A STUDY OF TIMBER CULTURES PLANTED FIVE DECADES AGO IN
THE WOOD RIVER VALLEY, KLAMATH COUNTY, OREGON.

by

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INTRODUCTION

This paper is a study of the timber cultures planted in the Wood River Valley near Fort Klamath, Oregon over five decades ago. Historical, as well as silvicultural studies were made of the stands.

These timber cultures were chosen for special study because, so far as is known, they are the oldest timber plantations in Oregon. The study of why they were planted and what has happened to them since they were planted has been not only interesting, but the source of much information on early-day thoughts and attitudes toward forest conservation. These stands were planted under the provisions of the Timber Culture Act of 1872 as it stood revised in 1873. The purpose of this act was conservation through encouraging the growth of timber on western prairies.

No other study of timber cultures existing in Oregon has come to the attention of the author. In order to study the stands, and the causes for their presence in this region it was necessary to review the history of homestead legislation. The provisions of the Timber Culture Act were obtained from Professor T. J. Starker's folder on Forest Laws of the United States. Another valuable reference in this work was "Tree Culture", a
pamphlet containing observations accompanying the annual report of 1868 of the General Land Office on Forest Culture. This material was taken from pages 892 to 932 in "The Public Land Laws of the United States" by J. C. Zabriskie.

The next step was a review or history of the manner in which the homestead legislation affected the Wood River Valley. To obtain this information it was necessary to interview some of the local residents in the valley. Most of the needed information was obtained from Mr. Ray Loosely, a native of the Wood River valley.

Of the three stands in the valley, the Scott plantation, now owned by the Nichols brothers, was the largest, and in the best condition, so all silvicultural studies were made in this plantation.
A Study of Timber Cultures Planted Five Decades Ago in the Wood River Valley, Klamath County, Oregon.

How This Study Began.

Five years ago, as I was driving along a county road one mile west of Fort Klamath, Oregon, I was surprised to see a small stand of Lodgepole Pine (Pinus contorta) growing row upon row. The entire stand was not over nine acres in extent and I had passed it before fully realizing what I had seen.

Perhaps such a small stand of the common Lodgepole Pine, in an area where no valuable commercial use has been found for the wood, would seem quite unimportant to most people. It did not prove interesting to me until I had seen it a second time and started wondering why it was growing in such neat rows. I began asking questions about it. Why was this small plantation growing on valuable clover land? If it had been planted, who had done the planting and when? What was behind it all? The answers to these questions were not easy to find. Few of the oldtimers knew much about this nine acre tract of timber. Before a year had gone by I had learned much local history, as well as many unique interpretations given to some of our former land laws.

It would seem that this small plantation, along with several others existing in the Wood River valley (approximately forty miles north of Klamath Falls, Oregon), is indicative of a trend of thought in an earlier day. What did people think of the future of our forests in those days when our western country was still young?

Background of Timber Culture Act.

As far back as 1868, the annual report of the Commissioner of the General Land Office, on Forest Culture contained these interesting observations:

".....it may be realized that our forests are disappearing with alarming rapidity; that while the demand for all descriptions of lumber is annually increasing, the districts furnishing the supplies are rapidly diminishing in number and extent, indicating even at the present rate of consumption fifty years will not have passed before every forest will have disappeared from that portion of the United States lying east of the Mississippi. West of that river the prospect is still more unfavorable from existing supplies of woods. From the Missouri River westward to the Rocky Mountains, from the southern to the northern boundary the general characteristic of the country is that of a vast treeless plain. Between the Rocky Mountain chain and the Sierra Nevada and Cascade ranges, extensive tracts exist, destitute of trees, leaving a narrow belt between the last-named ranges and the Pacific Ocean of first-class timber lands.........What makes the matter still worse, the States of California, and Oregon, and in the Territory of Washington, the public dominion is being denuded of forests by trespassers, the lumber being
sent to South America, China, and Japan, and even to European countries, so that long before the population shall become even moderately numerous in the regions to which these forests should furnish the required supplies, spoilation will have brought about a destitution almost as great as exists east of the mountains; and it may be said of the country west of the Mississippi, as of that on the east, that unless the forests now existing are better protected, and the system of planting new ones speedily commenced, scarcely a tree will be left at the end of forty years, except in remote and inaccessible localities. (4)

This report went on to discuss the progress that had been made in other countries in their tree planting programs on especially desolate areas.

"The forest of Fontainebleau grows in a soil composed of 98 per cent of sand, and as it is almost without water, it would be a drifting desert but for the artificial propagation of forest-trees upon it. Certainly, if trees can be successfully cultivated in this forest, on the drifting sand plains of Gascony, of northern Germany, and the Russian Steppes, there is not the remotest reason why forest culture should fail on any part of the great American Plains, the favorite haunts of the buffalo for centuries on account of their nutritious grasses." (4)

The report was concluded with these following recommendations:

"In view of what has been said, it is recommended that an amendment be made to the homestead law requiring each settler, on proving up at the end of five years, to make proof of having planted and cultivated a certain number of trees, living, and at least three years old from the seed or from setting out at the time of the application for a patent. The labor of tree planting being first enjoined as a requisite to obtain a title, would fix the attention of settlers upon the subject, and discovering the feasibility of the enterprise they would soon prosecute it from the
consideration of its evident advantages to themselves and the whole community. An additional inducement might perhaps be presented by a general law, offering an additional number of acres to each settler who would successfully cultivate for a given number of years a certain number of acres in forest." (4).

These observations have not been presented to illustrate the correctness or incorrectness of predictions made in 1868, but rather to show the background and the causes of why we had such laws as the Timber Culture Act of 1872.

**Timber Culture Act of 1872**

The provisions of this Timber Culture Act of 1872 were: Persons planting and maintaining in a healthy condition for ten years forty acres of timber on any quarter section of land might receive a patent for that land. Homesteaders might also receive patents if at the end of three years they had kept for two years timber growing on one-sixteenth of their claims. All the forty acres of land were to be planted the first year and there could be no entry less than 160 acres. It was amended to cover these two defects, and revised entirely in 1878.

**Purpose:** Conservation, through encouraging the growth of timber on western prairies.

**Results:** Settlers found it impossible to comply with the original act or even with its revision in
1878, providing for 10 acres instead of 40. The law had no appreciable effect on stimulating timber growth and in most cases served as a fraudulent means of acquisition of land. (1)

Review or History of the Manner in Which the Homestead Legislation Affected the Wood River Valley.

Fort Klamath, the principal town of the Wood River valley, derives its name from the name of the fort located there in the early days. Soldiers were quartered here to help police the Indians on their new home, the Klamath Indian Reservation. Many of these soldiers saw action in the celebrated Modoc Indian War, which occurred when the Modoc Indians left their new home on the reservation because of a difference of feeling with their new neighbors, the Klamath Indians. However, these soldiers played another role in the valley. When their terms of enlistment were up many of these men took homesteads in the Fort Klamath country. Some stayed, but the majority of them sold their claims to the settlers coming into the region at that time.

Methods Available for Securing Land.

In my talks with Mr. Ray Loosely, a native of the
Wood River valley, I was informed that when the settlers first came to this region they found a level, barren valley. The soil had possibilities, and was of a light sandy nature. Water was available for irrigation, but rainfall was only about 20 inches annually. The land was classified as prairie land, and homesteads were taken out. Although the Timber Culture Act of 1872 was intended primarily to accomplish afforestation in the prairie states, these sly settlers managed to secure another 160 acres of land through the planting of 20 acres of trees on this land in the Wood River valley. The Timber Culture Act, as amended in 1878 stated that only 10 acres of timber need be planted, but the people in this region were of the opinion that most of the timber cultures here had been 20 acres in size when first planted. Later the required area of trees to be planted was reduced to 10 acres. These following three methods of obtaining land were available to the early settlers in this valley. (1) Pre-emption, 160 acres. (2) Homestead, 160 acres. (3) Timber Culture, 160 acres. (20 acres of trees to be planted. This amount later reduced to 10 acres.) In order to secure a pre-emption on the land it was necessary to pay $1.50 per acre and to make some improvements
upon the land. In order to homestead land, a man was supposed to live on the land for 5 years, and make some improvements upon the land.

**Timber Cultures in Klamath County.**

In the Wood River valley the 20 acres of timber culture were usually planted with hardy Lodgepole Pine. The rows were prepared with a plow, and spaced from 6-10 feet apart. The young seedlings were brought in on a wagon from the surrounding foothills and placed in the rows in a somewhat haphazard manner. There seems to have been no effort to space trees with each row.

**Location of Timber Cultures.**

The three timber cultures existing in this area at the present time are: (1) The Scott Culture (SE\(_4\), SE\(_4\), S. 18; T. 33 S.; R. 7\(_{\frac{1}{2}}\) E.) and (2&3) The Melrose Cultures (NW\(_4\), NW\(_4\), S. 33, and NE\(_4\), NE\(_4\), S. 32; T. 33 S.; R. 7\(_{\frac{1}{2}}\) E.)

**The Scott Timber Culture.**

According to Mr. Loosely, the Scott plantation, now owned by Nichols brothers was planed approximately 60 years ago as far as he can remember. (3) In making growth studies of the trees in the culture, the greatest ring count amounted to 49 years, but due to slow starts the trees may be several years older than this. This
ring count was made in December of 1940. That would place the age of the stand at approximately 51 years of age at present.

Extent of Timber Cultures.

"The precise number of timber cultures originally planted is unknown, for once the settlers had secured title to their land many of them found this land more valuable when planted to alfalfa or clover, or used for range and pasture. These uses were made possible with the advent of irrigation in the valley. Also the surrounding foothills contained an abundance of timber, so it was only natural for many of the settlers to take out the young trees once they had served their purpose and turn the land over to agricultural uses. Each of the three remaining stands was originally 20 acres in size, but year by year they have been whittled down in size, until now the largest, the Scott plantation, is only a little over 8 acres in size." (3)

Present Condition of the Scott Stand.

After a study of each culture, the Scott culture, now owned by the Nichols brothers was picked for further study. The name of Scott has been derived from the man who originally planted and owned the stand.
It was the largest of the three, both in the area it included, and in the size of the individual trees upon the area. The stand is approximately 8.5 acres in extent. The average D.B.H. of the trees averages from ten to twelve inches. Their age is from 50 to 52 years.

The first step taken in the study of the culture was that of taking pictures of as much of the stand as possible to show the condition existing in various parts of the stand, as well as other local conditions on nearby land.

Growth in the Scott Culture.

Following the photography work, increment borings were taken from trees varying in size from eight to sixteen inches. The cores taken from these trees showed that the majority of the trees had made rapid growth during the first 30 years, but in the last 20 years the stand had reached a period of stagnation, for the rings were so close as to be very difficult to count.

Age of the Scott Culture.

One fourteen inch tree on an outside row in the stand was windthrown, so a section was removed from the tree about one foot above the ground level. A picture
of the actual growth of the tree, from the standpoint
of its crowding by other trees on the one side and its
freedom on the other was obtained. This section con-
tained 49 rings, and was taken from the tree in 1940,
so it seems logical to believe that the stand is from
50 to 52 years of age.

**Tree Size.**

This stand was planted in a region where Lodge-
pole Pine is abundant, and seems well adapted to the
climate. The trees on the edges of the stand contain
healthy, live limbs to within eight feet of the ground.
The whole stand has been pruned to a height of eight
feet. The average tree in this stand would answer a
description something like this: D.B.H. ten inches;
branches pruned up to eight feet; whorles partially
grown over; height of tree, fifty-five feet; branches
on the tree to a height of forty feet; numerous small
cones on all of the dead branches.

**Climatic Influences**

**Effect of Wind.**

No noticeable effects of the wind were observed
in the stand, for severe winds are not common, and
stand density is such that only the outside edges of
the stand would feel the effect of strong winds. The uniform height of all the trees in the stand is another factor which reduces liability of wind damage.

Effect of Rain and Snow.

The average annual precipitation in this region averages about twenty inches. Much of this is snow which thickly blankets the country from the end of November to the first of March, as a rule. The rain comes during the fall and spring months. Without the snow it is doubtful if this plantation would have survived, for the winter temperatures are low, dropping below zero frequently. It is evident that the snow is beneficial in at least two ways. First, it stores up moisture and forms a reserve supply that is available in the spring. Secondly, it forms a blanket or cover which helps prevent the harmful effects of frost and freezing temperatures. Sections of the stand that have been grazed or upon which livestock have been fed over the winter months show many harmful effects of frost. When the snow becomes trampled, a slush forms, and during the day little puddles of water appear. These freeze hard at night injuring the trees' root systems. In the area where grazing has been carried on within the Scott culture the trees have shown
Effect of Grazing

One of the most important biotic factors affecting this stand is the amount of grazing done by the cattle and horses on the area. Luckily, for the sake of comparison, a barbed wire fence extends through the entire length of the stand. Nearly two-thirds of the stand has been very heavily grazed annually, while the remainder of the stand has not been grazed for a long time. This was a most interesting happening, for the whole Wood River valley is a great cattle-raising region, and when the animals congregate in large numbers during the summer, they favor the shaded areas of their range. Here, under the shade of the trees they rest, or spend restless hours pawing the dirt in an attempt to dust off the insect pests. The effect on the trees is readily apparent. What happens, apparently, is that the dirt covering the roots of the tree is ground up and turned into dust in the summer by the cattle and then during the winter, cattle on the area trample the snow so that the freezing winter temperatures tend to freeze or expose any
unprotected roots. This may cause high mortality in a stand in which heavy grazing takes place.

**Effect of Competition of Other Plants**

Within the stand itself, the only competing vegetation is the heavy sod or turf which grows quite well as a result of the high water level throughout the area. Where the stand has been thinned out by over-grazing, it may be that a combination of the grazing and this thick sod has prevented any reproduction from appearing on the area. Within the un-grazed portion of the stand, the stand itself is so dense that no reproduction has occurred.

**Effect of Over-crowding or Competition**

Up to the present time the greatest effect of the over-crowding or competition present within the stand has been the greatly reduced growth rate in the last 20 years. The fact that within the stand, only the upper twelve to fifteen feet of the trees have green branches is also a result of over-crowding. This condition has caused a loss of approximately ten percent of the trees six inches and over in diameter in the last twenty years. Although over-crowding is present in this stand, it is usually present in a much greater degree in
naturally stocked Lodgepole Pine stands. According to Hanzlick, "trees 100 years of age in the Blue Mountains of southern Oregon average seventy to eighty feet in height and twelve inches in diameter, while trees in the Sierra were ninety to one hundred feet high and fifteen to eighteen inches in diameter." (2) Here in this stand we have trees that average fifty-five feet to sixty feet in height and ten inches in diameter at fifty years of age.

Effect of Insects.

Harlow and Harrar in their Textbook of Dendrology state that, "bark beetles inflict heavy damage in stagnated stands of Lodgepole Pine. (2) At the present there are no beetle-killed trees within the Scott plantation, although the bark from dead trees shows that some beetle work has been done after the tree's death.

Effect of Pathogens.

In all of the increment borings made of the trees, no trace of rot was present in any of the live trees in the stand. When trees within the stand died they stood for several years before rotting at the base, then when they fell over on their side, most of the
tree was not in contact with the ground, and so deterioration did not take place rapidly. This has resulted in much of the stand presenting a scene of wild disorder on the ground floor. "Mistletoe causes some damage and because of its thin bark, fire is always a serious menace to the tree, even though heavy stands result through this agency." (2)

**Effect of the High Water Level**

The water level is approximately a foot to a foot and a half below the surface of the ground in this area. The effect of this water level upon the stand is rather difficult to ascertain. We do know that, as a rule the Lodgepole Pine prefers dry sandy soils to the flooded areas. The presence of this species in such abundance on the coast might seem to be a contradiction to this rule, but the truth of the matter is that the salt present in the water renders only a small amount of water available for the tree's absorption. So the Lodgepole Pine on the coast, even with its roots deep in the salty water, isn't getting much more water than the tree of the same species growing in the dry sands of Eastern Oregon. The summers in the Wood River valley area are usually long and dry. This factor may mean that the
presence of water underneath the ground is beneficial to the trees, but in the winter such water and its tendency to freeze doesn't look favorable. One fact can be stated on this question, and that is that one of the Melhase plantations planted in this same valley at approximately the same time as this Scott plantation has not done nearly as well, apparently because it is growing on an area which has a much higher water level.

Wherever dams have been built, or the level of bodies of water raised, a distinct effect can be noticed among those trees whose roots have become inundated. Most of these trees die within a few years. However, due to the many varying circumstances on the Scott plantation area, it would be hard to determine what the exact effect of the high water table has been upon this stand.

Future Uses of the Stand

Probably the most immediate use of this stand will be one as a homesite. A beautiful log and stone structure has been constructed on the south-west corner of the timber culture. This valley has been the home of many prosperous cattle ranchers, many of whom have fine homes.
Fuel Wood.

Lodgepole Pine has been used for many years as a fuel wood in this region. There are several reasons for this: First, it is abundant and grows close at hand. Secondly, it splits very easily, and is usually free of large knots or burls. It also seems to be entirely satisfactory in its burning qualities. With regard to the Scott culture, it is quite likely that since a homestead has been established on the corner of the stand, the trees will be used for fuel wood. They are near at hand, quite straight, and many of them have fairly clean boles.

Fence Posts.

Locally this species is used quite extensively for fence posts since it has greater durability than either the Ponderosa Pine or the white firs, the only other abundant species in this region.

Log Siding.

In recent years several of the local ranchers have put the small, straight Lodgepole Pine logs into use as siding. Usually, three sides of the logs are smoothed and squared so that when placed on top of another log, the logs will lie tightly against each other. This results in a solid wooden wall of from 4 to 8 inches in
thickness. Such construction has been unusually satisfactory, I believe, for the winters in the valley are severe. A natural finish is usually applied to put the finishing touches on these log homes.

Summary.

In the study of this timber culture we have delved into past land laws, and past thoughts that tended toward timber conservation. In 1872 this conservation tended more toward forest plantings, rather than forest protection.

In some areas of the United States, the planting of trees has been the only practical method of re-establishing a forest in the shortest time. However, in the forests of the Northwest we have found that if we leave a few seed trees in the residual stands, or a few strips or islands of trees in the cut-over areas we will usually secure up to seventy per cent regeneration. The establishment of a new forest, then, depends upon the measure of protection from fire that we give these young trees.

As a result of this natural regeneration, we find that the planting of timber plantations has not been carried out to any extent. The timber cultures in the
Wood River valley, as symbols of another period in our history, are now relegated to the positions of interesting phenomenon.
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These two views show the Scott plantation in an over-all view. Originally this stand occupied a full 20 acres, but nearly 11 acres on this side of the stand has been grubbed out for additional land upon which to raise clover. The water level on this land is only one to one and a half feet below the surface of the ground.
These views were taken within that portion of the stand where grazing has not been carried on. The timber is in much better condition, and the per cent of survival among the trees is much greater than on the grazed portion of the stand. Note the heavy carpet of grass beneath the trees. The D.B.H. of the trees in these two views is from 12 to 16 inches.
More views of the un-grazed portion of the Scott timber culture. The lower picture was taken January 1, 1941, and shows snow and ice conditions within the stand.
These two views give us a picture of the heavily over-grazed portion of the Scott culture. Notice in the upper picture that short, rotten stumps are all that remains of much of the stand. The lower view shows the thinned-out condition of the grazed area. Many of these trees are in poor condition and lack the vigor to survive for many more years.
The scenes on this page were samples of parts of the stand where competition got the better of some of the trees with sad results following. The upper view, however, shows that many of the dead trees were sawed down and evidently used for fire wood. The upper picture is one of the grazed area, while the lower picture has been taken in an ungrazed area.
A front view of the beautiful log and stone home built on the south-west corner of the Scott timber culture.

This close-up view of the log construction shows the manner in which the logs were smoothed and squared on three sides and fitted with a tongue and groove.
This cross-section of Pinus contorta was removed from a tree in the Scott culture at a point a foot above the ground. The diameter of this section is 16 inches. Since this tree from which the section was taken was growing on the edge of the timber culture, a wide variance in the rate of growth is noticed. The lower right of the section shows the slow rate of growth of that part of the tree in the interior of the stand. The larger rings at the top are indicative of the rapid growth put on by the side of the tree exposed to no competitive influences.