i> ).....	22	6.8	24.5	17.4	10

#### WASHINGTON STATE COLLEGE

The planting of many shade and forest trees at Pullman, Washington, by the Washington State College authorities was begun about twenty-five years ago. Many of these trees furnish very definite conclusions as to how the various species thrive in the Palouse country. In Table No. 1 are a few of the growth records of some of the more highly valuable species. These are inserted because they show the longest growth periods to be found for these species within the confines of the Inland Empire region. See also Figs. 3, 4, and 5.

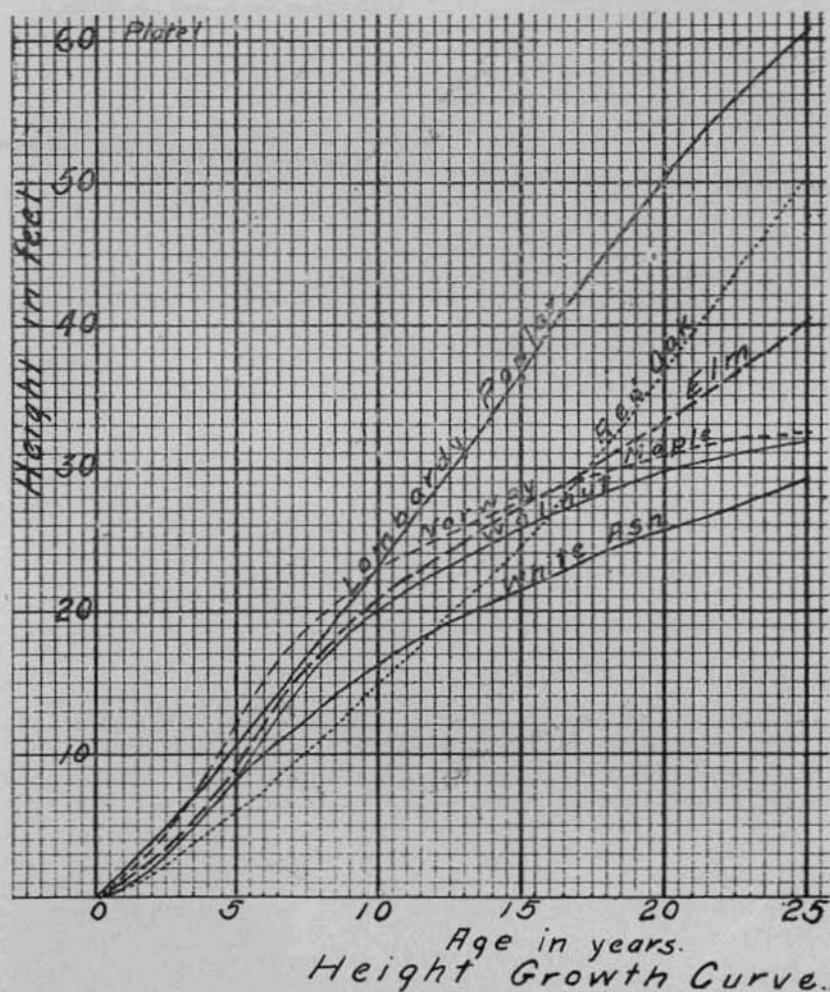
#### EARLY PLANTING IN IDAHO

In attempting to gain information as to the durability of the various tree species for any new State, careful study should be made of the trees found in the different parts of that State. The reason why this should be done is because of the tendencies of people coming from the older states to plant in the parks, on the streets, and about their homes those species to which they have become attached, often from childhood. When we consider the general cosmopolitan character of the population of most

of the towns in Idaho, one may well expect in the larger and older ones especially, to find trees native to many parts of the United States and even a goodly number brought from Europe and Asia. A close study of these trees will always furnish the most reliable information concerning what exotic species to recommend to those desiring trees for any purpose.

With this object in view several of the older communities of Idaho

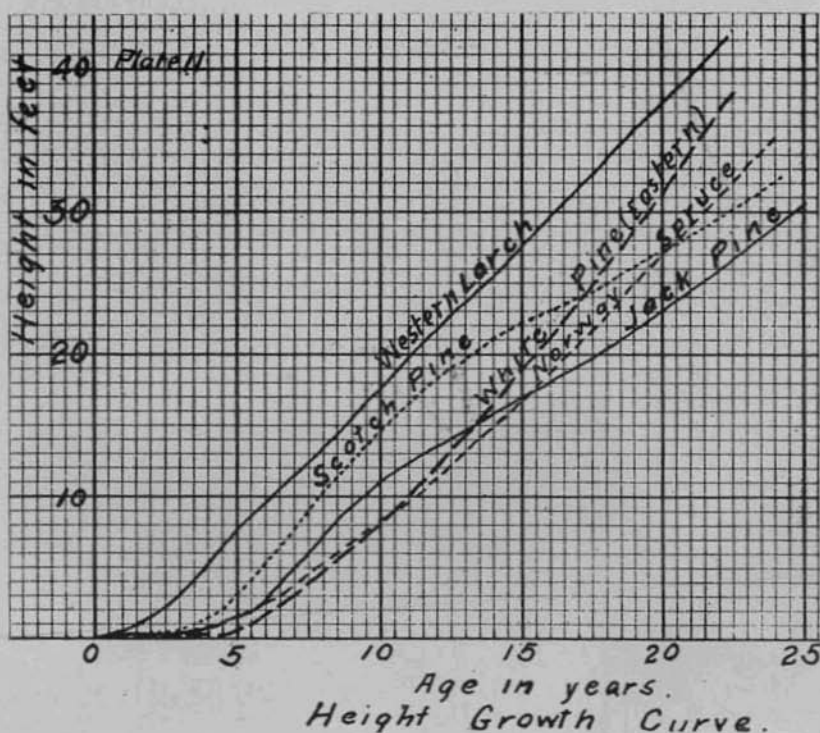
Plate I.



have been visited, and a careful survey made of the trees found. Large numbers of measurements and photographs have been taken. The cuts employed in this bulletin are with a few exceptions taken from photographs of trees grown in Idaho and the Inland Empire, and should serve to convince anyone that a great number of species of trees can be grown to a high state of perfection in the State, and that a large majority of them will do as well as in the East and oftentimes better.



Plate II.



#### NATIVE SPECIES

In considering what trees to recommend for planting in any State, the species native to that State should receive careful attention. We find that Idaho has a number of native trees possessing the rare qualities of beauty, hardiness, and usefulness. Information and assistance have been secured in every way possible by the Department of Forestry in preparing a list of trees, which may with reasonable safety be recommended as suitable for practical planting purposes in the State.

The following list of native trees and shrubs deserves careful consideration from those planting trees in Idaho. There is no better method of beautifying our rural and city homes, parks, and other public grounds than by using *our own native plants*, many of which make excellent growth. They are often more hardy than plants brought from without the State and give to our planting efforts those distinctive characteristics which can be secured in no other way. The more important are:

## Coniferous Trees

	*	O	S	WI	Wb	Rf
1. White pine ( <i>Pinus monticola</i> ).....	M	X	X	X	X	X
2. Yellow pine ( <i>Pinus ponderosa</i> ).....	D	X	X	X	X	X
3. Lodgepole pine ( <i>Pinus contorta</i> ).....	D	X	X	X	X	X
4. White bark pine ( <i>Pinus albicaulis</i> ).....		(X	X			X
5. Limber pine ( <i>Pinus flexilis</i> ).....	H	(X				
6. Fox tail pine ( <i>Pinus aristata</i> ).....		(X				
7. Douglas or red fir ( <i>Pseudotsuga taxifolia</i> )	D	X	X	X	X	X
8. White or grand fir ( <i>Abies grandis</i> ).....	M	X	X		X	
9. Concolor fir ( <i>Abies concolor</i> ).....	M	X	X		X	
10. Alpine fir ( <i>Abies lasiocarpa</i> ).....	H	X				
11. Western red cedar ( <i>Thuja plicata</i> ).....	M	X	X	X	X	X
12. Larch ( <i>Larix occidentalis</i> ).....	M	X	X	X	X	X
13. Alpine larch ( <i>Larix lyallii</i> ).....	H	X	X			
14. Western juniper ( <i>Juniperus occidentalis</i> )	D	X	X			
15. Western juniper ( <i>Juniperus utahensis</i> )...	D	X				
16. Western yew ( <i>Taxus brevifolia</i> ).....	M	X				
17. Engelmann spruce ( <i>Picea engelmannii</i> )...	M	X	X	X	X	X
18. Colorado blue spruce ( <i>Picea pungens</i> )...	M	X		X		
19. Mountain hemlock ( <i>Tsuga mertensiana</i> )	H	X	X		X	X
20. Western hemlock ( <i>Tsuga heterophylla</i> )..	M	X	X		X	

## Hardwood Trees

21. Black cottonwood ( <i>Populus trichocarpa</i> )..	M	X	X	X	X	X
22. Narrow leaf cottonwood ( <i>Populus angustifolia</i> ).....	M	X	X	X	X	X
23. Balm of Gilead ( <i>Populus balsamea</i> ).....	M	X	X	X	X	X
24. Aspen ( <i>Populus tremuloides</i> ).....	D	X	X	X	X	X
25. Mountain Maple ( <i>Acer glabrum</i> )..	M	X	X			
26. Alder ( <i>Alnus tenuifolia</i> ) .....	M	X				
27. Dogwood ( <i>Cornus nuttallii</i> ).....	M	X				
28. Willow ( <i>Salix exigua</i> ) .....	M	X			X	
29. Willow ( <i>Salix nuttallii</i> ) and others.....	M	X			X	
30. Birch ( <i>Betula occidentalis</i> ).....	M	X	X			
31. Birch ( <i>Betula papyrifera</i> ).....	M	X				
32. Wild cherry ( <i>Prunus emarginata</i> ).....	M	X	X			
33. Mountain mahogany ( <i>Cercocarpus ledifolius</i> ) .....	D	X				X
34. Western haw ( <i>Crataegus douglasii</i> ).....	M	X			X	
35. Large flowered haw ( <i>Crataegus brevispinus</i> ) .....	M	X			X	
36. Hackberry ( <i>Celtis occidentalis</i> ) .....	D	X	X	X	X	X

Thirteen recommended for four or more purposes.

## \* KEY TO USES

O = Ornament  
S = Shade  
WI = Woodlot  
Wb = Windbreak  
Rf = Reforestation

## KEY TO REQUIRED CONDITIONS

M = Medium moisture  
D = Dry conditions  
H = High altitudes



FIG. 3. The chestnut oak makes rapid growth in the Palouse country and will doubtless do well in the valleys of the Snake river and its tributaries to an elevation of 3000 feet. These trees are twenty-two years old, from thirty-five to forty feet in height, and from four to seven inches in diameter, straight and thrifty. One of the most valuable trees to plant.—*Courtesy Washington State College.*

The following is a brief description of those most highly recommended:

#### Coniferous Trees

DOUGLAS OR RED FIR (*Pseudotsuga taxifolia*).—This is a beautiful tree, very easy to transplant and can be grown in all parts of Idaho. It is especially recommended for lawns and parks and also makes a splendid windbreak or a good hedge. It is highly valuable for lumber, or posts and poles, and makes excellent fuel. It needs no irrigation in the greater part of the State and grows at all elevations up to 7000 or 8000 feet. (See growth records). Seeds should be planted late in the fall; seedlings or transplants put out in the spring.

WESTERN YELLOW PINE (*Pinus ponderosa*).—This tree is very difficult to transplant, but after the first year it grows well in comparatively dry situations up to elevations of 4000 feet. The foliage is somewhat

coarse but gives dense shade when open-grown. The wood is not so valuable for posts and fuel as the red fir but the lumber from it is of very high grade. It grows rapidly, is ornamental and forms good wind breaks in a few years. It should be planted or transplanted in the spring.

LODGEPOLE or "JACK" PINE (*Pinus contorta*).—The lodgepole pine is easily transplanted and grows rapidly on fairly dry ground. The tree will assume a symmetrical pyramidal form when open-grown, or may be made to grow into slender poles if thickly planted. It is valuable for posts, poles or fuel, but generally not large enough for lumbering. Its range is from 3500 to 8000 feet in different latitudes.

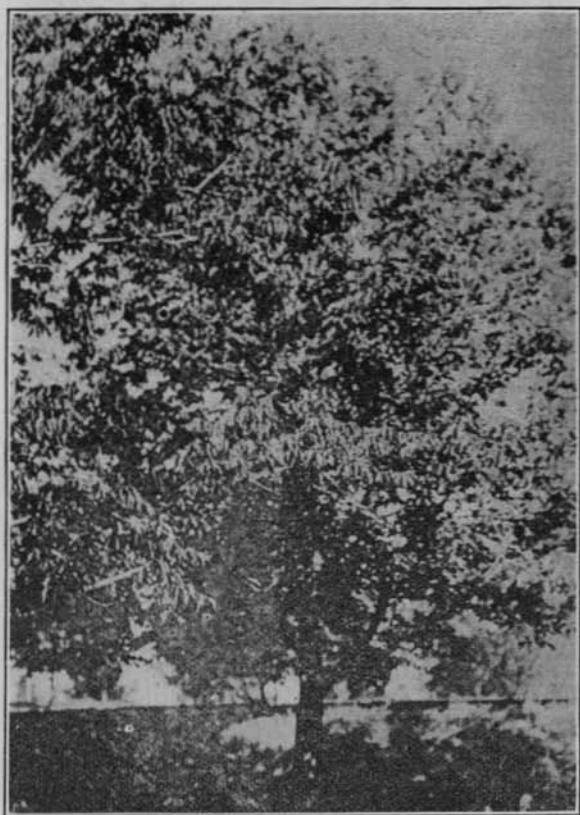


FIG. 4. The American chestnut does well in all parts of Idaho below 2500 feet elevation. The wood and nuts are valuable and the tree is highly ornamental. It has been extensively planted at Lewiston where it grows rapidly and produces nuts abundantly.—*Courtesy Washington State College.*

WESTERN WHITE PINE (*Pinus monticola*).—The western white pine can be grown without irrigation only in the moister regions of the State. It will not stand a very hot sun or drying winds especially when young.

It is our most valuable lumber tree. The wood lasts fairly well in the ground but it is not so good for fuel as any of the foregoing species. It is highly ornamental for park and lawn purposes or for hedges. Its range is from 2000 to 5000 feet. Seeds should be planted in the fall. Young plants should be set out in the spring.

WESTERN LARCH OR TAMARACK (*Larix occidentalis*).—An attractive



FIG. 5. The Co'orado blue spruce is one of the most highly ornamental of all the evergreens. It is especially attractive when used in groups and on hillsides. It is also much used for foundational plantings around buildings where its slow growth and beautiful blue-green color make it most desirable.—*Courtesy Washington State College.*

tree which will thrive under rather dry conditions. It can be transplanted with little difficulty and grows very rapidly either alone or when planted in bodies for windbreaks or other purposes. It is our most valuable fuel tree; the wood lasts well in the ground, is very strong and is therefore valuable for dimension lumber. Its altitudinal range is about the same as that of white pine. It may be planted in spring or fall. Young plants should be moved in the spring.

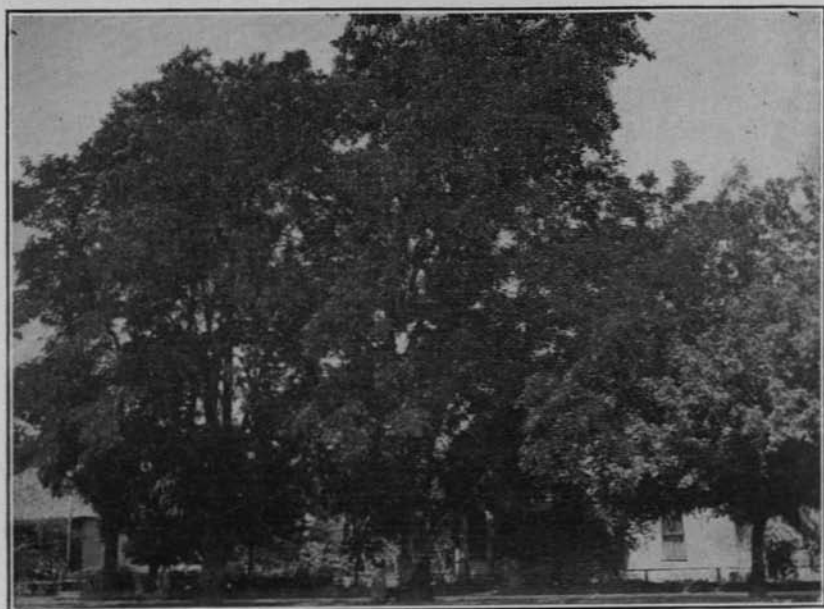


FIG. 6. Two of the most beautiful trees in Boise. They are black locusts about forty years old, between two and three feet in diameter, and seventy-five feet in height. They were set by Pony Young to shade the judges stand on his race track. They are said to have been brought to Boise from Portland in an ox-wagon and to have cost five dollars apiece. Boise is one of the most attractive cities in Idaho because of its beautiful streets, parks and public grounds, so wisely and appropriately planted and so thoughtfully and carefully tended. These homelike surroundings have caused many excellent families from the East to locate in the Boise Valley.



FIG. 7. A town near Boise, said to be older, and has had running water all its history. Yet four trees, four years old, were all the writer could find there when this picture was taken. Will these surroundings attract or hold settlers? Why not plant a few trees?



**ENGELMANN SPRUCE** (*Picea engelmanni*).—This is probably the most beautiful of all the trees native to Idaho. It should be more generally grown for ornamental purposes. It is very easy to transplant but requires considerable moisture and some shade when quite young. It makes good lumber but is used chiefly for pulp and aeroplanes. It forms good windbreaks, and hedges but is also highly desirable for planting in parks and lawns. Its general range is from 2000 to 8000 feet. Seeds should be planted in the spring and the young plants moved then.

**WESTERN RED CEDAR OR GIANT ARBORVITAE** (*Thuja plicata*).—This tree will thrive only when grown in good soil with abundant moisture. Under such conditions it grows very rapidly and is highly ornamental. It will do best, while young, if shaded at least part of the day by older trees or buildings. The wood is very valuable for posts, poles, shakes and shingles. Its range is about the same as white pine. Seeds should be planted in the spring and young plants moved in the spring.

**WHITE OR GRAND FIR** (*Abies grandis*).—This tree is slow of growth in the first few years. It is ornamental and valuable for windbreaks. The wood is not lasting nor of great value for lumber. It does not require a large amount of moisture, but does best where the soil is good and the rainfall is twenty inches or more. Its altitudinal range is about the same as that for white pine.



FIG. 8. Many settlers on the timberlands of Idaho may have beautiful home grounds by using such care as is revealed in this picture where the valuable Douglas fir and white pine trees have been removed but enough of the white firs left standing to furnish shade, shelter and general attractiveness. Many settlers make the mistake of cutting all the trees.

#### Hardwood Trees

**BLACK COTTONWOOD** (*Populus trichocarpa*).—This tree grows in the more marshy parts of north Idaho along streams and near lakes. It grows rapidly attaining a height of 100 feet or more and a diameter of

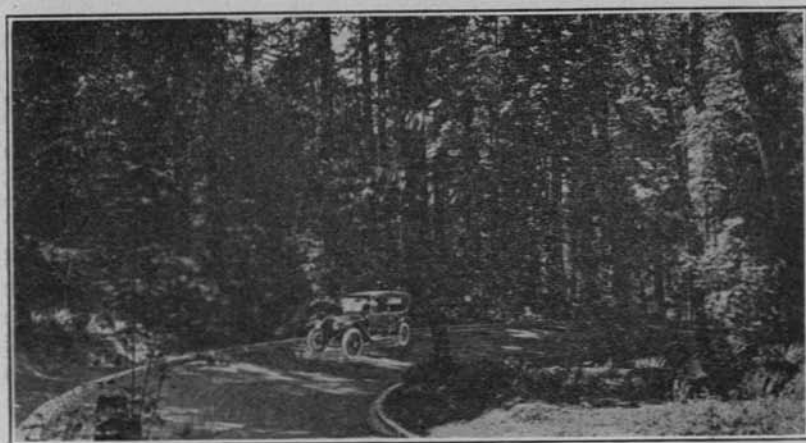


FIG. 9. Idaho is now spending vast sums on highways. Many of these traverse regions famous for their natural scenery, to which nothing contributes more than the magnificent forests. Proper cutting regulations will permit the logger to harvest the mature timber, and yet preserve for her citizens and the tourists the charm and beauty of the highways of the State.

as much as four feet (usually about two feet). It can be grown from cuttings, is a handsome shade tree when young but has a tendency to become ill-shapen with dead and broken branches when old. It will do well under irrigation and is hardy in all the agricultural areas of the State.

**NARROW-LEAF COTTONWOOD (*Populus angustifolia*).**—This tree is a native of the upper Snake River valley, and also borders some of the lakes in southern Idaho and in Utah. It thrives best at elevations between 5000 and 6500 feet. It is usually a tall, rather slender tree, height sixty to seventy feet, diameter usually under two feet. It is a rapid grower and where well watered has heavy dark green foliage. Under proper care it is one of the most beautiful of the cottonwood family. It grows well from cuttings and deserves a wider use in the higher altitudes where only a few species of trees do well.

**BALM OF GILEAD (*Populus balsamifera*).**—The Balm of Gilead is found native along many of the streams in Idaho. It grows rapidly and attains a height of from fifty to sixty feet and a diameter of eighteen inches. It is a beautiful tree while young but is subject to disease and early decay. Like all the cottonwood family it may be propagated from cuttings. It is hardy at elevations up to 6000 feet and grows well under irrigation.

**QUAKING ASP (*Populus tremuloides*).**—This is the most abundant hardwood in Idaho. It is a small tree forty to fifty feet in height and seldom more than twelve inches in diameter. It covers large areas in southern Idaho where it is used for fencing and fuel. It is hardy to great elevations (7000 to 9000 feet) and will thrive on less water than any of the hardwoods of the State except mountain mahogany. It grows

well from cuttings and where plenty of water is available it becomes a handsome tree in a very few years.

**MOUNTAIN MAPLE (*Acer glabrum*).**—This is one of the smallest of the maple family, seldom attaining a height of thirty feet and a diameter of six inches. Its habit of sending up many sprouts from the base of the parent tree causes it to appear in clumps as highly ornamental shrubbery. It is hardy at all elevations up to 7000 feet. Its rich autumn colors and the ease with which it can be grown combine to make it one of our most valuable native trees for decorative planting.

**WILLOWS (*Salix* spp.).**—Idaho has a number of species of willows that possess the qualities of hardiness and drought-resistance so much desired. Under irrigation a number of these grow rapidly and form good sized trees valuable for shade, windbreaks and fuel. They all grow from cuttings and deserve a much wider use.

**MOUNTAIN MAHOGANY (*Cercocarpus ledifolius*).**—This tree is found on the driest southern slopes and rocky cliffs in the mountains of south Idaho. It is often only a mere sprawling shrub, but large areas are covered with this species where it grows large enough to produce highly valuable timber for posts and fuel. Owing to its extremely slow growth it cannot be recommended for planting purposes.

#### THE FORESTRY ARBORETUM AT THE UNIVERSITY OF IDAHO

Several objects were in mind in establishing the forestry arboretum and demonstration plats.

1. It is highly desirable that all students of plant life at the University should have access to the greatest number of growing plants including of course trees of all kinds. The arboretum admirably supplies this need.

2. The students of forestry need such a working field because it supplies them with the very best illustrative and laboratory material for courses in general forestry, silviculture, dendrology, forest mensuration, forest ecology, forest protection, etc. The arboretum is a permanent experiment, changing yearly in much the same manner as does the forest, is subject to the same influences, and affords the best possible opportunity for observation and study of a large number of species assembled in one locality.

3. Since the forestry department was expected to maintain a nursery of many thousands of trees of different species, the demonstration plat has proven extremely useful as a place in which to set out trees of all kinds where they may be observed as they become older and measurements and records taken from year to year and kept. Much valuable information, now at the disposal of the State, has been thus obtained and the arboretum becomes more valuable for all these purposes each year it continues to grow.

In considering what species should be used it was thought best to try a few trees (five to fifty) of a large number of species giving promise of success for shade and ornament in Idaho, and to plant several hundred of each species giving reasonable assurance of being suitable for mass growths, as woodlots, forests, and windbreaks. This policy has been followed from the outset and the results will speak for themselves.

The following tables show the average growth of trees in the Forest School plantation and give the relative growth of young trees of the various species found in the Inland Empire. The trees were measured just as they occurred in the plantation, taking one or two rows and measuring all trees so that the results are fair averages. Where less than ten trees were measured for a given species it was because only the measured number had been planted. The spread measured is less than if the trees had been grown in yards or streets since the trees were set out four feet apart and their side branches are interfering.

Table 2.

SOFTWOODS  COMMON AND SCIENTIFIC NAMES	No. Yrs. growth in plantation	Age when set out	Total age	Ave. diameter inches	Average total height (feet)	Average height—feet										Minimum height	Maximum height	Average spread, feet		No. of trees measured
						9th year	8th year	7th year	6th year	5th year	4th year	3rd year	2nd year	When set out	Top			Bottom		
Balsam fir ( <i>Abies balsamea</i> )	5	3	8	1.7	5.6	....	5.6	3.6	1.9	1.2	.7	.5	....	.5	.4	7.2	2.4	3.4	15	
Red or Douglas fir ( <i>Pseudotsuga taxifolia</i> )	5	3	8	1.6	5.5	....	5.5	3.6	2.3	1.5	1.1	.8	....	.8	3.1	7.2	2.1	3.6	20	
European larch ( <i>Larix europea</i> )	5	2	7	3.4	11.6	....	....	11.6	8.6	5.3	2.5	1.1	.8	.8	8.0	16.0	....	6.9	24	
American larch ( <i>Larix laricina</i> )	8	1	9	3.4	15.4	15.4	12.9	11.4	9.6	8.2	5.4	3.0	1.2	.9	14.0	17.0	....	8.6	5	
Austrian pine ( <i>Pinus austriaca</i> )	5	2	7	1.9	4.7	....	....	4.7	2.8	1.6	1.0	.8	.6	.6	3.2	6.8	2.7	3.7	16	
Coulter's pine ( <i>Pinus coulteri</i> )	5	3	8	2.9	6.4	....	6.4	4.1	3.0	2.2	1.2	.8	....	.8	6.1	7.1	2.2	4.6	5	
Jack pine ( <i>Pinus divaricata</i> )	5	4	9	2.2	10.7	10.7	7.7	4.8	2.9	1.7	1.1	....	....	1.1	8.2	12.3	3.6	8.2	5	
Jeffrey's pine ( <i>Pinus jeffreyi</i> )	5	3	8	1.8	4.7	....	4.7	3.4	2.5	1.9	1.3	1.0	....	1.0	3.3	5.4	2.2	2.9	5	
Lodgepole pine ( <i>Pinus contorta</i> )	5	3	8	2.7	7.9	....	7.9	5.2	3.9	2.5	1.8	1.3	....	1.3	5.7	9.2	3.6	6.3	10	
Pitch pine ( <i>Pinus rigida</i> )	5	4	9	2.5	8.7	8.7	6.4	4.6	3.0	2.0	1.2	....	....	1.2	6.2	10.9	3.5	5.7	10	
Scotch pine ( <i>Pinus sylvestris</i> )	5	2	7	2.6	7.9	....	....	7.9	5.5	3.0	1.9	1.2	.7	.7	5.9	11.0	4.1	5.7	25	
Eastern white pine ( <i>Pinus strobus</i> )	5	2	7	1.3	3.3	....	....	3.3	1.8	.5	.4	.3	.2	.2	2.1	4.6	2.0	2.4	24	
Western yellow pine ( <i>Pinus ponderosa</i> )	4	1	5	1.7	3.8	....	....	....	....	3.8	1.8	1.0	.7	.7	3.2	4.2	2.3	2.4	10	
Black spruce ( <i>Picea mariana</i> )	5	3	8	1.4	4.9	....	4.9	3.8	2.3	1.4	1.0	.7	....	.7	4.1	5.7	1.0	3.5	6	
Norway spruce ( <i>Picea excelsa</i> )	5	3	8	2.0	5.3	....	5.3	3.7	2.5	1.6	1.0	.7	....	.7	3.4	7.6	1.8	3.8	20	

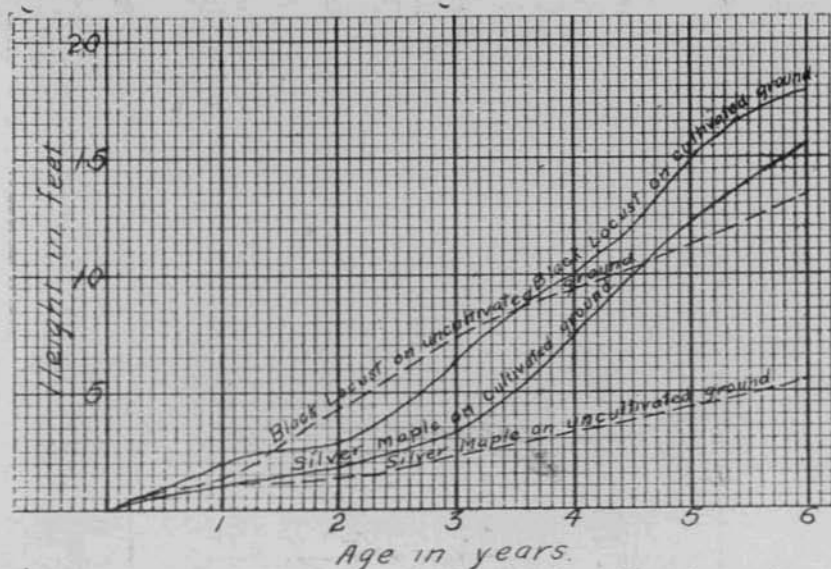
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Table 3.

HARDWOODS  COMMON AND SCIENTIFIC NAMES	No. Yrs. growth in plantation	Age when set out	Total age	Ave. diameter inches	Average total height (feet)	Average height—feet							Minimum height	Maximum height	Average spread	No. of trees measured
						7th year	6th year	5th year	4th year	3rd year	2nd year	When set out				
White ash ( <i>Fraxinus americana</i> )	5	1	6	1.9	10.3	10.3	8.2	5.1	2.2	1.5	.9	8.0	13.5	5.6	15	
Basswood ( <i>Tilia americana</i> )	5	1	6	1.2	5.5	5.5						2.9	7.5	5.2	15	
European beech ( <i>Fagus sylvatica</i> )	5	2	7	1.3	5.8	5.8	4.3	3.0	2.0	1.5	1.2	1.2	3.1	7.3	4.9	12
Yellow birch ( <i>Betula lutea</i> )	5	2	7	3.0	14.9	14.9						1.0	12.5	17.2	9.4	6
Boxelder ( <i>Acer negundo</i> )	4	1	5	2.6	17.1		17.1	13.7	9.3	3.5	1.5	12.7	20.5	8.1	10	
Butternut ( <i>Juglans cinerea</i> )	4	1	5	1.4	6.9		6.9	3.9	1.5	.8	.5	4.5	8.4		10	
Catalpa ( <i>Catalpa speciosa</i> )	5	1	6	2.0	6.5		6.5	4.3	1.9	1.5	1.1	.8	4.0	10.0	4.3	15
Cherry ( <i>Prunus serotina</i> )	5	1	6	2.0	11.6		11.6	8.1	6.5	3.6	1.7	.8	8.5	13.0	5.5	8
Elm ( <i>Ulmus americana</i> )	5	2	7	2.4	14.7	14.7	12.1	8.4	6.9			2.0	11.0	18.0	7.1	15
Horsechestnut ( <i>Aesculus hippocastanum</i> )	4	3	7	2.2	6.1	6.1	4.9	3.8	2.8	1.5		1.5	6.5	9.5	4.3	5
Black locust ( <i>Robinia pseudacacia</i> )	5	1	6	3.0	17.9		17.9	15.1	10.0	6.6	2.6	1.8	15.8	21.0	9.8	20
Norway maple ( <i>Acer platanoides</i> )	5	1	6	2.9	15.9		15.9	12.3	8.8	3.5	1.0	.7	14.0	18.5	6.9	10
Silver maple ( <i>Acer saccharinum</i> )	5	1	6	2.1	15.4		15.4	12.4	7.7	3.2	1.7	1.0	10.0	18.0	5.4	17
Burr oak ( <i>Quercus macrocarpa</i> )	5	2	7	1.4	7.3	7.3	5.4	3.0	1.3	1.0	.8	.8	5.0	10.1	4.2	14
Red oak ( <i>Quercus rubra</i> )	5	2	7	1.0	7.2	7.2	5.7	3.8	2.2	1.1	.8	.8	4.0	9.9	4.8	10
Black walnut ( <i>Juglans nigra</i> )	5	1	6	2.3	12.1		12.1	9.0	5.7	2.6	1.6	1.0	8.4	13.4	5.3	15

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Plate III.



Comparative growth of trees on cultivated and uncultivated ground.

## List of experimental plats set out in the arboretum in 1910.

			O.	S.	Wl.	Wh.	Rf.	
Plat 1.	Norway spruce	Ex.	M	X	X	X	X	X
	Black spruce	Ex.	M	X	X			
	Oriental spruce	Ex.	M	X	X			
Plat 2.	Colorado blue spruce	Ex.	M	X				
	Red spruce	Poor		X				
Plat 3.	Eastern white pine	Ex.	M	X	X	X	X	X
Plat 4.	Jack pine	Ex.	A	X	X		X	
	Virginia pine	Ex.	A	X	X		X	
	Pitch pine	Ex.	D	X	X		X	
	Coulter's pine	Ex.	L	X	X		X	
	Jeffrey's pine	Ex.	D	X	X			
Plat 5.	North Carolina pine	Poor	L					
Plat 6.	Western yellow pine	Ex.	D	X	X	X	X	X
Plat 7.	Lodgepole pine	Ex.	D	X	X		X	
	Old field pine	Poor	L					
	Corsican pine	Ex.	A	X	X	X	X	X
Plat 8.	Digger pine	Fair	D	X				
	Austrian pine	Ex.	A	X	X	X	X	X
	Scotch pine	Ex.	A	X	X	X	X	X
Plat 9.	Cedar (Eastern red)	Ex.	M	X	X		X	
Plat 10.	Redwood	Poor	L	X				
	English yew	Ex.	M	X	X			
	Cryptomeria	Fair	L	X				
Plat 11.	Eastern balsam fir	Ex.	M	X	X		X	
	Fraser's fir	Ex.	M	X	X		X	
	Veitch's fir	Ex.	M	X	X		X	
Plat 12.	Concolor	Ex.	A	X	X		X	
Plat 13.	European larch	Ex.	A	X	X	X	X	X
	American larch	Ex.	M	X	X	X	X	
	Japanese larch	Ex.	A	X	X	X	X	X



Plat 14.	Eastern hemlock .....	Fair	M	X	X			
Plat 15.	Western arborvitae .....	Ex.	M	X	X		X	X
Plat 16.	Arborvitae, pyramidal .....	Ex.	M	X				
	compact.....	Good	M	X				
	eastern.....	Good	M	X			X	
Plat 17.	Rocky Mountain Douglas fir.....	Ex.	A	X	X	X	X	X
Plat 18.	Pacific Coast Douglas fir.....	Ex.	M	X	X	X	X	X
Plat 19.	Willows .....	Ex.	A	X	X		X	
Plat 20.	Soft maple .....	Ex.	M	X	X	X	X	X
	Norway maple .....	Ex.	M	X	X	X	X	X
	Sugar maple .....	Ex.	M	X	X	X	X	X
Plat 21.	Black locust .....	Ex.	D	X	X	X	X	X
	Black locust with spruce and firs—	Poor.	Evergreens all died.					
Plat 22.	White elm with Norway spruce.....		D	X	X	X	X	X
	English elm .....	Ex.	M	X	X	X	X	X
Plat 23.	Soft maple with Norway spruce.....	Ex.	M	X	X	X	X	X
Plat 24.	Catalpa .....	Poor	L	X	X			
Plat 25.	Linden .....	Fair	M	X	X			
Plat 26.	White ash .....	Ex.	A	X	X	X	X	X
Plat 27.	Birch .....	Ex.	M	X	X	X	X	X
Plat 28.	European beech .....	Ex.	M	X	X			
	American beech .....	Good	M	X	X			
Plat 29.	Walnut .....	Ex.	M	X	X	X	X	X
Plat 30.	Butternut .....	Ex.	M	X	X			
Plat 31.	Red oak .....	Ex.	A	X	X	X	X	X
Plat 32.	Burr oak .....	Ex.	A	X	X	X		X
Plat 33.	Box elder .....	Ex.	A	X	X	X	X	X

## KEY TO USES

O = Ornament  
 S = Shade  
 Wl = Woodlot  
 Wb = Windbreak  
 Rf = Reforestation

## KEY TO REQUIRED CONDITIONS

M = Moist conditions  
 A = Average conditions  
 D = Dry conditions  
 L = Low altitudes

## KEY TO SUCCESS IN GROWING

Ex. = Excellent  
 Good = Above average  
 Fair = Average  
 Poor = Below average,  
 but living.  
 (No report on species all  
 of which died.)

## HOME GROUNDS

The sweetest word in any language is the word for Home. Every citizen of Idaho loves his home and has, or should have, a desire to make it beautiful as well as comfortable. The writers of this bulletin have assumed that the citizens of the State will welcome a few suggestions and rules intended to be helpful to those who are desirous of making the homes of our State more beautiful and attractive. We mean to confine ourselves largely to the selection, arrangement, planting and care of trees and shrubs.

While parts of Idaho are covered with native trees of great value for home planting, much of the agricultural land of the State is in the so-called arid belt, and the pioneer must erect his house where at first it is exposed to the burning summer sun and the driving winds of winter.

This may seem at first thought to be a serious drawback to making a home in Idaho, but on more careful consideration it will be seen that it is possible to have as beautiful grounds and as much shade and shelter



FIG. 10. Looking westward over the Forestry Nursery and Arboretum at the University of Idaho. The evergreen portion of the nursery, shown in the fore-ground, reveals the wonderful vigor of plants grown entirely without the use of lath frames or other forms of shade. On north exposures, as here shown, lath frames are not necessary at Moscow, when the plants can be properly watered. In fact more vigorous and better rooted plants can be grown without them.

Over fifty experimental plats, occupying more than ten acres of steep hillside which was a useless mass of thistles and weeds seven years before this picture was taken, are hereshown. During this time about 200 different species of trees have been put out, many of which give promise of doing well in Idaho. See list on pages 20 and 21.

Approximately 30,000 trees are growing in these permanent plats, and several hundred thousand evergreens and



FIG. 11. Looking eastward over the nursery and experimental plats of the Forestry Arboretum. The hardwood nursery is shown at the extreme left in front of the packing and shipping house. The area immediately in front of the stone monument in the center is occupied by many species from various parts of the world, sent us by the Office of Foreign Seed and Plant Introduction of the Department of Agriculture, Washington, D. C. In the foreground are shown commercial plats of young evergreens, composed of species which had given assurance of commercial value after being grown for several years on a smaller scale in the older plats shown at the top of the picture. These experiments will continue to furnish valuable information in forestry for at least a hundred years to come.

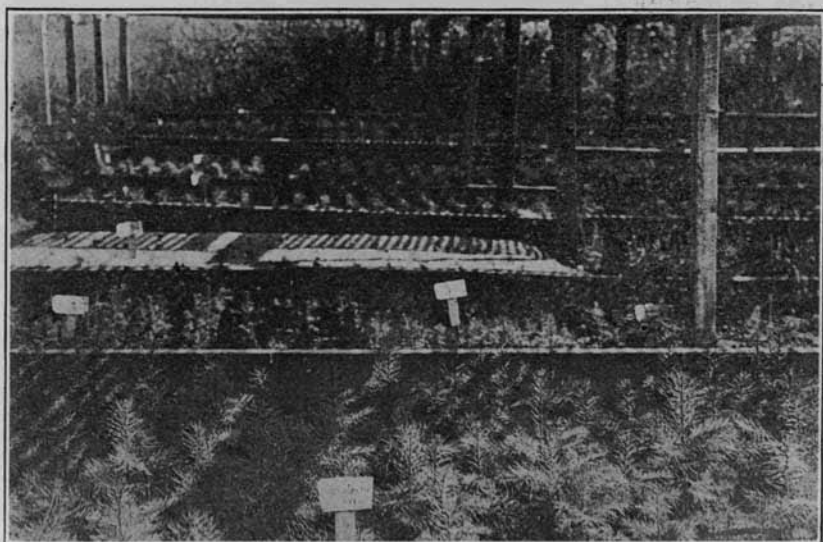


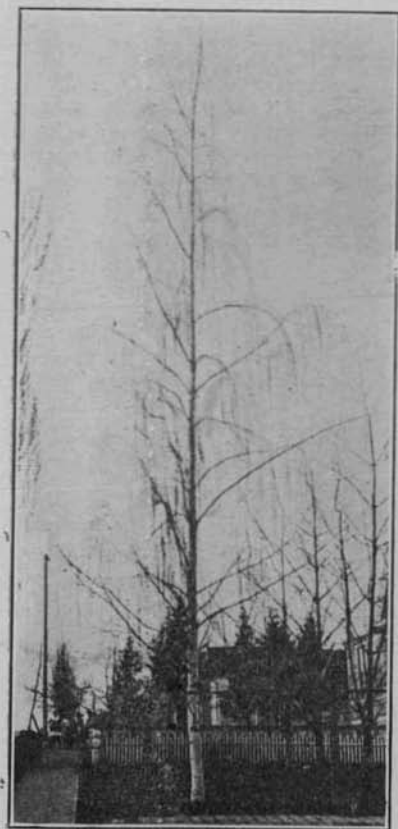
FIG. 12. Until very recently all evergreen seedlings were grown under lath frames, as here shown, or some sort of artificial shade. Where plenty of water is available, better seedlings can be grown in north Idaho without them. See Fig. 10.



FIG. 13. Showing an experiment, after running three years, in which black locusts, elms, maples and box elders were alternated with evergreens (spruces, white and Douglas firs). The aim of this experiment was to test out the tolerance of these evergreens for under-planting purposes in woodlots. All of the evergreens have made good growth under each of the hardwoods except the black locusts. Under these all evergreens fared badly. Practically all of each species except Douglas firs, which were planted in a more open stand, died within the next three years. It is thought that the extensive surface root-system of the black locust is the cause of this difficulty. See Fig. 39.

in Idaho in a very short time as in the older states (Fig. 32), and by a little careful study and planning at the outset it is exceedingly easy to have our homes even more attractive than those of the older states where unaided nature was depended upon to give the desired effect.

It is highly desirable that in laying out the home grounds some kind of definite planting plan be adopted and followed carefully. A few general rules may be of service and the plans and suggestions herewith submitted are intended to serve as a general guide. Certain principles apply to the arrangement of all home grounds and parks and these rules and plans are intended to embody the more important and necessary points to be observed.



FIGS. 14 and 15. The winter and summer views of the same tree here shown are of the weeping white birch. It is one of the most beautiful of all the exotics grown in Idaho. The white bark, pendulous dark brown branches, and shiny, rustling leaves combine in such a way as to make the tree very attractive. It is used to best advantage alone and considerably removed from other trees. This specimen is somewhat cramped for space necessary for its proper development.



FIG. 16. This Latah county farmer saved a few native trees in clearing which add greatly to the attractiveness of his home grounds. A comparison of this figure with the splendid planting shown in Figures 33 and 36 will reveal the fact that this man has here all the great essentials save one (foundation shrubbery and vines) which can be found in the most elaborate plan, namely a proper setting and background for his house, proper mass values of foliage, light and shade, and green sward; also pleasing vistas in various directions. Had he destroyed these native trees this effect could not have been secured within fifteen years by the most expensive planting and much labor and care.



FIG. 17. This attractive home is in the yellow pine belt of Idaho. The young trees have been reserved in such a manner as to afford shade, shelter and a desirable setting for the house. Not a single tree has been planted. Had these trees been cut at the time of clearing it would now require much labor and expense and twenty to twenty-five years' time to secure an effect equal to that here shown. Many of the homes and rural school houses of Idaho would be more attractive had a few native trees been preserved in clearing up the grounds.



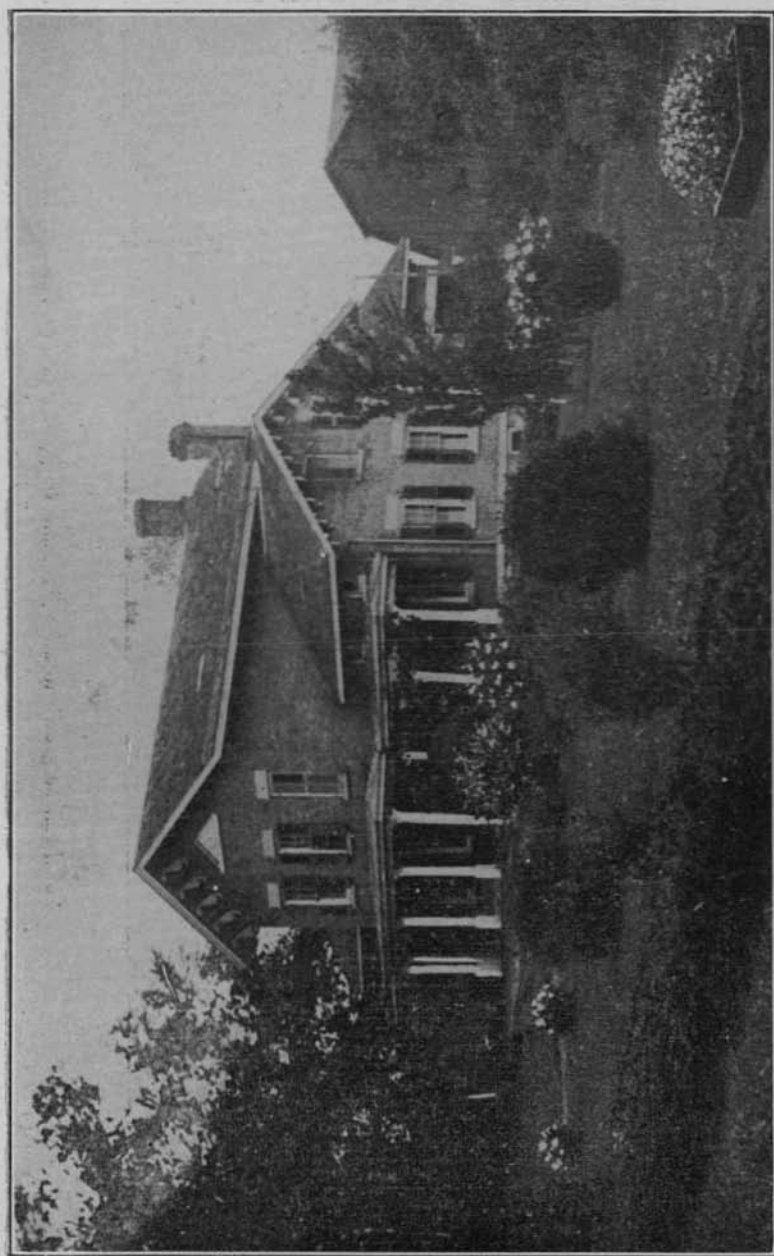


FIG. 18. An overdone, gaudy effect. One of the most common errors of inexperienced planters. The splendid green-sward effect of Figure 19 is lost and the appearance of the grounds cheapened by the improper use of shrubbery in the foreground. This should either be massed at the sides or eliminated entirely.—*Courtesy of Horticultural Department, University of Illinois.*

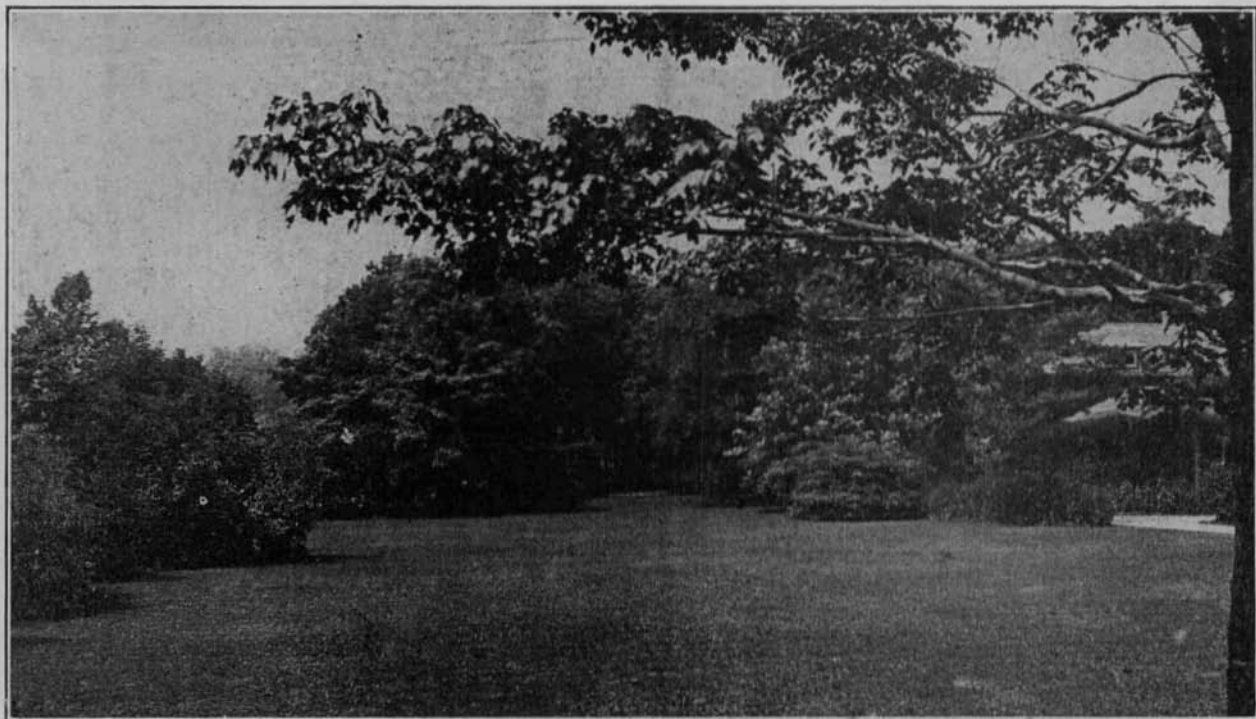


FIG. 19. This picture shows the proper distribution of green-sward, shrubbery and trees. These are so placed as to give pleasing vistas from the road into the grounds and from the house in various directions. The final expression is one of high quality. Everything here shown can be grown to an equal state of perfection in Idaho.—*Courtesy Horticultural Department, University of Illinois.*

1. *By all means have a plan.*—If possible this should be drawn to a definite scale which locates house, barns and other buildings together with the distribution of the trees and shrubbery, naming and locating each species to be used.

2. *Strive to plan and plant appropriately.*—By this is meant that one should suit his plan and planting to the size, shape and general lay of his grounds as well as to the size and style of his house and other buildings. If the home is, as are most of the new homes in Idaho, a simple cottage by the roadside or on the street, the main aim should be to select such trees and shrubs as will harmonize with the house, and to so place these as to avoid any appearance of bareness, yet magnify the size of the lawn and at the same time afford pleasing vistas or glimpses of the house to those on the road or street. Trees and shrubbery may also be used to screen off back yards and out-buildings which often constitute undesirable views.

3. *Remember that green sward has high aesthetic value.*—No plan which covers all the ground indiscriminately with trees and shrubs is desirable. (Contrast Figs. 18 and 19.) Such planting as shown in Figure 18 is termed *gaudy* and is not so pleasing as one which distributes the plants in properly arranged groups and masses.

4. *Strive for simplicity.*—The inexperienced or unguided often overcrowd the grounds and lay out too many walks and flower beds. Remember that *each tree* (see frontispiece) *or group* (see Figure 19) *must stand sufficiently apart to have a dignity of its own*, much as a beautiful building must not be crowded by others lest the proper pleasing effect be lost. Many well-meaning persons over-do the planting. It is in fact *the most common error* made by those who are really anxious to have beautiful home grounds.

5. *A natural is to be preferred to a formal plan in most cases.*—It is far more pleasing to avoid lines of all kinds as much as possible. Curved lines are more pleasing than straight lines as a rule, and irregular curves are more to be desired as a general rule than such type-forms as the circle, ellipse, rectangle or triangle. One tires of such grounds much more quickly than if no lines are visible.

6. *Use trees and shrubs for a large part of your planting plan.*—These do not have to be reset each year, and by proper care in selecting may be made to give pleasing effects all the year round. (Fig. 19.)

7. *Preserve the native growth as far as possible.*—(Figs. 16, 17, 33, and 36.) The splendid evergreens and native shrubs of Idaho are among the most beautiful known. A very common mistake is to cut these down and start over often with less beautiful exotics not so well adapted to our climate. Use hardy, native perennials as far as possible. Many of them bear beautiful flowers and fruits or have highly colored spring or autumn foliage.

8. *Consider the size of each plant at maturity* and also the form which it is apt to take. This is very important in guiding one as to the proper distances to place plants from each other and from buildings, walks and roads.

9. *Prepare the soil.*—The soil should be thoroly stirred, if raw land,

at least six months before planting, and in setting out trees and shrubs about the home grounds, clay and sand should be replaced with good rich loam.

10. *Plant for honest and tasteful adornment*, and the joy of having a beautiful home in a beautiful State will be your reward. Your example will also be an object lesson and an inspiration to others which will be more instructive and stimulating than the most carefully prepared written treatise.

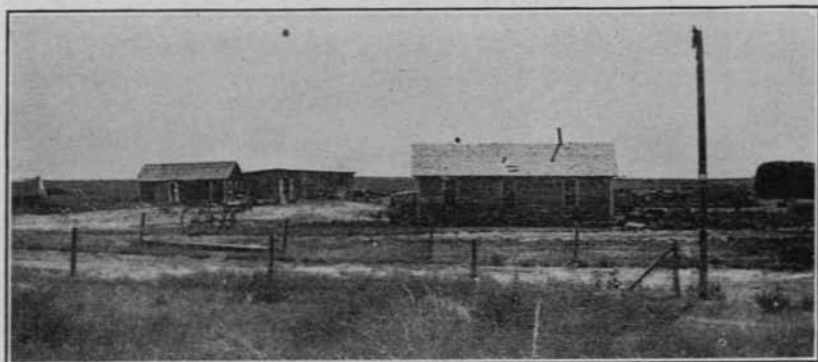


FIG. 20. The owner of this farm has lived on the place for seven years, producing enormous crops of grain and hay. A few trees would add to the attractiveness of the surroundings and contribute to the comfort of his family and his farm animals in both summer and winter.

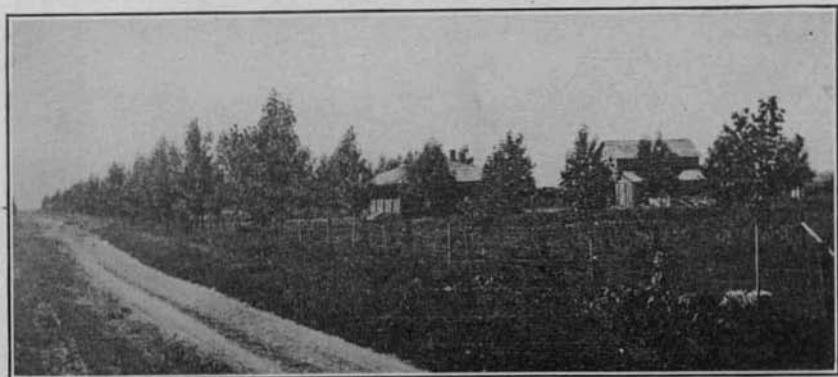


FIG. 21. This place stands just across the road from that shown in the picture above. It has been occupied but four years from the sage brush. The grounds are already beautiful, homelike, and comfortable, largely because the owner put out a few trees (cottonwoods) the first year. Contrast these two places. Which would the prospective settler be most apt to purchase as a place to bring his family, from their eastern home with its wealth of trees and shade, its beauty, comfort and protection.

### THE VALUE OF TREES ON THE FARM

As one passes thru the vast fertile prairie regions of the Middle West he is impressed with the general beauty and homelike appearance of the great majority of the farms. It is in fact difficult for him to imagine, as he beholds the beautiful savanna-like landscapes consisting as they do of shade, shelter, beauty and utility, that this was once a bleak and cheerless plain without a tree for miles and miles. The writers saw the great plains of Missouri, Kansas, and Nebraska when they were such treeless wastes, and nothing less homelike can be pictured than the abodes of the early settlers (often sod shanties) on these plains before trees were planted. The picture is vastly different now. Why? *Because so many settlers planted trees.* The result of this wise step is a landscape which in no sense is bleak or uninviting—in fact it is hard to believe that it was ever a treeless region because every home is surrounded by such a wealth of shade and shelter that the entire face of the landscape has become changed and the country transformed from an uninviting and monotonous plain into one of the most attractive and homelike regions to be found in all the world.

The settlers on the treeless sagebrush plains of Idaho can learn a valuable lesson from the work of the settlers of these eastern states. *We can and by all means we should* transform the vast areas of extremely fertile prairie region in Idaho from their bleak and desert-like present appearance into places of beauty and comfort (Figs. 24, 25, 26). This can be done in a few years in all those projects under irrigation, since it is now clearly demonstrated that we have many valuable species of trees capable of making rapid growth under such conditions. The splendid groves around Nampa, Boise, Mountain Home, Pocatello, Idaho Falls, Lewiston, and many of our young cities where irrigation is practiced abundantly testify to this fact.

In the regions where dry farming is practiced, the process of establishing trees must necessarily be slower, but generally it can be done. The number of species from which to select is much smaller, and greater care must be exercised in cultivating and mulching than where irrigation is practiced. Yet one can with careful cultivation, work a complete transformation on much of the better dry-farm land with such trees as the poplars, cottonwoods, boxelders, elms, black locust, eastern jack and digger pines and Douglas firs. It has been determined in Minnesota that a farm of 160 acres with a woodlot and trees for windbreaks and ornamental purposes will not only have a much more ready sale, but will sell on the average for as much as \$1000 more than a similar farm on which trees have not been planted. This is no more true in Minnesota than in Idaho. The eastern man coming to our State is amazed at the crops of hay, grain, potatoes, and fruit that our land is producing but often when he looks at the home surroundings and thinks of bringing his family to such a place (FIG. 20) his heart fails him. He cannot and will not bring them onto such a bleak and cheerless farm home. He does not purchase land in Idaho and we have lost forever the chance of securing him and his family as citizens. He may even go back to the East and so describe our State that others are kept from coming to us. Actual instances practically identical to this have come to the attention of the writers.

We must beautify the homes of Idaho if we would hope to attract people from their beautiful homes in the East. Trees cost but little and require but little care—they *grow while you sleep*—and no other equal outlay is so sure to bring to your home, whether in town or country, so much attractiveness and home comfort or yield a more substantial revenue when selling the property. Good business men are coming to realize that it pays to consider the elements of beauty and comfort wherever possible, and it is surely good business to so beautify the homes of our splendid young State as to make them attractive to settlers. What Idaho needs more than anything else is *more people* and especially more farmers on our highly productive lands now unoccupied, and it is certainly good business to make the farms as attractive and homelike as possible.

### Windbreaks

Trees check air currents and therefore reduce the velocity of the wind. If set out in the form of windbreaks they serve as a protection to field crops, orchards, gardens, livestock and buildings, thus increasing the production of crops and lessening the consumption of feed and fuel. They also furnish fuel, posts, and poles for the farm. (Figs. 1, 22 and 24.) The benefits derived depend upon the density and height of the trees.

Studies and measurements made by reliable authorities (F. S. Bul. 86, the Wis. Agr. Expt. Sta. Bul. 42, and the Neb. Agr. Expt. Sta. Bul. 48) show that there is considerable increase in the yield of fields and orchards sheltered by windbreaks. It is a well known fact that the rate of evaporation from the surface of the soil and of transpiration from the leaves of plants is in proportion to the rate of movement of the air. In the arid regions of south Idaho a great amount of water is evaporated by the dry, rapidly moving winds. Since large bodies of the agricultural land of Idaho are under irrigation, the effect of windbreaks in checking evaporation of water stored in reservoirs, that moving in ditches, and that placed upon fields, is exceedingly important.

It has been found that in a region where the annual loss of water from a reservoir amounted to sixty inches, it could be reduced to forty-one inches or a saving of nineteen inches per year for an area of sixty acres, when protected by a windbreak a mile long and fifty feet high. This would be more than enough to irrigate an equal area of cultivated land for an entire season. Most of the reservoirs in Idaho have large surfaces exposed. These can and should be protected by windbreaks planted along the border. Immediately after water has been turned upon the fields, and for a few days while the surface of the soil is saturated, there is apt to be a great loss by evaporation. In experiments carried on by the Department of Agriculture in Nebraska during the months of June, July and August, under conditions similar to those in southern Idaho, it is shown that during three days when water was being turned onto a field and while the surface soil was yet moist, the loss of moisture in unprotected areas might amount to two inches or more and that an efficient windbreak fifty feet high on the windward side would reduce the evaporation in a field thirty rods wide from thirty to seventy per cent.

It must not be forgotten that the same condition exists for a longer





FIG. 22. A windbreak of Lombardy poplars near Gooding, Idaho, sixty feet in height at twenty-five years of age. A wall of these trees is the most effective means known for checking the driving and drying winds of the Snake River plains. They are highly ornamental to the landscape, although much derided by some people. They produce abundant shade, shelter and fuel in a very few years, and are far better than no trees at all. At the right is shown the edge of a woodlot of this species set four feet apart each way and producing from 150 to 200 cords of wood per acre in from twenty to twenty-five years.

or shorter period after each rain. Capillary action is constantly bringing moisture to the surface of the soil. The moisture which should be available to plant roots is lost by evaporation. The evaporation of moisture from the plant-leaves has to be replaced by water taken from the soil by their roots. Decreasing the evaporation will decrease these demands upon the soil for moisture. As shown, the velocity of the wind is checked by tall trees. Therefore the air is so much retarded over areas to the leeward that it tends to become saturated and is warmed by the radiation and reflection to a higher temperature than the more rapidly moving air in unprotected fields. (Plate IV.) These two features united give a condition more like that of a hot-house and combined with the lower rate of evaporation produce more rapid growth than that of an open field.

Windbreaks tend to check storms, thus there is very much less damage in a protected field to grain, fruit, etc., than in open fields. A windbreak of evergreens around an orchard prevents the cold, dry, winter winds from "winter-killing" the fruit trees, and also protects the snow from the warm chinook winds in the spring. Early blossoming and consequent loss from frost is thus prevented. Peaches can be grown considerably farther north if protected by surrounding evergreens than if grown in the open. In localities where the soil is light and blown by wind, its drifting can be retarded by windbreaks.

A belt of evergreens surrounding farm buildings and feed yards has a wonderful influence in moderating the winter climate, and also furnishes

shade in summer. (Fig. 26.) Government study and measurements show that a narrow belt of two rows of evergreens close together and forty feet high will reduce the velocity of the wind at 200 feet to the leeward from twenty-five to five miles per hour. This reduction is equivalent to raising the temperature nineteen degrees as it affects man and beast. This means a saving of fuel in the home and of feed for the live stock. It



FIG. 23. The Balm of Gilead and other members of the cottonwood family can be made to produce beautiful avenues in a very few years. They are hardy, to elevations of 6000 feet in southern Idaho. These trees are but eighteen years of age. The silver poplar is a more beautiful tree, just as hardy and free from the dreaded "canker" disease (FIG. 40) which destroys many balms. (See Figure 32.)

also prevents the drifting of snow around the buildings and feed yards. The even distribution of a protective snow cover is very important in case of winter crops as wheat and rye. An evergreen windbreak serves this purpose best.

The efficiency of windbreaks depends upon the height of the trees and their density and also on the manner of placing, as follows:

1. The effectiveness of a windbreak in checking evaporation is proportional to its height and density. It may save at a single point in extreme cases seventy per cent of the moisture ordinarily lost by evaporation.

2. The area protected is proportional to the height and density of the windbreak, and the distance to which protection is felt increases with wind velocity. The protection is appreciable for a distance equal to five

times the height on the windward side, and from fifteen to twenty times the height on the leeward side. (See Plate IV.)

3. The distance of the area of greatest protection from the windbreak depends upon the position of the mass of green foliage which affords the protection. With a dense grove, it is immediately in the lee of the trees; with a narrow belt of trees, which lack lower branches, it is farther to leeward, depending on the height and density of the trees.

The damage to crops from shade and "root sapping" of a belt of trees is about equal to the production of an area equal to the height and length of the windbreak. The shaded area along the windbreak can be utilized for roads. Deep-rooted species should be planted adjacent to crops. Surface cultivate the trees when young and plow deep furrows a few feet from the trees to cut off the roots extending into the field. Trees planted along irrigation ditches will not have as extensive root systems as those on dry ground because their needs are met in a smaller area. The water saved by retarding evaporation from the crop, surface of the soil, and ditches is far greater than that absorbed from the ditch and soil, by the trees, and the growth conditions of the crop are decidedly better than without them.

A good windbreak should have at least three rows of trees. They should be placed close enough together so that the width of the strip is about half the height of the trees when full grown which in most cases would be a width of about 30 feet. Wider belts are not to be discouraged, but the above width is about the minimum for efficiency where the amount of land to be given to timber is limited. Closely set, single rows of dense-crowned species which branch to the ground as in case of Norway spruce (Fig. 1) are very effective. All belts should run at right angles to the prevailing winds. (Fig. 26.)

Trees should be set close together, from four to eight feet, for all windbreak groves. This insures a dense wall, and also produces straight poles and posts which can be utilized when the trees get older and need thinning.

Tall, fast growing, deep rooted trees are generally desirable for windbreaks. Lombardy poplar, cottonwood, Norway spruce, pine and Douglas fir have these characteristics. Lombardy poplar and cottonwood are not long-lived trees but are thrifty and grow rapidly in all parts of the State, and in a few years will make excellent windbreaks.

In localities where black locust grows well (4000 feet and lower), it is preferable since it is long lived, grows rapidly, makes excellent fence posts, poles and fuel. White ash, boxelder, maple, willows, evergreens or any bushy, slow-growing species such as mulberry, Osage orange, or Russian olive are good trees to plant mixed with the tall-growing species or set out along the edge. The slow-growing trees fill up the spaces under the branches of the more rapidly growing ones and more effectively check the wind.

Boxelder, maple, butternut, black walnut and willows all make good windbreaks but do not always make a desirable height growth as shown in Table 1. The height-growth curves given in Plate I, show that

Lombardy poplar makes the best height growth at any given age. The height-growths given in Plates 1 and 2 show the species that grow most rapidly in height, reaching thirty to thirty-five feet at from twenty-two to twenty-four years of age in this region.

To be successful with shade and forest trees, cultivate them while they are young with as much care as fruit trees. (See curves of growth for uncultivated trees, Plate 3.) If fruit trees require irrigation the young forest trees should be irrigated. Evergreens generally require more care than broad-leaved trees.

Never prune or dock trees used for windbreaks except when the spaces where the branches are cut off are to be filled by other trees.

Live stock should be kept away from trees when young and it is better at all times to have as little tramping as possible about the roots.

In northern Idaho where a great many farms are being cleared of timber, the leaving of belts of trees standing for windbreaks should not be neglected, since their influence will be quite as desirable here as in treeless regions. (See Fig. 17.)

#### Woodlots

One is largely governed in determining what species to plant for the woodlot by the use to which the wood is to be put when the trees are cut. The chief demands on the woodlots in southern Idaho and eastern Washington are for fuel, posts and poles, altho many calls are made upon them for wagon and sled tongues, double-trees, eveners, and handles of various kinds. Undoubtedly the greatest demand is for fuel and posts. In all parts of the State below 4000 feet elevation, the black locust is probably the best all-purpose tree. It stands drought very well indeed, yet responds surprisingly when grown under irrigation. Good posts can easily be grown in about seven years at Moscow and with water in about five years in southern Idaho. The trees shown in Figure 24 are four-year-old black locusts grown under irrigation at Twin Falls.

The white ash can be grown up to elevations of 6000 feet. It does well and furnishes an excellent hardwood valuable for many purposes. The red oak is a rapid grower in good soil with plenty of moisture and is hardy in most parts of Idaho. The wood is valuable for fuel and many other purposes. In the Snake and Clearwater valleys, chestnut and chestnut oak are valuable trees for the woodlot. They both make rapid growth and furnish a good grade of valuable hardwood. The chestnut oak is recommended for the Palouse country. (See Figure 3.) The birches and maples practically all do well in all parts of the State and furnish a large amount of excellent wood in a very few years. Both walnuts and butternuts do well in the lower altitudes and furnish nuts as well as wood.

Many of the native and introduced evergreens do splendidly in all parts of the State. There is no reason why every farm may not have its woodlot, if its owner will go to the very slight expense of purchasing seeds or seedlings of trees known to do well, and will take ordinary care of the young trees for the first two or three years or as long as a horse can be driven between the rows. The trees should have flat cultivation.



FIG. 24. The trees here shown are black locusts four years old. They were grown at Twin Falls, Idaho, under irrigation by Mr. J. A. Waters. They were set two feet apart in six-foot rows, producing in eight years 7000 posts; worth over \$1000 per acre. Such woodlots form excellent windbreaks for buildings, orchards and stock.

Figures 3 and 24 speak for themselves and the lists of native and introduced species show which ones are especially recommended for this purpose. Generally the roughest and poorest site on the farm should be utilized. North slopes are especially valuable and generally the steepest slopes are preferable as they have more moisture and better soil than south exposures.





**What to Plant for the Woodlot****1. Seeds of certain hardwoods:**

Ash	Red oak	Honey locust
Walnut	Chestnut	Norway maple
Butternut	Chestnut oak	Silver maple
Boxelder	Black locust	Sycamore maple

**2. Seedlings of certain hardwoods:**

Ash	Honey locust	Box elder	Sugar maple
Red oak	Norway maple	White elm	Sycamore maple
Black locust	Silver maple	English elm	Walnut

**3. Transplants of certain conifers:**

Douglas fir	Austrian pine	Black spruce	European larch
White pine	Engelmann spruce	Balsam fir	Japanese larch
Yellow pine	Norway spruce	Concolor fir	Scotch pine

**4. Cuttings of:**

Silver poplar	Eastern cottonwood	American willow
Lombardy poplar	Narrow-leaf cottonwood	Purple willow
Balm of Gilead	Russian-leaf cottonwood	Golden willow



FIG. 25. This ranch has been occupied for fully ten years. The soil is excellent and supplied with abundant water for tree growing. A few cuttings from a neighbor's cottonwood trees could have been so placed years ago as now to furnish abundant shade, shelter and fuel, at the same time enhancing the value and attractiveness of the place and contributing immensely to the comfort of the family and farm animals.

**THE SCHOOL GROUNDS**

The pictures on page 41 show two types of school grounds. The first one, Fig. 27, is that of a schoolhouse in a densely populated portion of the State. There is not one thing about these grounds which could in any way appeal to the higher nature of the young or develop in them a love for beautiful or homelike surroundings. The simple observ-

ance of a single Arbor Day a few years ago would have given to all the children of this community, who spend nine months of each year in and about this building, more beautiful, uplifting, and inviting surroundings such as are shown in Figure 28. It is true that in the early days money was scarce and trees may have been hard to secure; but at the present time any teacher desirous of improving school grounds, either rural or city, can quickly raise the small sum necessary to purchase a goodly number of appropriate trees, in fact, can very often secure the donation of such. At the same time he will do much to awaken local civic pride by setting apart a few hours on each Arbor Day for school-ground improve-

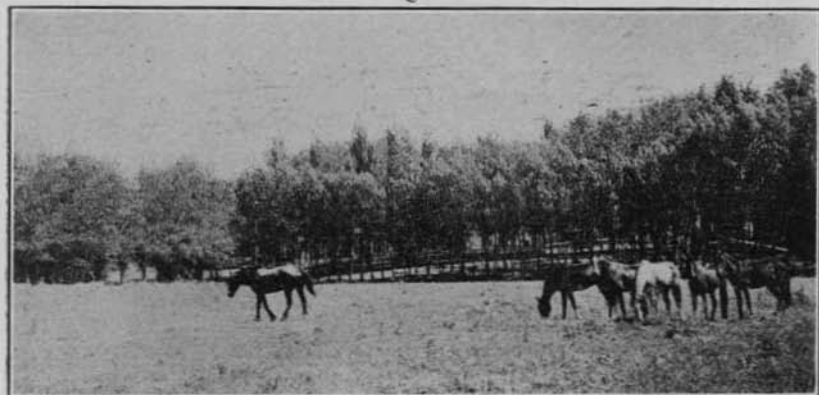


FIG. 26. Corrals and pastures shaded and sheltered by cottonwood trees set twelve years ago. Both views are from the Snake River plains.

ment. It is very hard to appreciate properly the amount of influence which well-planned and well-kept school buildings and grounds have upon the minds of our young children. A great part of their lives, during the most impressionable period, is spent at school. It is here that they establish ideals which will greatly influence their actions thruout life. Can they get high ideals from the undeveloped grounds shown in the foregoing picture? It is natural for children to love the beautiful; they are instinctively drawn to it and equally repelled by that which is unkempt and therefore unattractive. Which of these grounds is most inviting to you?

#### Rules for Beautifying School Grounds

1. School grounds should receive more or less care all the year round. They are often neglected in the summer at the very time when they need most attention and care. Someone should look after them during the summer vacation. Homes should be made *attractive* if they are to be cherished; so should *school grounds*.

2. Children should have a share in improving and beautifying the school grounds. Arbor Day is a good time to begin.

3. Have a definite program. This should consist of such necessary work as removing stones, stumps, undesirable trees and underbrush;

leveling the grounds where necessary and preparing the soil; planting trees, shrubs, vines, and flowers. These should be appropriately placed around the school house and teacher's house, if there be one connected with the grounds, according to a definite plan.

This brings us to the problem of how to begin.

4. The grounds should be carefully studied with the view of plant-

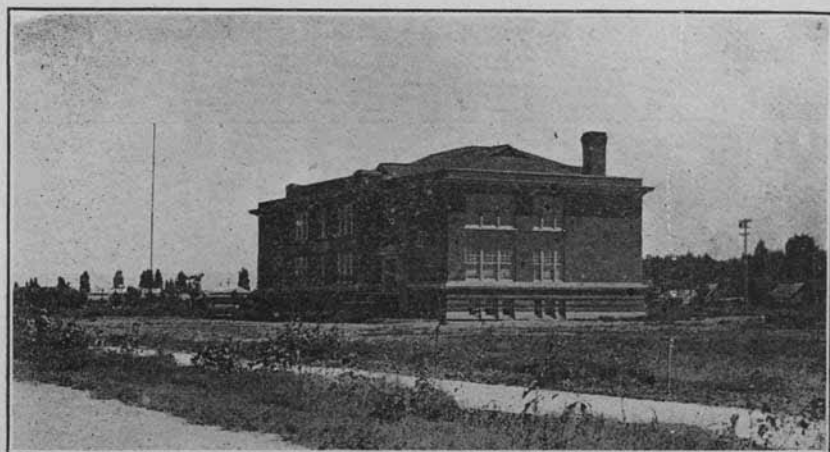


FIG. 27. An \$80,000 city school building with spacious grounds in the heart of a great irrigation district in southern Idaho. Shrubs and flowers should be planted around the base of the building and along the walks. Trees should be appropriately placed around the outside of the playgrounds and grouped in the corners. Perhaps a hedge or rows of evergreens should separate the girls' playground from that of the boys.

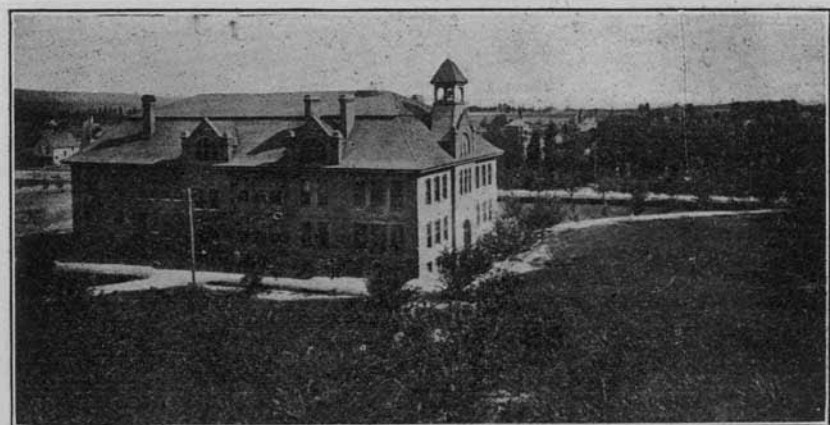


FIG. 28. A less expensive building in a neighboring town, but more attractive because more of planning and care has been bestowed upon its grounds. Practically the same trees and shrubs will grow in both localities.

ing in such a manner as to serve to the utmost that for which they are designed, namely:

(a) A place for the children to play. This means *all* the children. The *boys* will want a place to play ball and for the various running, wrestling and other athletic sports. This should be free from trees.

The *larger girls* will prefer games of a quieter nature, often in the shade. Their wants should have due consideration in the planting-plan.

(b) A place for the children to work. Many of the children will prefer to use their surplus energies in school garden work if a portion of the ground can be set apart for that purpose. Trees should not be permitted to shade garden plats.

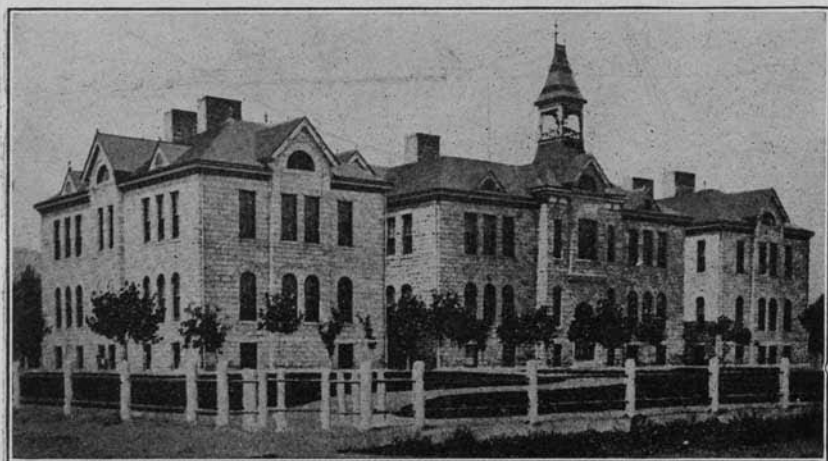


FIG. 29. A large city high school building in Idaho two months after twenty trees had been set on its grounds.

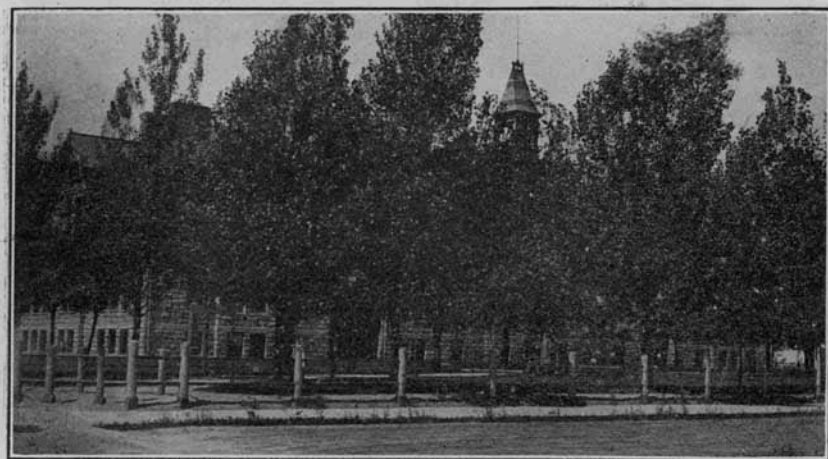


FIG. 30. The same grounds six years later. Trees grown under irrigation and receiving average care.

(c) The grounds should be made attractive to all by massing shrubbery around the foundations, in the angles of walks, and setting trees around most of the grounds. (See Fig. 28.)

Considerable care by the teacher and trustees should be exercised in planning the school grounds for *use* as well as enjoyment.

Why have so few of our rural school grounds been improved? There are several reasons:

1. Many of our communities are comparatively new and the people have been so much occupied with other strenuous problems that this one has not had a place in their thoughts.

2. The trustees may not have had their attention called to the possibility of putting the grounds into a more desirable and usable condition.

3. They may not believe in such efforts; reasoning that since *they* grew up without any such thing their children may as well do so, forgetting that we all have many things which our forefathers did not enjoy.

4. The teacher may not care to encourage such efforts, but more often he does not know how to begin.

5. Neither teacher nor trustees may know what to do, nor how to do it.

(a) The first suggestion therefore is that the grounds be laid out and planted for *use* and *enjoyment*, and *all* should join in the work.

(b) In this the tastes and desires of the greatest possible number should be considered.

(c) Use all the natural advantages possible, as trees, shrubs and vines, that may happen to be growing in the ground in such locations as to permit their remaining where they are, or of being removed to some other part of the grounds.

(d) Use every effort possible to work up a public spirit in beautifying homes, parks, and school grounds in the Arbor Day exercises.

(e) Get your local correspondent to write up, and the minister to announce Arbor Day and don't be afraid to put a little *money* if need be into trees, shrubs and flowers.

(f) *It pays*. Because if handled properly it makes a better community spirit.

(g) *It pays* in the formation of better characters and higher ideals in our boys and girls.

(h) Whatever helps the children helps all of us and is therefore desirable.

We should, and we believe we do, all stand for a more beautiful and a better Idaho, as it may be expressed in tastefully-planted school grounds.

#### CITIES AND VILLAGES

In many of the older cities and villages of Idaho much has been done in the way of beautifying the home grounds and the same is true of many villages but recently established, and much credit is due to those who have done this; however, this is by no means always the case. One should not expect people to become attached to such village surroundings as shown in Figure 31, and there is generally no excuse for such places remaining so for any considerable time. Every city and every village should have a city *planning committee* and this committee should be ready at all times to give or to secure information relative to the proper

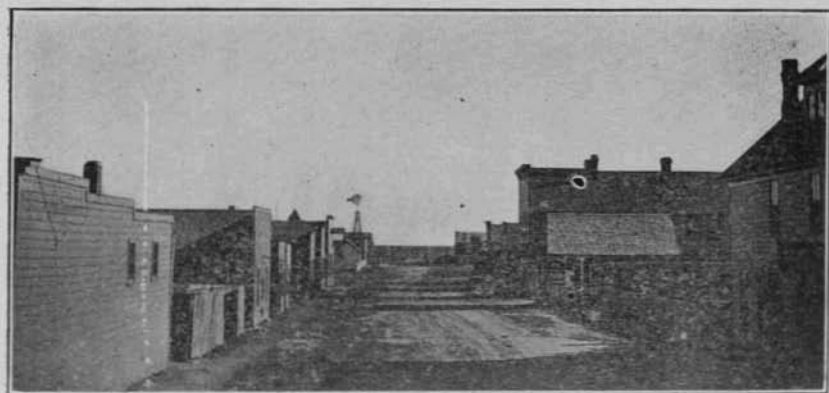


FIG. 31. A street in a Snake River valley town near one of the largest irrigation dams in the State. The entire town is sadly in need of protection from the burning summer sun and the driving winter winds. Several species of the cotton-wood family could be made to produce abundant shade and shelter here in a few years. The town grows very slowly.



FIG. 32. A street in another Snake River valley town. This street has been set to silver poplars which were fourteen years of age when this picture was taken. Every street in this town is lined with beautiful trees. It has more than doubled its population in the past ten years.

trees to plant, where they can be had, and how they should be arranged. This assistance will often not only stimulate our citizens in the work of tree planting, but will prevent such errors as selecting the wrong species, bad arrangement, and improper spacing. Certain trees never become large, others grow very slowly, others rapidly, some are short lived, others become too large for certain places, some will do well in one locality when they will not do at all for others. Some are light-demanding, others



shade-loving. This information is easy to get and should by all means be made available to those who would plant trees.

People often fail to plant trees because they realize the danger of making such mistakes as are enumerated above. If they could have the assistance of such a committee as the one just mentioned, they would gladly secure the trees, put them out and care for them properly.

### Parks and Parkings

Many of our most beautiful cities have adopted a rule for further planning which declares that no part of the city shall be more than one-half mile from a public park. Property owners and real estate men have found that it pays from a dollars-and-cents standpoint as well as from many others, to make the cities more beautiful and healthful. Statistics actually prove that property adjacent to such parks will sell for enough to more than offset the sacrifice of land made in setting aside the park areas. Often the park areas can be set aside from low ground, or from ground so broken and rocky as not to be desirable for residences or business blocks. Such lands always lend themselves most admirably to park purposes. In addition, the class of citizens settling adjacent to such a park area is sure to be much higher than would settle in such low or broken ground if no park were established. Now is the time for the rapidly growing cities of Idaho to establish their parks. This should be done on such a scale and with such forethought that future generations in Idaho may enjoy the results of our wise planning and planting, and also in order that Idaho cities as they become larger may be saved from the congestion, general unsightly appearance, and undesirable quarters of many cities in the older states. Excellent lessons are to be had from a study of the planning of such beautiful cities as Washington, D. C., Chicago, Denver, Portland, Seattle, Boise and Spokane. The latter city has advanced in the past eight years from the thirty-third to the sixth city in the Union in the area of its parks.

Next to the parks the planning of our streets and the planting of trees in street parkings should receive most careful attention. Here again, as around our homes and in our parks, we find that the observer, especially the newcomer, is unconsciously attracted or repelled by the impressions made upon him. Here again, the committee on city planning may be of the greatest service. *The keyword to street beauty is system.* The planting must necessarily be in straight lines (Figure 32); it is formal and exactly opposite to that in parks where trees and shrubs should be grouped informally, and apparently as though no system were employed. Park planting to be effective requires a much more carefully worked out planting plan than any other. Street planting to be successful is dependent on the uniformity of proper species; spacing and care will do the rest. The beauty of a city depends more upon the width of the parkings than on the width of driveways of its streets.

Uniformity should always be sought. This means uniformity of architecture, of street improvements, and of the trees along each individual street, all of which unite in making a beautiful city. The value which trees add to a street depends upon the skill, and the judgment,

used in selecting them. Uniformity of species lends symmetry and charm to the scene. Repetition of the same object is a well recognized principle of design which creates a pleasing impression upon the mind of the observer. Mixing several species of trees with different colored foliage, forms, and habits of growth on the same street is bad taste and the impression which it gives is not pleasing. It is one of the commonest and also one of the worst mistakes in city planning and planting.

In order to avoid monotony, a variety of good shade trees should be used in each town but each street or each vista of such street, as from one hill-crest to another, should be planted to a single species.

Cities which have become famous for their beautiful shade trees have confined their planting to one species on each street. Washington, D. C. is credited with having the most beautiful trees of any city in America. Plans have been made and followed since the capital was established. The plan of its street planting has been to set out only one species on a street for at least a considerable distance. This uniformity of planting has made several of the streets renowned for their beauty. Among these are Pennsylvania Avenue, planted with oaks; Massachusetts Avenue set with basswood; Indiana Avenue lined on either side with Oriental planes, and New Jersey Avenue set with three miles of American elms.

Telephone and power poles should be placed in the alleys or the lines placed underground. But if necessary to place the poles in the parking they should be set next the walks and painted green where the foliage screens them and they are less conspicuous.

Trees should be set with relation to each other and the street as a whole. The spacing should be uniform and, if possible, the trees on the two sides of the street should be opposite to each other. The average distance apart in most towns in this State should be from thirty to forty feet, depending upon the species planted. Inexperienced people invariably plant trees too close together.

The selection of the right kind of trees is extremely important. It should be borne in mind that the mature tree will present a different appearance from the young sapling and plans made accordingly. The width of the street will often determine the form of crown to choose. Narrow streets should be set with narrow-crowned or short trees. The spacing will depend upon the form of crown and the size attained by the mature trees in the locality.

The selection of good trees for planting requires consideration of the following points:

1. *Hardiness.* Streets require hardy trees because they have to stand unfavorable conditions.
2. *Shade.* Street trees should give medium shade; dense shade injures the grass. If possible, street trees should leaf-out early and retain their foliage until late in the fall. Autumn colors are desirable.
3. *Form and foliage.* Street trees should be symmetrical in outlines and bear foliage which is pleasing in both color and design.

### Selection of Trees for Parkings

As just shown, much care should be exercised in selecting the species of trees to be set in parkings, but several other factors are to be taken into consideration, such as:

1. *Nature of street.*—That is, whether it is to be used for traffic or a boulevard; wide streets admit tall trees, narrow ones generally do not; wide parkings demand spreading trees such as the sycamore or Norway maple; narrow ones require tall slender trees, such as the birch. The location of telephone and other poles may compel the use of shorter trees such as the mountain ash. Residences, business houses or factories are also determining factors—more trees for residences, fewer for business blocks, and mass growths of hedges and vines as screens for factories.

2. *The effect desired.*—Are the trees to adorn buildings, to screen buildings, or to form tree avenues?—If for the first purpose, short shrub-like trees, as dwarf maples, or slow-growing evergreens should be used near the foundation; tall slender trees at the corner or in angles. Trees attaining good size are best for screening purposes, while spreading trees are generally better for tree avenues, altho splendid avenue effects can be secured by using Lombardy poplars and narrow-leaf cottonwoods.

3. *Time allowed for planting plan to mature.*—If rapid growers are demanded, the various members of the cottonwood family are the best. Since they also die soonest, it is generally preferable to resort to black locusts, silver maples, Norway maples, red oak or chestnut oak. Among the slow growers are the white ash, walnut, butternut, mountain maple and such evergreens as the arborvitae, junipers, and Colorado blue spruce. The high growers are Lombardy poplar, narrow-leaf cottonwood, red oak, chestnut oak, Douglas fir, white pine, Norway and Engelmann spruce. The best wide growers are Norway and silver maple, European sycamore, chestnut and beech. The root systems of the cottonwoods and black locust are very hard on lawns and the former should be avoided near sewers or drain-pipes.

4. *Climate.*—One must be guided largely by the climate where the trees are to be set. Certain trees, as the walnut, butternut and chestnut, require a long season, whereas the birch, ash and maple will endure a much shorter one. The altitude also has an important bearing; some trees being able to withstand the hard winters fatal to others. Certain trees require abundant moisture, while others endure drought; also certain trees are very selective as to soil while others will thrive on much poorer soil.

Table 4. This table shows the condition of the various trees planted along the streets of a town in northern Idaho. These represent average conditions for the average western town. Note the small spread of the crown due to close planting, which produces misshapen, unsightly trees. No trees under ten feet in height were

considered. The general haphazard placing of these reveals the need for proper city planning and planting.

COMMON AND SCIENTIFIC NAMES	No. trees reported	Condition (No. of trees)						Average height, feet	Average spread, feet
		Good	Medium	Poor	Discased	Poor form	Sun scald		
Box elder ( <i>Acer negundo</i> ).....	35	25	4	6	.....	20	.....	20	14
Silver maple ( <i>Acer saccharinum</i> )....	29	15	10	4	1	8	6	22	9
Sycamore maple ( <i>Acer pseudo-platanus</i> )	11	11	.....	.....	.....	.....	.....	12.3	7
White elm ( <i>Ulmus americana</i> ).....	31	15	11	5	1	6	1	29	16
Black locust ( <i>Robinia pseudacacia</i> )....	28	14	12	2	.....	3	2	19	13
Lombardy poplar ( <i>Populus nigra var. italica</i> ) .....	222	130	76	16	.....	.....	14	33.3	9.4
Balm of Gilead ( <i>Populus balsamifera</i> )	46	40	6	.....	.....	6	5	30	10
Mountain ash ( <i>Pyrus americana</i> ).....	9	2	4	3	.....	6	4	20	9
Norway maple ( <i>Acer platanoides</i> ).....	10	5	5	.....	.....	.....	.....	17.5	11.3

In recently established towns, a plan for street-planting should be made when streets are laid out. Systematic street-planting should be begun immediately and haphazard planting discontinued. Grades and width of streets and width of parking should be established in order that trees can be properly placed. In the older towns this street-planting plan should be based upon the greatest number of desirable species of trees found on each street. All trees that are set out in the future should

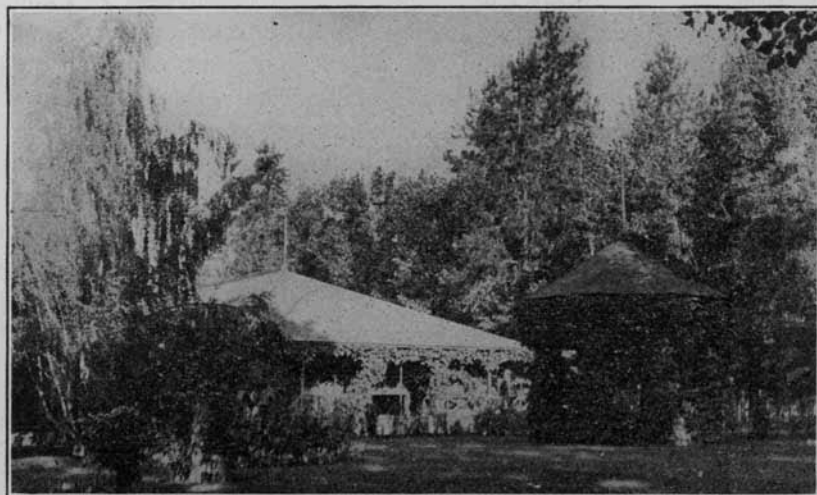


FIG. 33. In this view from Coeur d'Alene we have the native trees (firs and pines) forming a splendid stately background. These furnish a mass effect of foliage which gives to the buildings a most appropriate setting, by framing and throwing them into proper relief. They also balance the equally beautiful green-sward effect in the foreground. The foundational and trellis effects are secured by the proper use of vines and shrubbery. The pleasing vistas from without toward these build-

ings, and from them outward onto the lake and boulevards have been carefully and tastefully arranged. Few better examples of appropriate planning and planting of grounds can be found in the State.



FIG. 34. The finest and most difficult effect to secure is here obtained from the native trees so wisely preserved. The highly pleasing effects here shown have been secured without planting a tree. The native growth has been preserved, the ground leveled, seeded and laid out with appropriately planned walks. The mass effects are of foliage, light and shade, and green sward. The vistas in every direction are pleasing.

be placed according to the plan. Most of the old trees, especially the more undesirable ones will be taken out in time and replaced by young ones of the species designated in the plan.

The plan and selection of species to be planted should be made by someone fully competent to handle the work. In the larger cities, a consulting landscape gardener, arborcultivist, or city forester should be employed to draft the plan. In the smaller cities a committee of local people best adapted to this kind of work should draw up a planting-plan.\*

The plan should be strictly followed when once adopted, regardless of individual ideas. Some paid city official should be authorized to direct street planting when done either by property owners or by the city. A man trained along these lines should be employed permanently to supervise parks and street-tree planting in all the larger towns. (See Figures 33 and 34.) In smaller towns it should be in the hands of the city engineer or street commissioner, guided by the best authorities on arboriculture and landscape gardening. The plan of planting should not be changed with the change of officials.

The following shade tree ordinance carries provisions adaptable to most western towns:

\* "Shade Trees in Towns and Cities" by William Solotaroff, Wiley & Sons, New York City, may be taken as a guide.



### ORDINANCE

An Ordinance relating to the planting, protection, regulation, control of shade trees planted or growing upon the public highway of the city of.....

Be it ordained by the city council of the City of..... as follows:

"SECTION I. No Individual, or officer, or employee of a corporation shall, without the written permit or direction of the city engineer cut, prune, break, climb, injure, or remove, disturb or interfere in any way with any tree on a public highway; or spray with any chemicals or insecticides any tree in a public highway; or place any rope, wire, sign, poster, or other fixture on a tree or tree-guard in a public highway; or injure, misuse, or remove any device placed to protect such tree on a public highway.

"SEC. II. No shade, ornamental, or fruit tree or shrub shall be planted in any of the public highways of the City of..... until such tree shall have first been approved and the place where it is to be planted designated by the city engineer.

"SEC. III. No person shall fasten a horse or other animal to a tree in a public highway in the City of....., nor cause a horse or other animal to stand so that said horse or animal can injure such tree.

"SEC. IV. No person shall, without the written permit of the city engineer place or hereafter maintain upon the ground in a public highway, stone, cement, or other substance which shall impede the free passage of water or air, to the roots of any tree in such highway, without leaving an open space of ground outside the trunk of said tree in area not less than four square feet.

"SEC. V. In the erection of any building or structure, the owner thereof shall place such guards around all nearby trees on the public highway as shall effectually prevent injury to them.

"SEC. VI. No person or corporation shall, without the written permit of the city engineer attach a wire, insulator, or any device for the holding of a wire or pole to any tree growing or planted upon any public highway of the City of.....

"SEC. VII. Every person or corporation having any wire or wires charged with electricity running thru a public highway shall securely fasten such wire or wires so that they shall not come in contact with any tree thereon.

"SEC. VIII. Any person or corporation violating any of the provisions of this ordinance shall, upon conviction thereof, forfeit and pay a penalty of ten dollars for each offense or repeated violation.

"When adopted this ordinance, properly signed, should be published and copies posted in various public places in the city." \*

### THE RAILWAY STATION

Nothing can do more in the way of creating, among traveling people, a good or bad impression of a town, than the conditions surrounding rail-

\* Adapted from "Shade Trees in Towns and Cities," by William Solotaroff.



way stations. This is recognized by many of our great railway systems and they are spending large sums to beautify the grounds around their depots; they well know that many travelers are on the lookout for attractive places in the West where they may bring their families and establish a home. The very first glimpse of a station and its surroundings has great influence in causing them to decide for or against locating at that place.

Every wide-awake town desiring to attract business and capital should realize that no more practical thing from a purely commercial standpoint can be done than to beautify the railway station and grounds. Well laid-out lawns around the station appropriately set to trees and shrubs and with a few flowers cost but little, and add greatly to the attractiveness of a small town.

Citizens and railway companies should labor together in forwarding this important phase of community building.

#### GOOD TASTE SAVES EXPENSE AND LABOR IN PLANTING THE HOME GROUNDS

A great many persons who are desirous of having beautiful home grounds, as we have said before, make the mistake of over-doing in the matter of planting shrubbery and trees. A few trees carefully selected and properly placed about the home grounds or parks, are much more to be desired than the indiscriminate planting so often resorted to in both town and country.

Many people do not realize that quality and taste can be displayed in efforts at landscape gardening, as well as in the decoration of the interior of the home or in the selection of personal attire. The man who plants his front yard to trees or shrubs, using the all-over, rows-in-two-directions plan, has taken steps to secure what will prove to be a gaudy, cheap, orchard-like effect as his trees mature. At the same time he will have used more trees, costing a greater outlay in money and labor, than if he had tastily arranged them in clumps and groups about his walks and along the sides or in the corners of his yard. By the latter plan he will reserve for those occupying the house, pleasing vistas of the road or street and proper expanses of green sward with appropriately set clumps of shrubbery or beds of flowers. He will also have secured for the passing public a much more pleasing view of his house and grounds and both will appear much more pretentious than if the grounds were improperly laid out. It is not the aim to give the impression that one can secure quality in home grounds merely by the *proper placing* of what is planted. While this is very important, yet he may so select *improper species* as to size at maturity, color of foliage, flowers, etc., as to still render his efforts in this direction fruitless. A knowledge of what plants may do well in the sun, what ones in the shade, which plants will stand the driving wind, and which ones should have the protection of others, or of buildings, should be had in order that complete success may be attained. A little careful study of properly planted grounds or of bulletins giving proper methods and species will save those so doing money

and effort and enable them to approach ideals which are much more likely to be realized as the planting plan reaches maturity.

### A FEW SUGGESTIONS FOR DECORATIVE PLANTING

*Have a plan, which is fundamentally correct*, in that it contains the principles necessary for obtaining proper landscape effects. The more important of these principles are: First, to fit the plan to the size, location and nature of the plat to be beautified. This is very important, and much of the bad taste exhibited in planting by many well meaning people is due to this fundamental error. Next, one should strive to select such plants as when mature will most decidedly contribute toward the effects desired. Such are:

1. *Mass effects along the bases or at corners of buildings.*—These are secured by a proper selection of shrubs, and shrubby evergreens placed near the base of the buildings; and for the corners, by means of vines, and tall, slender trees. These effects are proper and highly to be desired because they give the maximum of decoration with the minimum expenditure of money, time and labor, and are more or less pleasing all the year round, depending on the skill used in selecting and caring for the plants.

2. *Mass effects in back yards, alcoves of buildings, corners of parks, or drives and angles of walks and roads.*—Here much may be accomplished by the proper selection and placing of species. Tall trees should be selected for the background, wide, spreading ones for the middle ground, and low trees or shrubs and flowers for the foreground, along walks and for hedges.

3. *Color effects.*—Much want of taste is exhibited by people who fail to consider the effects produced by improper color harmonies, either among the plants themselves or between the plants and buildings or other backgrounds; red or yellow roses against a red brick wall, or white flowers against a white house are good examples.

4. *Vista effects.*—Very much can be accomplished here by the proper selection and placing of plants with regard to framing certain views of buildings, streets, roads, mountains, towns, valleys, lakes or streams. The shutting out of unsightly views of old buildings, or poorly kept grounds, is often very effectively accomplished by well planned planting.

5. *Green-sward effects.*—Practically all the foregoing are greatly heightened by the proper use of the green sward, and all should grade down into it. No scheme of planting is good which does not recognize the value of neatly kept green sward, and in most cases we should jealously guard against much encroachment upon its main masses. These tend to magnify the size of buildings and grounds and to give an atmosphere of quality and good taste which can be secured in no other way. (Figs. 19, 33.) The careful observance of the foregoing suggestions and warnings will be found to aid those who desire to secure pleasing effects in planting, and to entail less expense to the owner than the all-over methods of indiscriminate planting of anything and everything so often resorted to by those who desire beautiful grounds but have neither proper plans nor correct ideas for obtaining them.



FIG. 35. The President of the Kendrick (Ida.) School Board, addressing the citizens and school children at the dedication of their city park, at which time it was appropriately planted according to a plan carefully prepared by the Forest School of the University of Idaho. This park, while only four years old, has been so well cared for that it is easily the most attractive spot in the town. It pays to start right and then keep up the interest in tree planting.



FIG. 26. A view of the city park, Coeur d'Alene, Idaho, showing how the native yellow pines furnish an appropriate background for exotic ornamentals, both trees and shrubs. By saving these native trees the park managers were able to secure immediately an effect of majestic stateliness, which could not have been obtained had they allowed the trees to be cut, in less than from fifty to seventy-five years.



FIG. 37. This row of beautiful poplars has been ruined for want of a city ordinance requiring telephone poles to be set in the alleys. The trees of many of the towns in Idaho are thus "butchered."



FIG. 38. The owner thought his trees needed pruning (?).

#### PLANTING PLANS

We have but two classes of plans: 1. Formal or artificial; 2. Informal or natural.

We may have a formal plan in which all plants are in rows one way or we may have them in rows in two directions. The general effect is that of an orchard or vegetable garden and it is very seldom pleasing. It generally looks worse as it grows older.

Again, we may have a formal planting-plan in which beds or clumps of trees and shrubs are used either in rows or groups. This may be recommended where the space to be planted is rather small and contiguous to much travel or traffic, such as small parks and grounds about railway stations. The larger the area, the more one should strive to avoid rows and lines of any kind and to approach the informal or natural plan.

Informal planting may be divided into two kinds. The first or all-

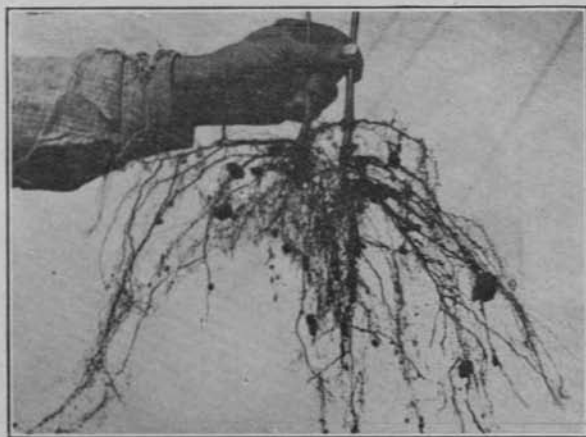


FIG. 39. The root system of the black locust is so extensive that no other trees can be successfully used for underplanting in woodlots of this species.



FIG. 40. The "canker" disease, a bacterial infection is very prevalent on the Balm of Gilead trees in Idaho and is the worst objection to the use of this species for any purpose. The silver leaf poplar is quite free from this disease and is recommended as being better for practically all purposes. The trees shown above are sixteen years old, but will die in a short time.

over method is generally to be condemned. It costs more both to plant and to care for, it destroys the mass effects of the green sward, while highly pleasing vistas both into and out of the grounds are generally interfered with. The method generally reveals inexperience and lack of good taste.

The second division of informal-planting, that of distributing the plants used in masses or clumps is undoubtedly the best in most cases. It is more valuable as it more nearly simulates nature. Its use however requires the fullest possible knowledge of the plants employed and also what effects are to be sought or preserved. In its highest perfection it can only be developed by most careful and scientific planning. The following outline of planting-plans will give the reader a clear idea of what is described above.

1. Formal in rows:

- |              |            |
|--------------|------------|
| a. One way   | } Both bad |
| b. Both ways |            |

2. Formal in beds or clumps:

- a. If in rows generally bad.
- b. May be so grouped as to give good effects but not easily.

3. Informal or natural:

- a. All-over. Generally very bad.
- b. In clumps and groups. Undoubtedly best but requires taste and careful planning to give best results.

*What to avoid—*

1. Gaudiness
2. Over doing
3. Too great a variety
4. Improper selection of species as to:
  - a. Size at maturity
  - b. Form at maturity
  - c. Color harmonies
  - d. Intolerant plants (in sun)
  - e. Tolerant plants (in shade)
  - f. Soil and moisture requirements
  - g. Hardiness
5. Destroying lawn
6. Destroying vistas
  - a. Into grounds
  - b. Out of grounds to:
    - x. Rivers
    - xx. Lakes
    - xxx. Mountains, etc.

#### MISTAKES IN TREE PLANTING

1. Planting trees in sodded lawns or fields.
2. Planting a sun-loving tree in the shade.
3. Planting a shade-loving tree in the sun.



4. Planting in freshly plowed sod.
5. Ridging the ground in cultivating the trees. Flat cultivation is much better.
6. Deep cultivation which injures the roots.
7. Frequent but scant watering, which tends to draw the growing roots to the surface. Water thoroly but not too often. You can drown a tree.
8. Planting trees with tops too large for the reduced root system.
9. Watering the trees in such a way as to cause the soil to bake around the base. A mulching of sand or straw will prevent this. Sand is best.
10. Planting parking trees too close together.

### SEASONS FOR PLANTING

In planting tree seeds or transplanting trees there are but two seasons, spring and fall, during which reasonable success may be expected. For most localities in Idaho better success is usually secured in the spring. It is impossible, owing to the great variation in altitude in various parts of the State, to fix planting dates very definitely, but a safe guide for spring planting would be when warm weather is sufficiently advanced to warrant garden making; that is, when the soil has dried out to such an extent that it will "work up" in the proper manner and the days and nights are warm enough to stimulate growth.

The second best season for transplanting seedlings is in the autumn after fall rains have set in, but before the nights become very cool or any considerable amount of frost has occurred. The main objection to fall planting in Idaho is because of the very cold and drying winds in the spring; these often kill the trees before the roots have formed sufficient connections with the soil to enable them to supply enough moisture to keep the bark from shriveling and the buds from dying. In planting tree seeds in the fall, and most tree seeds should be planted then, one should wait until just before the ground becomes permanently frozen. Earlier planting often causes the seeds to germinate in the fall with disastrous results.

### PREPARATION OF THE SOIL AND USE OF FERTILIZERS

If possible the ground should be plowed (where raw land is being used) in the autumn, where spring planting is to be done, or in the spring if fall planting is contemplated. By this means the sod will become somewhat rotted down and it will be much easier to put the soil in proper condition. If, however, a few trees are to be set in unplowed land, it is highly desirable that the sod be entirely discarded when digging the holes for the trees which should be set in the ground slightly deeper than they formerly grew. If the soil is at all dry, it is an excellent plan to fill the holes with water the day before the trees are to be put out, and when the trees are set moist soil should be used to fill the hole and *firmly packed* around the roots. In case the location is rocky or sandy or the soil of a clayey nature, large holes, two to three feet in

diameter should be dug and good black loam should be used to fill in around the trees. It is often a good plan to take a small amount (1 part in 4) of *well-rotted* stable manure and mix with soils that are not sufficiently rich, in order that root growth may be stimulated. The use of any large amount of fertilizer of any kind, however, is to be discouraged in setting out trees. It is much better to fertilize the soil after the trees have begun to grow since there is little danger of over-doing at this time, while trees are often killed by too free an application of fertilizers when being transplanted.

It is an excellent plan where lawn, street or park trees are to be watered with a hose or bucket, to leave a depression around the tree from three to four inches deep which should be filled with sand. The sand serves as an excellent mulch for holding the moisture and at the same time prevents baking. Never allow water to stand around the tree until the earth is puddled. The hot sun invariably bakes the soil, rendering it unfit for plant uses and also highly conductive of moisture; thus the water is evaporated from the ground in the neighborhood of the tree roots and damage done. If sand cannot be had, a mulch of straw or grass from the lawn will answer very well. Even a few boards laid around the base of the tree helps.

#### SETTING THE PLANTS

In putting out trees or shrubs *great care* should be exercised in order that the roots may not be exposed to the hot sun for any considerable length of time. This is *extremely important* in the case of *all of the evergreen trees*. It is decidedly better to keep the roots heeled-in in moist earth with the top toward the south. If they must be removed and transported any great distance, they should be immersed in a bucket of thin mud or wrapped in wet moss or grain sacks and never permitted to become dry. The holes should be made large enough to admit the roots without serious crowding. Any broken or injured roots should be trimmed with a sharp knife. Extra long roots should be cut back. If the soil is at all dry, a bucket full of water thrown into the hole may be desirable; this will bring the earth in very close contact with the roots and also make it sufficiently moist to stimulate growth immediately. One should be careful, however, that the wet soil thus formed in the bottom of the hole is completely covered with dry soil which should be pressed down firmly with the foot.

The tops of the hardwood trees should generally be cut back freely at the time of setting. The reason for this is that since the root system has been disturbed and also considerably reduced it will take some time for it to reestablish itself sufficiently to convey to the leaves the amount of water which they demand. If the top is allowed to put out its usual (or even a greater number) of leaves than before, as it will do if untrimmed, it is very evident that the water supply will be insufficient and the leaves will wilt and die; whereas if the leaf surface is reduced as much as possible the few leaves put out will thrive and the tree will live.

## VINES AND SHRUBS

The instruction for transplanting trees should serve in transplanting vines and shrubs. It is impracticable to set out climbing shrubs without trimming them back to a great extent. The same relations between root system and leaf system exists and often to a more marked degree. Therefore, we should not expect success in transplanting vines several feet in length when the root system is very severely disturbed and much reduced. If one takes up a large mass of earth with the tree, vine, or shrub the pruning may be correspondingly reduced, since the root connections with the soil are undisturbed in this earth and will begin at once to supply the necessary water for maintaining the life of the leaves.

## TREES, SHRUBS AND VINES SUITABLE FOR ALL PARTS OF IDAHO

## (GENERAL LIST)

It is extremely difficult to make a list of trees and shrubs equally suitable for all regions of the State; that is because of the great range in latitude, elevation and rainfall. Trees and shrubs doing well at the elevation of Lewiston, 742 feet, might not be hardy at Moscow with an elevation of 2600 feet. It is therefore, necessary that every locality be guided largely by the elevation and the rainfall or water supply at hand. Of course, in the irrigated districts only latitude and elevation should be considered.

The following plants may be somewhat generally recommended for use in most parts of the State:

*Vines.*—Boston ivy, English ivy, Virginia creeper, white clematis, purple clematis, wisteria (below 2000 ft.), wild honeysuckle, wild clematis, Dutchman's pipe.

*Shrubs.*—Syringa, service berry, arrow wood, barberry (common), purple barberry, Oregon grape, privet, shrubby evergreens, nine bark, hardy hydrangias (below 2700 feet).

*Trees.*—Black locust, honey locust, Norway maple, Douglas fir, Engelmann spruce, cork bark elm, silver maple, black walnut, butternut, European larch, blue spruce, white ash, mountain ash, red oak, chestnut oak, Norway spruce, white elm, catalpa, Austrian pine, eastern jack pine, Scotch pine, Digger pine, concolor fir.



Table 5.—Record of trees distributed by the Forest School in 1913 with reports for the growing season, 1913.

	DIST. 1				DIST. 2				DIST. 3				DIST. 4				DIST. 5				STATE				
	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	
Black locust	5	97	87	10	6	115	113	2	5	387	221	43	6	400	263	34	2	17	14	18	24	1016	698	31	
Norway maple	4	36	35	3	4	30	22	27	6	48	24	50	6	83	47	43	2	16	11	31	24	213	139	35	
Silver maple	6	83	81	2	5	133	121	9	4	56	43	23	4	83	76	8	2	36	22	39	21	391	343	12	
Black walnut	5	65	57	12	3	26	9	65	6	89	67	25	3	53	43	19	3	24	22	8	20	257	198	10	
Box elder	3	29	29	0	1	4	0	100	1	4	0	100	1	10	10	0	3	52	50	4	8	95	89	6	
White ash	6	85	76	10	5	85	64	25	3	35	31	12	5	48	39	19	3	52	32	38	22	305	242	21	
Red oak	5	60	49	19	4	20	16	20	4	60	42	30	5	28	15	46	2	9	4	56	20	177	126	29	
Honey locust									1	3	3	0									1	3	3	0	
Sycamore maple																									
Butternut																									
Catalpa																									
Elm									1	4	4	0										1	4	4	0
Tree of Heaven																									
Tulip																									
Austrian pine	3	57	55	4	3	48	29	40	5	79	45	41	5	80	37	54	2	27	6	78	18	291	172	41	
Scotch pine																									
Jack pine																									
Norway spruce																									
Douglas fir (c)																									
Douglas fir (rm)																									
European larch																									
Japanese larch																									
Blue spruce																									
Engelmann spruce																									
Pitch pine																									
Willows	2	22	22	0	1	100	100	0					1	20	20	0					4	142	142	0	
Totals		505	462	9		586	503	14.2		765	480	37.3		805	550	31.7		233	161	30.9		2894	2156	25.5	

Table 6.—Record of trees distributed by the Forest School in 1913 with reports for the growing season, 1914.

	Dist. 1				Dist. 2				Dist. 3				Dist. 4				Dist. 5				STATE			
	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent .....	No. trees reported upon .....
	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost
Black locust .....	4	94	72	23	5	317	163	49	6	446	314	30	3	100	20	80	2	26	5	79	20	983	574	42
Norway maple .....	4	29	28	4	6	45	24	47	5	70	60	15	1	8	7	13	.....	.....	.....	.....	16	152	119	28
Silver maple .....	7	123	100	18	5	117	78	33	2	36	26	28	3	53	42	21	.....	.....	.....	.....	17	329	246	25
Black walnut .....	6	55	35	36	4	40	16	60	4	77	58	25	3	43	27	37	.....	.....	.....	.....	17	215	136	37
Box elder .....	.....	.....	.....	.....	3	40	15	62	1	20	20	0	1	20	20	0	1	15	15	0	6	95	70	26
White ash .....	6	92	67	27	4	84	25	70	5	91	73	20	3	72	12	84	1	3	3	0	19	342	180	47
Red oak .....	5	42	11	74	5	25	9	64	4	65	39	40	3	21	9	57	1	4	3	25	18	157	71	55
Honey locust .....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	2	60	.....	.....	.....	.....	.....	.....	.....	.....	1	5	2	60
Sycamore maple .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Butternut .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catalpa .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Elm .....	2	7	7	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	6	3	50	3	13	10	22
Tree of Heaven .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tulip .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Austrian pine .....	4	52	35	33	3	28	2	93	4	76	35	54	2	45	25	45	.....	.....	.....	.....	13	201	97	52
Scotch pine .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jack pine .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norway spruce .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas fir (c) .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas fir (rm) .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
European larch .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Japanese larch .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue spruce .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Engelmann spruce .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pitch pine .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Willows .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals .....	494	355	28.2	.....	696	332	50.9	.....	886	627	29.3	.....	362	162	55.2	.....	54	29	46.3	.....	2492	1505	40	



Table 7.—Record of trees distributed by the Forest School in 1913 with reports for the growing season, 1915.

	DIST. 1				DIST. 2				DIST. 3				DIST. 4				DIST. 5				STATE			
	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....	No. persons sent trees .....	No. persons reporting .....	No. trees sent... ..	No. trees reported upon .....
	14	3	1396	407	26	3	3620	330	29	3	4896	261	19	0	3365	0	6	663	0	94	9	13940	998	
	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost	rec'd on species	trees reported set out	trees living at end of 3rd season	Per cent lost
Black locust .....	2	124	20	84	2	94	72	24	3	127	0	100					7	345	92	73				
Norway maple .....	2	20	10	50	2	15	12	20	2	16	1	94					6	51	23	55				
Silver maple .....	3	87	34	60	2	103	81	12	3	31	10	67					8	221	125	44				
Black walnut .....	2	20	9	55	1	10	10	0	2	20	9	55					5	50	28	44				
Box elder .....					1	15	15	0	2	25	25	0					3	40	40	0				
White ash .....	3	62	35	44	2	50	35	30	1	6	5	17					6	118	75	37				
Red oak .....	3	25	9	64	2	15	3	80	2	15	0	100					7	55	12	78				
Honey locust .....																								
Sycamore maple .....																								
Butternut .....																								
Catalpa .....																								
Elm .....																								
Tree of Heaven .....																								
Tulip .....																								
Austrian pine .....	2	37	34	6	2	28	22	12	2	21	0	100					6	86	56	35				
Scotch pine .....																								
Jack pine .....																								
Norway spruce .....																								
Douglas fir (c) .....																								
Douglas fir (rm) .....																								
European larch .....																								
Japanese larch .....																								
Blue spruce .....																								
Engelmann spruce .....																								
Pitch pine .....																								
Willows .....	1	32	32	0														1	32	32	0			
Totals .....		407	183	55.1		330	250	18		261	50	80.9										998	483	51.7

TREES—WHAT, WHERE, WHEN, AND HOW TO PLANT

Table 8.—Record of trees distributed in Idaho by the Forest School in 1914 with reports for the growing season, 1914.

	Dist. 1				Dist. 2				Dist. 3				Dist. 4				Dist. 5				STATE				
	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	
Black locust	13	72	57	21	17	403	360	11	4	122	119	2	6	160	125	22	9	130	96	26	49	887	757	15	
Norway maple	9	39	37	5	10	82	82	0	5	45	41	9	3	50	31	38	6	55	44	20	33	271	235	13	
Silver maple	16	172	163	5	10	137	127	8	4	26	23	12	5	125	86	32	7	137	123	10	42	597	522	13	
Black walnut	13	81	69	15	15	89	78	12	4	27	18	33	5	45	37	18	5	41	36	12	42	293	238	16	
Lox elder													1	25	15	40	1	10	10	0	2	35	25	29	
White ash	14	98	86	12	10	67	54	19	6	97	91	6	6	205	148	28	11	198	152	33	47	665	531	20	
Red oak	9	46	32	30	12	62	45	28	7	47	32	32	6	30	17	43	11	62	34	45	45	247	160	35	
Honey locust	8	66	63	5	8	95	79	17	4	26	23	12	1	10	3	70	5	92	72	21	26	289	240	17	
Sycamore maple	12	95	95	0	6	42	36	14	4	28	26	7					2	28	28	0	24	193	185	4	
Butternut	10	61	51	17	9	38	31	18	6	37	23	38	1	20	10	50	3	25	23	8	29	181	138	24	
Catalpa	7	39	32	18	10	50	43	14	5	28	20	29	1	10	7	30	1	5	5	0	24	132	107	19	
Elm	6	29	27	7	7	44	43	9	4	36	33	9					3	21	21	0	20	130	124	5	
Tree of Heaven	9	49	47	4	5	13	12	8	3	9	9	0	3	9	2	88					20	80	70	12	
Tulip	9	38	28	26	7	18	10	45	5	21	7	67	2	4	0	100	3	9	3	67	26	90	48	47	
Austrian pine	1	5	0	100	7	81	70	14	6	78	42	46	3	25	5	80	7	118	81	31	24	307	198	36	
Scotch pine	1	5	0	100	5	78	66	16	5	36	28	22	2	21	1	95	6	73	34	54	19	213	129	38	
Jack pine	1	25	25	0	3	30	25	17	4	13	2	85	2	21	19	10	4	57	17	70	14	146	88	40	
Norway spruce	3	30	29	3	9	65	58	10	6	55	49	11	3	55	42	24	3	13	12	8	24	218	190	13	
Douglas fir (c)					2	10	9	10	2	3	0	100										4	13	9	31
Douglas fir (rm)	1	20	8	60	2	22	22	0	4	48	15	69	2	50	40	20	8	90	61	33	17	230	146	37	
European larch	4	11	9	18	3	13	7	45	4	17	5	71	2	7	0	100	2	7	1	86	15	55	22	60	
Japanese larch	4	12	10	17	6	22	14	36	3	12	0	100	1	2	0	100					14	48	24	50	
Blue spruce	3	4	4	0	6	6	4	34	6	11	10	9	2	2	1	50	3	4	4	0	20	27	23	15	
Engelmann spruce	1	2	2	0	4	14	8	43	3	12	8	33					2	6	6	0	10	34	24	30	
Pitch pine									1	2	0	100										1	2	0	100
Willows	1	200	100	50	5	102	72	29					3	400	390	3	3	400	390	3	12	1102	952	14	
Totals		1199	974	19		1583	1355	14.4		836	624	25.4		1276	979	23.5		1581	1253	20.8		6475	5185	20	

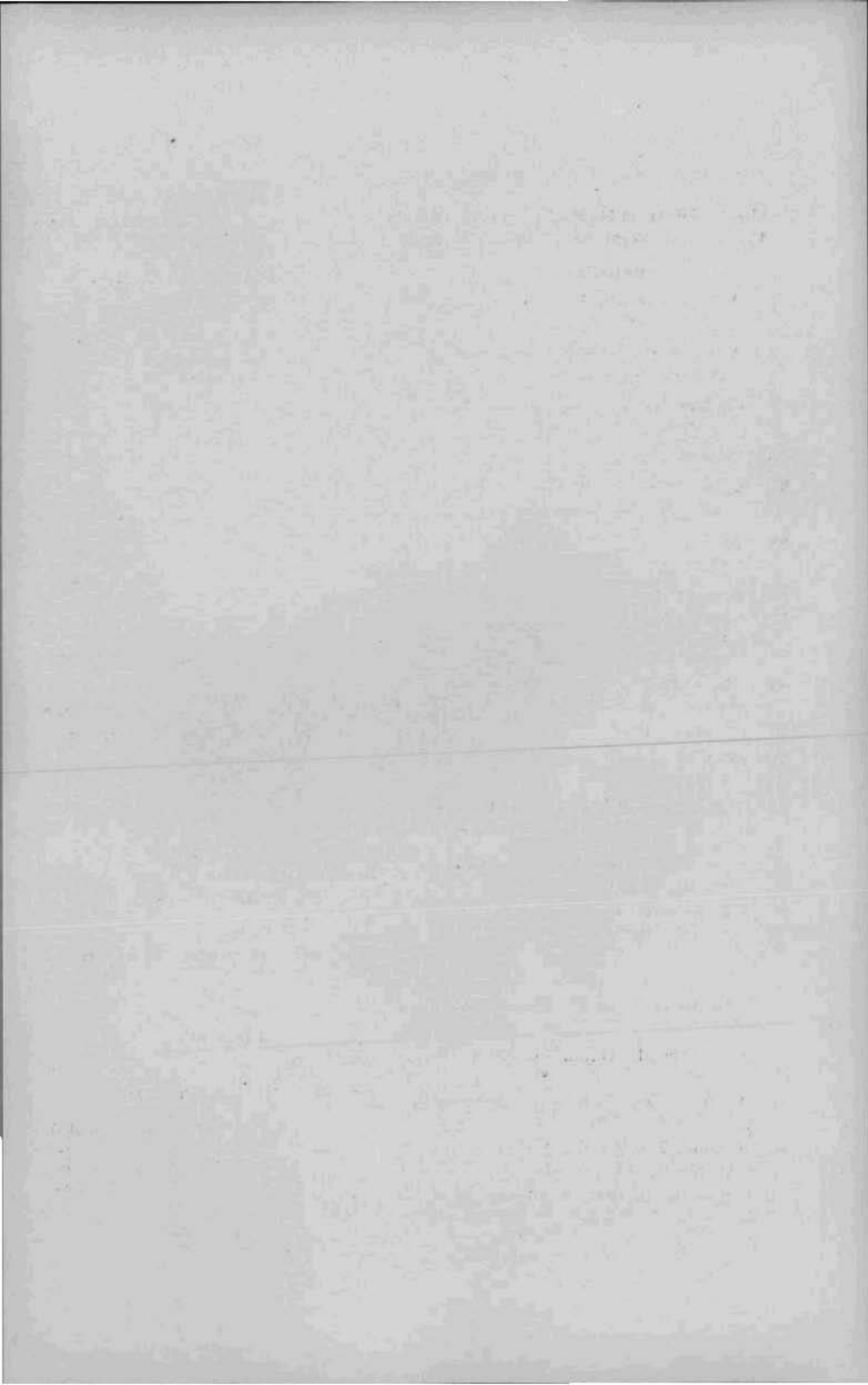
Table 9.—Record of trees distributed in Idaho by the Forest School in 1914 with reports for the growing season, 1915.

	DIST. 1				DIST. 2				DIST. 3				DIST. 4				DIST. 5				STATE			
	No. persons sent trees . . . . . 27				No. persons sent trees . . . . . 52				No. persons sent trees . . . . . 28				No. persons sent trees . . . . . 26				No. persons sent trees . . . . . 29				No. persons sent trees . . . . . 162			
	No. persons reporting . . . . . 11				No. persons reporting . . . . . 15				No. persons reporting . . . . . 13				No. persons reporting . . . . . 3				No. persons reporting . . . . . 10				No. persons reporting . . . . . 52			
No. trees sent . . . 1673				No. trees sent . . . 3452				No. trees sent . . . 2507				No. trees sent . . . 5794				No. trees sent . . . 3360				No. trees sent . . . 16786				
No. trees reported upon . . . . . 734				No. trees reported upon . . . . . 841				No. trees reported upon . . . . . 961				No. trees reported upon . . . . . 735				No. trees reported upon . . . . . 1276				No. trees reported upon . . . . . 4547				
	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 2nd season	Per cent lost
Black locust . . . . .	8	57	41	28	8	215	67	69	6	251	148	31	6	147	132	10	28	670	388	42	28	670	388	42
Norway maple . . . . .	4	19	15	21	7	57	29	49	5	53	30	44	1	10	10	0	5	45	23	49	22	184	107	42
Silver maple . . . . .	8	81	61	25	7	114	56	51	4	37	31	16	2	60	55	8	5	132	127	4	26	424	330	22
Black walnut . . . . .	7	42	19	55	9	65	36	45	3	20	11	45	3	25	5	80	4	31	20	35	26	183	91	51
Box elder . . . . .	7	42	30	29	6	27	12	55	5	125	109	15	1	10	6	40	7	135	45	66	26	339	202	41
White ash . . . . .	4	21	8	62	8	32	14	56	4	34	8	77	3	25	18	28	7	38	17	55	26	150	65	57
Red oak . . . . .	3	36	26	28	4	23	11	52	3	29	22	25	3	42	29	31	3	42	29	31	13	130	88	32
Honey locust . . . . .	7	73	70	4	3	24	4	83	3	27	25	7	1	10	8	20	14	134	107	21	14	134	107	21
Sycamore maple . . . . .	4	30	14	54	4	24	3	87	6	36	16	55	3	25	15	40	2	15	5	66	19	130	53	60
Butternut . . . . .	2	10	3	70	5	23	8	65	3	21	1	95	1	5	3	40	2	15	5	66	13	74	20	73
Catalpa . . . . .	3	12	7	42	3	14	12	14	2	20	19	5	2	15	9	40	10	15	9	40	10	61	47	23
Elm . . . . .	5	33	9	73	5	10	4	60	3	7	1	85	2	4	2	50	1	5	0	100	16	59	16	73
Tree of Heaven . . . . .	4	16	1	94	5	11	2	82	4	14	1	92	2	4	0	100	1	2	2	0	16	47	6	87
Tulip . . . . .	1	5	2	60	5	61	38	45	2	50	8	84	2	35	5	86	4	58	7	88	14	209	60	71
Austrian pine . . . . .	1	5	0	100	3	28	17	39	4	20	0	100	2	70	5	92	4	45	16	63	14	168	38	77
Scotch pine . . . . .	1	25	19	24	1	5	0	100	4	30	5	83	3	40	5	88	1	10	0	100	10	110	29	74
Jack pine . . . . .	3	20	10	50	6	56	13	77	4	54	36	33	3	65	33	49	4	23	8	65	20	218	100	55
Norway spruce . . . . .																								
Douglas fir (c) . . . . .					2	9	1	89	3	29	5	82	3	40	3	92	8	102	32	68	16	180	41	77
Douglas fir (rm) . . . . .					2	7	0	100	5	21	0	100					2	7	0	100	10	37	2	94
European larch . . . . .	1	2	2	0	2	7	0	100	4	13	0	100	1	1	0	100					7	21	0	100
Japanese larch . . . . .	3	3	2	33	3	3	1	66	5	10	5	50	2	2	1	50	3	4	3	25	16	22	12	46
Blue spruce . . . . .	1	2	0	100	2	6	0	100	2	10	7	30	1	2	0	100	1	5	0	100	7	25	7	72
Engelmann spruce . . . . .													1	2	0	100					1	2	0	100
Pitch pine . . . . .									1	50	3	94					3	400	180	55	7	970	483	51
Willows . . . . .	1	200	0	100	1	20	0	100	1	50	3	94	1	300	300	0	3	400	180	55	7	970	483	51
Totals . . . . .	734	339	53.9		841	328	61		961	491	48.9		735	474	35.5		1276	660	48.3		4547	2292	49.6	

TREES—WHAT, WHERE, WHEN, AND HOW TO PLANT

Table 10.—Record of trees distributed in Idaho by the Forest School in 1915, and reports for the growing season, 1915.

	DIST. 1				DIST. 2				DIST. 3				DIST. 4				DIST. 5				STATE			
	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost	No. reports rec'd on species	No. trees reported set out	No. trees living at end of 1st season	Per cent lost
Black locust	1	3	3	0	7	65	61	6	14	761	684	10	6	163	151	7	5	153	143	6	33	1145	1042	9
Norway maple	2	25	20	20	10	67	62	7	11	112	91	18	5	92	61	34	6	91	88	3	34	387	322	17
Silver maple	1	5	5	0	9	73	73	0	11	103	65	36	7	55	53	4	8	109	102	6	36	345	293	14
Black walnut	1	5	5	0	5	29	26	10	11	48	37	23	3	10	10	0	8	44	37	16	28	136	115	16
Box elder	1																							
White ash	1	5	3	40	8	73	73	0	7	73	45	38	6	87	63	23	7	81	75	7	29	319	259	19
Red oak					7	28	11	61	7	27	11	59	4	18	14	22					18	73	36	51
Honey locust					3	15	13	13	10	210	159	24	3	41	41	0	5	63	50	20	21	329	263	21
Sycamore maple					3	13	13	0	2	12	12	0	1	10	10	0	2	16	14	12	8	51	49	4
Hatternut					3	12	11	8	13	47	38	19	1	10	5	50					17	69	54	21
atalpa	1	5	3	40	6	23	20	13	11	57	49	14	2	7	5	29				20	92	77	17	
lm																								
Tree of Heaven					4	7	7	0	6	13	11	15	1	5	0	100	5	18	12	33	16	43	30	31
ulip																	1	1	0	100		1	0	100
Austrian pine									4	13	8	38	2	24	20	13	3	23	17	26	9	60	45	25
Scotch pine					2	11	11	0	4	8	8	0	3	10	7	30	4	38	32	16	13	67	58	14
Jack pine					1	10	10	0	6	41	22	46	1	4	4	0	5	39	35	10	13	94	71	25
Norway spruce					8	50	44	12	7	40	40	0	4	58	55	5	3	27	27	0	22	175	166	6
Douglas fir	1	20	1	95	2	14	5	64	7	48	39	19	3	34	10	72	3	27	13	52	15	143	68	53
European larch					2	6	4	33	3	31	20	35	2	23	0	100	2	10	6	40	9	70	30	58
Japanese larch									3	12	7	41									3	12	7	42
Blue spruce	1	10	10	0	5	22	15	40	11	51	45	11					8	53	43	19	25	136	113	17
Engelmann spruce					3	12	9	25	4	43	30	30					2	6	6	0	9	61	45	27
Hickory					4	26	12	54	10	64	24	62	3	25	19	24	2	15	1	93	19	130	56	57
Sugar maple					4	20	20	0	11	62	46	26	5	50	34	32	5	47	29	38	25	179	129	28
Willows	1	30	25	17					2	64	60	6									3	94	85	10
Totals		108	75	31		576	500	13		1940	1551	29		726	562	23		861	730	16		4211	3418	19



The following publications may be obtained without cost, by addressing the Agricultural Experiment Station, Moscow, Idaho.

### Bulletins

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| <p>72. A Report on the Milling Properties of Idaho Wheat.</p> <p>73. A Study of Idaho Butter with Suggestions for Improvement.</p> <p>75. Composition of Irrigated and Non-Irrigated Fruits.</p> <p>76. Tomato Culture in Idaho.</p> <p>81. Soils of the Cut and Burned-Over Areas of North Idaho.</p> <p>85. The Use of Lime-Sulfur as a Summer Spray for Apple Scab.</p> <p>86. Some Poisonous Plants of Idaho</p> <p>87. Insect Pests of the Orchards and Gardens of Idaho, and Their Control.</p> <p>88. The Milling Values of Dry-Farmed and Irrigated Wheat.</p> <p>90. Creamery Records.</p> <p>91. Methods of Clearing Logged-off Lands.</p> <p>92. The Annual Report of the Experiment Station for the Year Ending June 30, 1916.</p> <p>93. Experiments with Small Grains Under Irrigation.</p> <p>94. Experiments with Legume Crops Under Irrigation.</p> <p>95. The Management of Irrigated Grass Pastures.</p> <p>96. The Management of Farm Flocks in Idaho.</p> <p>97. Commercial Onion Culture in Idaho.</p> <p>98. Winter Versus Summer Pruning of Apple Trees.</p> <p>99. Experiments in the Irrigation of Apple Orchards.</p> <p>100. The Production of Clover Seed Under Irrigation in Southern Idaho.</p> | <p>101. The Production of Alfalfa Seed in Southern Idaho.</p> <p>102. Dairy Herd Management.</p> <p>103. Performance Records of Some Eastern Wheats in Idaho.</p> <p>104. Annual Report of the Experiment Station for the Year ending Dec. 31, 1917.</p> <p>105. Trees: What, Where, When and How to Plant.</p> <p>.... Measurement of Irrigation Water.</p> <p>.... Hog Cholera in Idaho.</p> <p>.... The Alfalfa Weevil.</p> <p>.... Directory of Idaho Pure-bred Breeders.</p> <p>Farmers' Bulletin 769. Growing Grain on Southern Idaho Dry Farms</p> <p>Farmers' Bulletin 907. Bean Growing in Eastern Washington and Oregon and Northern Idaho.</p> <p>*Ground Squirrel Control.</p> <p>*Oats in Washington.</p> <p>*The Home Drying of Fruits and Vegetables.</p> |
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\*Purchased of Washington State Experiment Station for distribution in Idaho.

### Circulars

2. Field Peas.
3. Feeding for Egg Production.
5. Tested Forest Trees for Planting in Idaho. This circular is a price list of trees for sale by the Department of Forestry at approximate cost.
6. The Spray Calendar.