The Farm Wood Lot—in the Hardwood District of Minnesota and in the Tualatin Valley of Oregon

by

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FOREWORD

This treatise is primarily intended to present a comparison of the farm wood lots of the Minnesota Hardwood District and the farm wood lots of the Tualatin Valley of Oregon. The presentation has been divided into two main divisions, each of which has been subdivided into three sections which deal with the different aspects of the wood lot situations of the two respective geographic regions. The first section of each division deals primarily with the wood lot histories of the two regions. The second component contains a discussion of the present wood lot management of the two regions. The third and last section considers the future possibilities of wood lot development in the two districts concerned.

The information upon which this report is based was obtained from a number of different sources. A large part of the material presented was gathered through personal observations in each of the two regions. Other information was collected from bulletins, magazine articles, and reference books dealing with the subject of farm forestry in the two respective regions. A complete list of the references used is found in the bibliography of this report.
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INTRODUCTION

A farm wood lot may be defined as a tract of wooded growth, lying within the boundaries of a farm ownership, maintained for the purpose of supplying certain forest products and uses to the owner thereof, either for private use or for sale. Large variations may exist in the relative sizes and compositions of farm wood lots, depending upon such factors as the following:

1. The size of the farm ownership.
2. The geographic location.
3. The type of farming being undertaken.
4. The available markets for wood lot products.

In certain advantageous regions, the farm wood lot may add materially to the annual farm income by furnishing commercial products and uses. In other localities, the wood lot may furnish very few marketable products, while the uses to which the wood lot is subjected may be such that a general deterioration results.

Within the boundaries of the farm wood lots of the United States is found approximately thirty per cent of the total commercial forest land area. These wood lots contain about fifteen per cent of the total commercial volume. It is to the advantage of the nation, both from an economic

and a cultural viewpoint, to protect this source of commercial timber from being depleted. In addition to the national importance, wood lots are often of considerable importance to the states, counties, and communities in which they are located. The relative amount of importance depends upon the economic and cultural values that may be derived from the products and uses of the wood lots concerned.

In practically all instances, the depletion of the individual wood lots, and consequently the collective wood lots, can be prevented only by the owners. Many owners are not fully aware of the values of their wood lots. An analysis of an individual wood lot will often reveal a number of values that are not always apparent at a first glance. Among these more or less obscure benefits are the following:

1. Weather protection.
2. Erosion control.
3. Recreational opportunities.
4. Spare time employment.
5. Improvement of the general appearance of the farm.

In the future, it will be necessary to awaken the wood lot owners to the full present and future values of their individual tracts. This must be done if a co-operative plan of wood lot management is to be realized.
PART I

THE FARM WOOD LOT IN THE HARDWOOD DISTRICT
OF MINNESOTA

Section 1.- - The Wood Lot History of the Hardwood District.

A Physical Description of the Region.

The Hardwood District of Minnesota is a more or less vaguely defined area which embraces the central and south-eastern sections of the state. The region has a gently rolling, glaciated topography. A great number of glacial lakes are present, varying in size from those having an area of only a few acres to the relatively larger bodies of water having a diameter of several miles. For the most part, these lakes are fairly shallow. The soil of the region is very rocky as a direct result of the glacial action of an earlier geologic period. In many districts, the use of agricultural machinery is exceedingly difficult because of the stony nature of the ground. The climate of the region is typically continental, having a fairly large daily and seasonal temperature variation. The seasonal temperature range in St. Paul, Minnesota has been recorded as 119 degrees Fahrenheit. The weather often becomes severe during the winter months, but is usually mild during the spring,

summer, and fall. The summer months may be very hot and
dry during cycles of drought, and conversely, cool and damp
during moist cycles.

The Original Forest Cover.

The original forests of the Hardwood District covered
approximately one-half of the entire area, the remainder
of the land being covered with a tall-grass prairie. The
trees of the original forest cover consisted chiefly of
maple, elm, basswood, and red oak, all growing predominant-
ly on the hills and upland areas. In localities where the
forest growth was sparse, the forest floor was often cover-
ed with a luxuriant vegetation of grasses and shrubs. Aspen
and poplar trees were found in small isolated groves on the
intermittent prairies. Willow groves and thickets were nu-
merous in the moist bottoms near the lakes and streams.

The Early Treatment of Wood Lots.

The early settlers of the Hardwood District were chiefly
of Nordic descent, coming principally from the Scandi-
navian Peninsula and Germany. The cultural and economic
backgrounds of these immigrants were of such a nature that
one might normally have expected some measure of a conserv-
ing attitude toward any natural resources that they might
come to possess. Unfortunately, such was not the case. The

1 The Forest Situation in the Hardwood and Prairie Dis-
tricts of Minnesota, Lake States Forest Experiment Station,
depletion of the timberlands began with the earliest arrivals. The first sawmill was erected in 1839; however, there are records of timber cutting as early as 1820. The settlers did not, as a rule, cut trees for lumber production, but rather to clear the land for agricultural purposes. The forest growth was of such abundance that little thought was given to the fact that the forests might eventually be depleted. It was essentially the same situation that faced the early pioneers of the North American continent, and the situation was handled in much the same manner. Some of the timber was used in the construction of buildings and fences, in addition to the wood that was cut for fuel. However, there undoubtedly was a very large amount of material waste.

During the latter part of the nineteenth century, perhaps the heaviest damage was done to the wood lots by the indiscriminate grazing of livestock. Normally, the animals were turned into the wood lots as soon as feasible in the spring and were not removed, except for short intervals, until the cold fall weather made it necessary. This continual grazing reduced the grass cover of the forest floor, caused much seed destruction, hindered the advance of reproduction, packed the soil, and in general, did a great deal toward the detriment of the forest growth. As Minnesota came into prominence as a dairying state, the practice

\[1\] Ibid., p. 230.
of indiscriminate grazing became more intense. As a result, the wooded pastures, where growth had once been luxuriant, came to contain only scattered and decadent remnants of the original stands.

Early Planting in the Hardwood District.

Although a great number of the early settlers were able to secure homesteads that contained either forest land or isolated prairie groves, this was not possible in all instances. If no woodland existed on a homestead, it became desirable to plant a grove around the buildings. The presence of a grove served to ameliorate the forces of the winter blizzards and the summer tornadoes. In most cases, the trees planted were of the same species as the components of the original forests. A mixture of relatively fast-growing trees and slower-growing, sturdier trees was most frequently selected to be planted. Black willow (Salix nigra), paper birch (Betula papyrifera), cottonwood (Populus deltoides), and box elder (Acer negundo) were planted to provide a combination of quick growth and decorative appearance. Silver maple (Acer saccharinum), basswood (Tilia americana), red oak (Quercus borealis), and green ash (Fraxinus pennsylvanica) were selected to provide a more permanent growth, and in addition, to add a measure of stability to the entire grove. Fruit trees were usually planted,

1 Ibid., p. 16.

either in orderly rows within the interior boundaries of the grove, or scattered throughout the grove in a more or less random manner. Conifers were often planted, chiefly for purposes of decoration. The groves were typically arranged in rows around the farmstead, with a preponderance of trees on the north and west sides to give additional protection from the winter winds.

The Timber Culture Act of 1873, and the Kincaid Amendment of 1911 did much to stimulate the planting of groves in Minnesota. It has been estimated that seventy per cent of the settlers set out plantations on their farms. The majority of these groves were planted during the period of heavy settlement which took place from 1880 to 1900.

The products and uses of early wood lots.

One of the most common uses of the early Minnesota wood lots was the production of fuel wood. The settler required approximately seven cords of wood during the year. Hardwood species such as oak, maple, ash, and basswood were preferred above others. The cutting was customarily done during the winter months.

In addition to fuel wood, the forests furnished fence posts and rails, not only to the wood lot owners, but also to such neighbors who did not possess wood lots of their

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The Forest Situation in the Hardwood and Prairie Districts of Minnesota, Lake States Forest Experiment Station, U. S. Department of Agriculture, July, 1937, p. 6.
own. Oak wood was used, almost exclusively, for the construction of the fences. After being cut, the wood was seasoned for several months. The work of hewing the bolts into posts and rails was done during the winter months. The posts were cut to a length of approximately six feet and were hewed into a rectangular shape. Three rectangular holes, about three inches by five inches in size, were cut through the posts with hand chisels and mallets. The rails, about twelve or fifteen feet in length, were hewed to fit the holes in the posts. From the cutting of the trees to the setting of the posts and fitting of the rails, this work was extremely laborious and time consuming. The advent of the barbed wire fence brought an end to the hand-made rail fences. However, the remains of hand-hewn fences, still in use on certain farms of the Hardwood District, testify to their qualities of durability.

A large amount of building material was cut from the farm wood lots during the early days of the homesteading era. Much of this material was hewed into the desired size and shape. Other material was sawed into shape at the small sawmills that were located at various points throughout the region. Usually, the locally-grown hardwood building material was used for internal construction only, the ex-

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A handmade fence, such as is described, is in evidence near the common county line of Douglas and Pope counties, approximately one-half mile north of Farwell, Minnesota.
terior sheathing lumber being imported from the softwood mills of northern Minnesota, or from other softwood producing states.

The early settlers were often forced to rely upon their own ingenuity regarding the construction and repair of many implements and machines. From the wood lot, the settler obtained bolts of hardwood which could be seasoned and used in the fashioning of tool handles, wagon tongues, plow beams, sled runners, wagon boxes, wheelbarrow handles, singletrees, and other articles of a similar nature.

Grazing has always been an outstanding wood lot use in the Hardwood District. The settlers commonly turned cows, horses, sheep, and hogs into the forests during the spring, summer, and fall. Overgrazing was widespread, as were its effects. As the dairy production of the state increased, the grazing increased in proportion.

The Hardwood District is noted for its great number of lakes. Many wood lots contained lakes or bordered on lakes. Farmers who owned such wood lots possessed excellent recreational opportunities. As a rule, the lakes were too common to allow the individual owners to commercialize their ownerships. However, for the private enjoyment of the individual owners, the values of their lakes or lake frontages

were of considerable importance.

Section 2. - The Present-Day Wood Lots of the Hardwood District.

The Existing Situation.

The present situation of the Hardwood District wood lots is not entirely satisfactory. The long years of poor cutting practices, overgrazing, drought, and erosion have taken their toll. At present, it appears that only through carefully planned and carefully executed management will the wood lots be brought up to a desired level of quality and composition.

Today, the average farm of the Hardwood District is approximately one hundred forty-five acres in size, twenty-five to thirty acres of which is in woodland. In the majority of instances, the wood lots are located on land that is unsuitable for agricultural purposes, either because of unfavorable topographic conditions, or because of unfertile, rocky soils. The average wood lot is composed of such species as red oak, white oak, silver maple, box elder, bass-wood, elm, black willow, green ash, white birch, and poplar. The typical wood lot contains a fairly even-aged stand which, in most instances, has been subjected to a considerable amount of culling. The exact amount of erosive damage depends to a large extent upon such factors as the amount of grazing to which the tract has been subjected, the topography, and the composition of
Factors Contributing to the Present Situation.

The present situation of the Minnesota wood lots can perhaps be attributed chiefly to one cause, namely that of improper management. Under this main heading would be placed such integral components as overgrazing, improper cutting practices, lack of erosion control, lack of conservation interest, and many other contributing factors of deteriorating natures.

Perhaps the one most destructive factor concerning the wood lot has been the practice of overgrazing. Minnesota has for years been an outstanding dairy state, and as such, has required a considerable amount of pasture land. From the viewpoint of the farmers, the grazing of wood lots has furnished one of the few logical answers to the grazing problem. It is true that abundant quantities of wild grass has always existed in the meadows and sloughs. However, it has been the practice of the farmers to cut this grass for hay to be used as winter fodder. As a result, there has been little grazing land left on the average sized farm besides the wood lot. Occasionally, a farmer may use agricultural land for pasture, but usually the relatively higher values of grain crops tend to prohibit the use of fertile soils for grazing.

Another cause which has contributed to the general
deterioration of the wood lots has been the practice of indiscriminate timber cutting. In many instances, only the healthiest trees have been selected for cutting. Continued over a period of several decades, this practice has resulted in an ever decreasing number of healthy trees, coupled with an increase of decadent growth.

Although the wood lot owners have been largely responsible for the present conditions of their wood lots, the entire blame cannot be attributed to them. During the years of 1930-1937, a severe drought existed throughout the greater part of the Hardwood District. Much forest growth perished from a lack of sufficient moisture, as well as from the accelerated grazing necessitated by critical pasture shortages. The reproductive capacity of the forest land was at a minimum during the drought period. The dry cycle ended in 1937, but the effects of its presence will be noticeable for a considerable period of time.

Products and Uses of the Hardwood District Wood Lots.

The average farmer of the Hardwood District cuts approximately seven cords of fuel wood, fifty-four fence posts, and one thousand board feet of lumber during each year. Although old and defective trees may be cut for fuel wood, the requirements of the fence and lumber material are usually of such a nature that only healthy and relatively well-shaped trees are utilized. The total wood lot drain is alleviated to some extent by the use of coal,
fuel oil, metal fence material, and imported lumber. The average wood lot owner still grazes livestock on his forest ground to a fairly large extent. In most instances, the livestock consists of a combination of cattle and horses, although not infrequently, sheep and hogs are also pastured in the wood lots.

The wood lot owner can usually derive at least a small amount of monetary profit from the products of his woodland if suitable markets are present. In most cases, the principal products are fuel wood and fence material. In certain conveniently situated localities, pulp wood, railroad ties, and saw logs may also be marketed. There may also be a limited demand for bolts of hardwood to be used for local manufacture of implement handles or other articles of a similar nature.

The Wood Lot and Recreation.

Minnesota has long held a reputation as one of the nation's leading recreational areas. The entire state contains a total of more than ten thousand lakes which, together with seventeen million acres of forest land, comprise a region of great scenic beauty. To this region, much of which lies within the Hardwood District, the tourist and sportsman alike are attracted. Since the advent of the automobile, the recreational revenue has been of considerable importance in the economy of the state.

Section 3. - Future Possibilities in the Wood Lot Development of the Hardwood District.

The Future Need of Wood Lots.

The farm wood lots of the Hardwood District must be preserved to maintain the social, cultural, and economic aspects of the region. The principal reasons for the perpetuation of the farm woodlands may be enumerated as follows:

1. Wood lots are needed to maintain a continuous flow of forest products, principally fuel wood and fence posts, but also including railroad cross ties, saw timber, and pulp wood.

2. In many localities, forest growth is necessary for the control and prevention of accelerated erosion.

3. Wood lots are necessary to aid in stabilizing and maintaining the recreational values of the region.

4. Forest land is needed to furnish a limited amount of controlled grazing.

It is obvious that a continuous flow of fuel wood, fence posts, railroad ties, saw timber, and pulp wood is of considerable importance to the economic welfare of the Hardwood District and to the state of Minnesota in general. It is true that each of these products can be replaced, either by the use of substitutes or by importation, but in practically all cases, replacement or importation would bring an additional expense to the consumer. At present,
the wood lots of the Hardwood District are able to supply only a portion of the region's industrial and agricultural wood requirements. Through carefully planned management, the wood lots of the region can be developed to a degree of production that will enable them to supply an appreciably larger portion of the wood requirements of the region. If, on the other hand, the wood lots are allowed to continue their present rate of depreciation, the economy of the region, and consequently of the entire state, will suffer.

Erosion, both from wind and water, has for many years been a major problem in various parts of Minnesota. In the hilly sections of the state, severe gully erosion has been caused by the removal of forests and other types of native vegetation. In the future, a certain amount of seeding and planting may become necessary to prevent severe damage to the topsoil. If some form of regeneration is not undertaken on land that is suffering from erosion, the once fertile land may be reduced to an area of barren waste land.

During the past few decades, Minnesota has gained a wide-spread reputation as a vacation land. The large number of spring-fed lakes, most of which are readily accessible by roads, attracts multitudes of tourists and sportsmen. The farm wood lots, comprising approximately eighty

per cent of the state's total forest land, assume an important position in relation to the recreational opportunities of the region. The Hardwood District contains a large percentage of the lakes and forest lands within the state and subsequently plays an important part in attracting and supplying recreational opportunities to the tourists.

At present, about eighty-five per cent of the wood lots of the Hardwood District are pastured. It is very likely that there will always be a demand for pasture beyond that which may be furnished by the existing planted or natural pasture land. It has been estimated that a lightly stocked woodland on good soil will support approximately one cow per two acres per season. This indicates that the average size wood lot of thirty acres will support about fifteen head of cattle. However, it should be remembered that the average wood lot will not be situated on particularly good soil, nor will it necessarily be of suitable stocking. These two factors are among the many that must be considered in the compilation of a grazing plan. The ideal management plan, from the viewpoint of wood lot improvement, will allow only a limited amount of grazing. This general situation will not soon, if ever, be realized if the present trends are an accurate indication. However, the grazing should definitely be limited to a practical minimum, and in addition, should be limited to those months

of the year during which the forests can best sustain the effects of grazing. Hogs, sheep, and horses should not be allowed to graze in wood lots under any circumstances. Hogs are particularly injurious to oak forests, destroying seedling trees and acorns alike. Sheep and horses normally crop the grass much nearer the ground than do cattle, and for this reason should be grazed on domestic pasture ground rather than on forest land.

Possibilities of Sustained Yield Programs.

It is apparent that sustained yield, or some similar program of forest perpetuation will be required if the Hardwood District wood lots are to be developed to a point of maximum value to the communities of the district, and to the state as a whole. It is likewise obvious that a great deal of extension work and general forestry education will be necessary before such a program can be successfully undertaken. From the standpoint of the wood lot owner, there are several reasons why a sustained forestry program is not entirely desirable. The average farmer seldom considers sustained yield forestry beyond the fact that it is essentially a long-time proposition. In addition, sustained yield forestry requires the application of certain silvicultural practices which find some measure of opposition on the part of the wood lot owners. Grazing would have to be severely curtailed, the cutting of the choicest trees before maturity would have to cease, and the removal of undesirable species would be necessitated. Sustained yield for-
estry, although an eventual probability, will become a reality only after a program of adequate forestry education is available to every wood lot owner.

The Future Markets of the Hardwood District.

During the past few years, the forest products market of the Hardwood District has absorbed practically all of the region's marketable products. It is quite probable that the future markets will continue to absorb a large percentage of the marketable material. It is not likely that the saw timber or pulp wood markets of the district will ever be completely filled by the local production. The markets for other products such as fence posts, fuel wood, railroad ties, and rough building material will probably remain relatively stable.

The demand for recreational facilities has increased greatly during the past decade and will probably continue to increase for some time to come. At present, the Hardwood District is furnishing recreation, not only for the citizens of the state, but also for tourists and sportsmen from all parts of the nation. Wood lot owners have, in many instances, found a lucrative source of income in the renting of lakeshore lots and rowboats. The farmer, whose wood lot borders an accessible lake, will often find that a few dollars invested in such recreational facilities as docks, boats, campground improvements, and stocking of fish will yield a profitable return.
PART II

THE FARM WOOD LOT IN THE TUALATIN VALLEY OF OREGON

Section 1. The Wood Lot History of the Tualatin Valley.

A Physical Description of the Valley.

The Tualatin Valley is located in northwestern Oregon, the approximate center of the valley lying about twenty-five miles west of Portland. Practically the entire valley is found within the boundaries of Washington County. The topography varies from the flat plains of the north Tualatin country to the steep and hilly land of the foothills and mountains that border the valley on all sides. The soils of the region fall into many classes, ranging from rich loams to infertile clays. In a few parts of the valley, particularly near the mountains, outcroppings of rock are quite common. The region has a mild climate, the temperatures seldom falling below the freezing point during the winters, while the summer temperatures do not become excessively high. The rainfall is heavy during the late fall, winter, and early spring, but the late spring, summer, and early fall months are usually free from heavy rains, and often become very dry. Although wind storms are common during the winter months, the wind velocity seldom reaches the stage where damage is done to structures. Lightning storms are not frequent, but occasionally do occur during the late summer and early fall months.
The Original Forest Cover.

The forests of the Tualatin Valley originally consisted of a combination of softwoods and hardwoods, with a predominance of coniferous species. Included among the various trees of the valley were the following:

- Douglas fir (Pseudotsuga taxifolia)
- Grand fir (Abies grandis)
- Western red cedar (Thuja plicata)
- Western hemlock (Tsuga heterophylla)
- Garry oak (Quercus garryana)
- Oregon ash (Fraxinus oregona)
- Willow (various species of Salix)
- Red alder (Alnus rubra)
- White alder (Alnus rhombifolia)
- Western dogwood (Cornus nuttallii)
- Broad-leaf maple (Acer macrophyllum)
- Vine maple (Acer circinatum)

The valley was largely covered with a forest growth. Douglas fir predominated on most of the timbered ground. In the swales, creek bottoms, and other lowlands grew a profuse growth of ash, alder, dogwood, and willow. Tall cedars grew in the cool, moist canyons of the hills surrounding the valley. The forest floor was covered with a combination

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of ground plants and shrubs, except under very dense tree growth where the lack of sunlight precluded the growth of most types of ground vegetation.

The Early Treatment of Woodlands.

It is undoubtedly true that a great deal of material waste can be credited to the forest practices of the pioneers. In defense of the early settlers, it might be mentioned that the demand for forest products during the early years was relatively small, and in addition, the land was superbly suited for agricultural purposes, once the forest cover had been partially or completely removed. In view of these and other factors, it is possible that the pioneers were somewhat justified in their apparently negligent treatment of the woodlands.

Prior to the period of intensive logging which took place near the beginning of the present century, a relatively small amount of woodland clearing was done in the Tualatin Valley. The earliest settlers located their farm sites on the Tualatin Plains which are located about eight miles northeast of the present city of Hillsboro. Very little clearing was necessary on these nearly treeless plains. As the settlements grew in size, the settlers found it necessary to remove an increasing amount of timber and brush. A large part of the early land clearing was done by hand or with the aid of animal power. As a result, the amount of land that could be cleared by a farm owner during a year's time was seldom more than an acre or
two in area.

Grazing was practiced to a certain extent on the farm woodlands of the early-day Tualatin Valley, although probably not to the same extent that it was practiced in Minnesota. The coniferous woodlands did not lend themselves as readily to grazing as did the hardwood forests of the Lake State. Much of the grazing done in the Tualatin Valley was confined to the grassy creek bottoms and the woodland composed of hardwood growth such as ash and oak.

**Products of the Early Farm Woodlands.**

The pioneers of the Tualatin Valley found a host of uses for the products of the forests. These uses included the production of fuel wood, building material, fence components, and other general uses.

The fuel wood was usually cut from Douglas fir, oak, and ash. Much of the cutting was done during the winter months, the wood being piled and left to season until the following summer or fall when it was hauled to the woodshed. The wood of the vine maple was used for a special purpose, namely, that of providing a seasoning smoke for the curing of hams and bacon sides.

Building material was cut from the forest, hewed roughly into shape, and used in the construction of farm and community buildings. A surprisingly large number of the present farm and community structures were built, chiefly by hand labor, during the latter half of the nineteenth century. The joints of these buildings were hand fitted
and dowelled with wooden pegs. A close inspection of the wall boards of such pioneer structures will often reveal the marks of the axe, the adze, and the jack plane.

The fences of the early Tualatin farms were usually of the stake-and-rider or rail types. On many of the farms, sections of such fences are still in evidence, and in a few instances, still in use. The majority of these fences were constructed of cedar, the durabilities of the other available species being relatively inferior.

In addition to the fuel wood, building material, and fence rails taken from the forests, the settlers derived a great many other products from the trees, shrubs, and ground plants. From bolts of seasoned hardwood, the pioneers manufactured implement handles, plow beams, sled runners, and rough furniture. The bark of the cascara tree furnished a medicine for both humans and livestock. Forest shrubs, including Oregon grape, salmonberry, blackcap, wild blackberry, wild strawberry, and numerous others were used for food. It is undoubtedly true that much food was also indirectly derived from the forest in the form of game animals and birds.

The Period of Logging in the Tualatin Valley.

The period of intensive logging began near the turn of the present century and lasted roughly for a decade. In many of the abandoned buildings of logging camps, one may still find shreds of newspaper bearing date lines of the logging period. The end of the logging period left a ragged
remnant of the former old-growth forest. Wolf trees, defective trees, and undesirable species were left standing. The reproduction which survived the logging period was often insufficient and of inferior character. Large areas of the logged-over land were purchased by the farmers of the region, as well as by the new settlers who came from other localities. The new owners proceeded to clear the ground, aided by the use of explosives and animal power. Even with these auxiliaries, the land clearing was a slow, laborious process, and as a result, the land clearing progressed very slowly. The owners usually set aside an acreage of land to become the farm wood lot. This land was usually unsuitable for general agricultural purposes because of rock outcrops, steep topography, or poorly drained soil. The wood lot was used to furnish the necessary forest products which included fuel wood, building material, and fence posts. By the end of the logging period, the dairy industry necessitated the use of the wood lots for grazing. In some instances, the farmers grazed goats on the wood lot ground for the purpose of keeping the growth of brush under control. The grazing had a deteriorating effect on the forest through the stimulation of erosion, suppression of reproduction, and in general, interference with the normal forest processes.
Section 2.- The Present Day Wood Lots of the Tualatin Valley.

The Existing Wood Lot Situation.

The wood lots of the Tualatin Valley, like the wood lots of Minnesota, have undergone a considerable amount of conversion since the days of the early settlers. A large part of this change has taken place since the period of commercial logging. The woodland has not only been considerably reduced in area, but the characteristics of the growth and composition have also been materially altered. The valley was originally stocked with old-growth stands of Douglas fir for the most part, with smaller areas of hardwood in the creek bottoms and lowlands. Today, the forest growth found on farm wood lots may be generally classed in the following three categories:

1. A combination of second-growth and old-growth Douglas fir trees with the old-growth trees dominating the stand.

2. Second-growth stands, composed principally of Douglas fir, usually more or less even-aged.

3. Land covered with various species of scruffy trees and brush.

The combined old-growth and second-growth stands exist throughout the Tualatin Valley. The old-growth trees were left standing after the period of commercial logging, chiefly because they were commercially undesirable. These trees are also undesirable from a silvicultural viewpoint and
should be removed to liberate the younger trees, thus producing a wood lot of greater production. The even-aged stands of the Tualatin Valley have attained most of their growth during the past sixty years. A great number of these stands have stagnated and are badly in need of thinning. Infestations of insects and fungus are not uncommon. The lands bearing the second growth stands, as well as other types of farm woodlands, are still subjected to a large amount of clearing. As time goes by, much of the present woodland will undoubtedly be cleared and used for agriculture. The woodland that is located near the centers of population will almost certainly be used for home sites, at least if the rate of urbanization during the past decade is any indication of the future trend.

Present Markets of the Tualatin Valley.

At present, the Tualatin Valley offers a number of marketing facilities to the wood lot owner. A large part of the fuel wood production can be sold within the valley, either to the farmers who do not possess wood lots of their own, or to the home owners of the valley towns. The markets of Portland have not been entirely satisfactory for the sale of fuel wood, although excellent for the sale of other forest products. The relatively poor fuel wood market in Portland is partly due to the competition offered by other fuels and also to the added cost of hauling the fuel wood over an average distance of twenty miles.

Such saw timber as may be produced in the Tualatin Valley can readily be marketed at the small local mills in
the valley, or at the larger mills in the Linnton and the Portland areas. In either case, the present markets are lucrative. If the farmer does not desire to cut and market his own timber, he can usually sell it to any of several local operators who will then cut and market the wood. Although this method entails a minimum of labor on the part of the timber owner, it is not always the most satisfactory from a remunerative standpoint.

Poles, piling, and pulpwood may be marketed in much the same manner as saw timber. In most instances, however, these products will have to be marketed in the Portland or the Linnton areas. The owner has a choice of cutting and marketing his own product or selling it directly to local operators.

The supply of cedar trees has diminished considerably since the period of commercial logging. At present, most of the cedar growth is found in the cool, shaded canyons of the hills surrounding the valley. The owners of such sites can find a ready market for their products which include fence posts, hop poles, and shakes. Such products can usually be marketed within the valley, the leading customers being the farmers who do not possess woodlands, or whose woodlands do not include cedar or other wood suitable for the manufacture of fence posts or shakes.

The valley wood lots contain a variety of miscellaneous products for which the markets are generally unstable. Such products include cascara bark, sword fern, maple burls, mullein, berries, nuts, and rock garden material. The mer-
chantability of these products appears to vary with the season of the year, the market accessibility, the prevailing wage scale, and the quantity of the product present. Present Uses of the Tualatin Valley Wood Lots.

The valley wood lots are not all well suited to a program of multiple use forestry. In many instances, the wood lot composition, topography, and density are such that certain uses are partially or entirely prohibited. Among the more common uses of the Tualatin Valley are the following:

1. Production of fuel wood and fence posts for farm use and for sale.
2. As a source of grazing, sometimes limited by composition and density.
3. As a source of marketable saw logs and pulp wood.
4. As a source of valuable forest by-products, including cascara bark, burls, and sword ferns.
5. As a source of limited recreation for the owner and such others that he may admit.
6. Other uses, including the increasing of farm value, the creation of insurance value, and the addition of aesthetic values to the farm.

The value of a farm wood lot as a source of fuel wood and fence posts is of considerable importance in the program of farm economy. A small amount of rural heating is being done with oil and electricity, but the large majority of farm houses and other buildings are still heated by means
of a wood stove. The cedar fence post as yet has no practical substitute for the construction of permanent fences.

A great many of the lowland tracts of hardwood growth, as well as many of the upland wood lots, are used for grazing during the periods of the year when grazing is available. In some cases, grazing is used as a means of keeping the intrusive growth of brush under control. Usually, the amount of grazing is not controlled to any large extent. As a result, much of the grazing is of a deteriorative nature. This is particularly true on woodland areas where horses have been allowed to enter.

During the years of the last war, the relatively high prices of saw logs and pulp wood encouraged many farm wood lot owners to harvest their tracts. Although the fair value of the material was not always received by the owner, the farmers were made aware of the values of their wood lots as sources of readily marketable material. At present, the harvesting and thinning of wood lots are much more common than in the years preceding the war. Closely related to the harvesting of the tree growth is the harvesting of the forest by-products, including cascara bark, maple burls, and sword ferns. These products are in much greater demand than in the pre-war days.

The farm wood lots of the Tualatin Valley are not as well adapted to a program of regional recreation as are the woodlands of Minnesota's Hardwood District. In the valley woodlands, most of which have a comparatively dense
growth, there is not a great deal of attraction for the average tourist or sportsman. In stands where the tree growth is less dense, the underbrush often forms an almost impenetrable obstacle to the hiker or picnicker. The valley contains only a small number of streams of sufficient size and stocking to attract fishermen during the open season. Many of the wood lots that are adaptable to recreational activities are posted by the owners, usually as a result of much abuse by hunters, fishermen, and others, who in trespassing, have left gates ajar, have trampled field crops, have frightened or perhaps even wounded livestock, and in general have made nuisances of themselves. It is very likely that the future will see a considerable increase in the number of posted lands in the Tualatin Valley. This increase will be caused partly by an increase in the number of sportsmen who choose the woodlands and streams of the valley as hunting and fishing grounds, and partly by the ever decreasing amount of woodland available to sportsmen, which in turn causes a concentration of hunting and fishing on the remaining lands.

Section 3. - Future Possibilities of Farm Wood Lot Development in the Tualatin Valley.

The Present and Future Economic Values of the Wood Lots.

The average farm wood lot possesses a number of values, some of which are readily apparent, and others which are more or less intangible. These values vary in magnitude with the relative importance of a particular wood lot
in relation to the farm management. Certain of the values can and should be developed to a much greater extent than they have been in the past. Some of the more important values of a farm wood lot may be listed as follows:

1. The value as a source of forest products and forest uses.

2. The value as an aid in erosion prevention and control.

3. The value as a source of winter employment for the wood lot owner and such other employees as might be necessary.

4. The value in maintaining or increasing the sales value of a farm.

Perhaps the most outstanding value of the Tualatin Valley wood lots lies in the production of forest products which may either be marketed or utilized on the farms. Among these products are fuel wood, fence posts, poles, piling, pulp wood, saw timber, and rough construction material. Many of these products are marketed in the immediate neighborhood, or within the Tualatin Valley, thus becoming of considerable importance to the economy of the region, as well as to the economies of the individual farms from which the products originated.

Many parts of the Tualatin Valley are subject to the erosive action of water. In certain of the hilly sections, principally in the Chehalem Mountain region, erosion has become a serious problem. In localities where the topog-
raphy allows severe erosion, the planting of a wood lot may be one of the very few alternatives left to the land owner. In most cases, areas of extremely severe erosion are too steep for the practical use of farm machinery, thus tending to exclude the use of the land for agricultural purposes. On such lands, the farm wood lots can fill important economic needs.

The average farmer of the Tualatin Valley has a relatively small amount of work to do during the winter months. Farmers who own wood lots can often find profitable work to fill the days of the quiescent winter months. This work may consist of cutting fuel wood, pulp wood, poles, piling, or saw timber. With the advent of the portable sawmills, it is entirely possible that farmers, through co-operation, can increase the value of their winter labor by producing lumber for personal use or for sale.

An intangible wood lot value is found in the increase of a farm's sales value when that farm includes a suitable tract of woodland. The actual increase in value is quite difficult to determine as it depends directly upon several factors among which are the following:

1. The size of the wood lot in relation to the size of the farm.
2. The wood lot composition.
3. The topography of the land which bears the wood lot.
4. The soil characteristics of the land which bears the wood lot.
If the wood lot is too large in relation to the remainder of the farm, it is apparent that the over-all value of the farm will be decreased rather than increased. This will also be true in instances where the wood lot consists of diseased, insect-infested, or poorly developed trees. Wood lots occupying ground that could more profitably be utilized for agricultural production will also have a tendency to reduce the sales value of a farm. However, if the wood lot is located on suitable soil and is not overly large in relation to the rest of the farm, the sales value of the farm tends to be somewhat higher than if no wood lot exists. This appears to be true in cases where the prospective buyers are city dwellers, as well as when they are from the rural districts.

The Tualatin Valley Wood Lot and Sustained Yield.

The establishment of a general sustained yield program on the farm wood lots of the Tualatin Valley will first require a considerable change of attitude toward sustained forestry on the part of the woodland owners. The average farmer has a tendency to view with suspicion any type of a sustained forestry program. A surprisingly large number of farmers still cling to the belief that a tract of forest land is to be regarded as a liability rather than an asset. The over-all picture appears to indicate that an extensive program of forestry education will be required before sustained yield programs can successfully initiated on a large scale. The program of forestry education should
call attention to the fact that, although essentially a long-range program, sustained yield forestry offers many attractions to the farmer. Emphasis should be placed on the fact that sustained yield need not necessarily be a large-scale operation. The wood lot of average size will, in most instances, lend itself quite readily to the practice of sustained yield forestry.

Any program of farm forestry education or information should not lead the farmer to believe that farm wood lots are always desirable. Any farmer who in contemplating a farm forest as an integral part of his farm management should first consider the various aspects of owning a farm wood lot. The following questions should receive careful consideration:

1. Is the soil suitable for tree growth?
2. Do markets exist for possible future products of the wood lot and if so, are the markets within a practical transportation distance?
3. What species are the best suited, economically and silviculturally, for this particular wood lot?
4. Are other alternative uses available which may be more economically feasible?

Once the farmer decides to set aside a part of his land for the growing of trees, he should consult the local extension forester concerning such questions as size of the wood lot, composition, and general management. The farm
owners of the Tualatin Valley are eligible to buy planting stock from the Oregon State Nursery at Corvallis, Oregon. If the farmer has access to areas of forested land, he may be able to gather wildling stock which he may then transplant in his wood lot.

**Future Markets of the Tualatin Valley.**

At present, the markets of the Tualatin Valley and the neighboring Portland and Linnton market areas are relatively good. It seems logical to suppose that the markets will remain fairly stable for some time to come. The demand for fuel wood will probably not be diminished as long as a more practical method of heating the homes of the region is not commonly accepted. In regard to fence material, it is true that steel posts are being used in some instances, but the cedar post still remains predominantly popular. Although the marketing facilities for pulp wood are not, in most instances, located in the Tualatin Valley, small operators are buying pulp wood on the stump, thus offsetting the marketing disadvantages from the farmer's point of view. With the advent of the portable sawmill, it is possible that much of the future marketing will take place at the wood lot site. This will aid greatly in solving the transportation problem, which in the past has prevented many wood lot owners from marketing their surplus timber.

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PART III
CONCLUSION

Section 1.- Common Problems of the Hardwood District and the Tualatin Valley.

Prevention of Further Deterioration.

The prevention of additional wood lot deterioration is of primary importance in both the Hardwood District and the Tualatin Valley. The grazing of livestock on farm woodlands is perhaps the most destructive agent of wood lot deterioration at present. This practice should be curtailed wherever it is possible to do so without causing undue hardship to the woodland owner. It will also be necessary to revise many of the current silvicultural practices in both regions. The practice of cutting the healthier trees, allowing defective and weak trees to sustain the wood lot, will, over a period of years cause a gradual deterioration of the entire wood lot.

The prevention of further deterioration will have to be done by the owners of the woodlands. Before the owners will undertake any serious work of this nature, they must first realize that it is to their economic advantage to do so. The task of furnishing the required forest practices education to the farmers will be largely that of extension foresters, state boards of forestry, forestry colleges, and other educational agencies. The work could be done through newspaper articles, radio programs, local meetings, and personal contacts by the extension foresters, county agents,
and other representatives. The public relations work might include the showing of instructive motion pictures, the presentation of local lectures, and friendly discussions of forest problems with the individual wood lot owners.

**Harvesting and Marketing of Products.**

One of the principal hindrances of harvesting and marketing woodland products has been that of transportation. Very few farmers have the equipment necessary to haul saw logs, pulp wood, cordwood, or fence posts over any great distance. In addition to the lack of proper hauling equipment, the market price of the products in the past has not been able to bear the additional production cost of long-distance transportation.

There are several solutions available to the farmers regarding their harvesting and marketing problems. One such solution lies in the sale of stumpage to local operators who do the cutting, harvesting, and marketing. This type of selling has been done quite extensively in the Tualatin Valley. It has not been entirely satisfactory because of the relatively low stumpage prices paid to the farmers by certain operators. A second solution has recently entered the picture in the form of small portable sawmills. Such mills will undoubtedly be of great value in harvesting wood lots which are too limited in area and volume to allow the other methods of harvesting to be economically utilized. A third and perhaps the most solution, namely that of co-operative harvesting, can come only as a result
of mutual understanding and aid among the wood lot owners. The promotion of such co-operation will be the task of extension foresters, county agents, and individual leaders among the farmers. In most cases, a co-operative forestry program will involve the pooling of equipment and labor. The purchase of a portable sawmill might often be justified if a sufficient quantity of merchantable timber exists. The marketing of the lumber products can probably be done in the immediate neighborhood, or in near-by centers of population.

Section 2.- - Future Needs in Management.

The Need of a Proper Understanding of Wood Lot Values.

The average farmer does not fully realize the value of a farm wood lot. Beyond the supplying of timber products for farm use and intermittent sales, the wood lots have relatively little value from the farmer's viewpoint when a comparison is made between the woodlands and the agriculturally productive ground. For this reason, forest growth is often removed from land which is best suited for the production of trees. There is a need then, for the wood lot owner to become aware of the economic importance of his woodland, not only in relation to his own individual farm, but also in relation to his community, his state, and his nation. This need of the farmers can be filled largely through a program of farm forestry education made available through the action of federal, state,
and local forest agencies.

The Need for Co-operation on the Part of Woodland Owners.

The age-old adage of "strength in numbers" may be readily applied to the co-operative efforts of wood lot owners. Such co-operation is important, not only in the harvesting and marketing of the forest products, but also in the sharing of information during the growing period of the trees. The average farmer will more readily accept constructive criticism from a fellow farmer, provided the criticism is supported, than from an outsider. At present, it appears that only through an extensive program of co-operative management, including development, harvesting, and marketing, can the wood lots of the Minnesota Hardwood District, the Tualatin Valley of Oregon, and the nation in general be developed to a desired level of production and subsequently assume their potential position in the economy of the nation.
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