

Oklahoma Agricultural Experiment Station,

STILLWATER, OKLAHOMA.

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PLANTING TREES

FOR POSTS, FUEL, AND WINDBREAKS.

INTRODUCTION.

There is much interest among farmers generally concerning the important subject of providing home-grown posts and fuel. The Station has been collecting data and conducting experiments along this line for several years and the following brief notes are believed to indicate the proper methods for Oklahoma generally. The information on which the recommendations are based is not confined to the results obtained on the station farm, but includes that derived from reports of successful tree planters throughout the Territory and from personal examination of many widely scattered plantings. The station appreciates the kindness of those who have given assistance and thus aided in extending the scope of the inquiry and adding to whatever of value there may be in the results. The station has no tree seeds or trees for sale or distribution but those desiring to purchase any of those mentioned will find no difficulty in obtaining them from local seedsmen and nurserymen.

COLLECTION OF TREE SEED AND PROPAGATION AND CARE OF SEEDLINGS.

The farmer who contemplates planting forest trees must grow his own trees from the seed or buy them from the nursery. Buying the trees

from the nursery will incur a greater expense than most of the farmers in Oklahoma feel able or disposed to bear though often it is more economical than growing them. The purchase of the seed to start the trees is an item of considerable importance to many. A start can be made quicker if the trees are purchased and set this winter, but if this expense cannot be borne then the seed should be secured and a small nursery started on the farm. Farmers can, with little expense, give the cultivation and care necessary to grow a few hundred trees in the nursery row.

A little care and labor will frequently avoid the expense of buying seed of most of the common trees. In all of the older sections of Oklahoma there are many trees under cultivation that produce seed which can be had for the gathering. Many of the native trees are well worth cultivating for wind-breaks and timber supply on the farm and all of these trees produce seed in abundance. There is little demand for tree seed, it is difficult to gather, and many kinds will not grow after they are one year old. These three conditions are the predominating cause of the high price of tree seed.

The following table gives the approximate cost and number of seeds per pound of the kinds of trees most commonly used in plantings for wind-breaks and wood-lots.

VARIETY.	No. of seeds Per pound.	Approx. cost Per pound.
Ailantus	20000	\$0.60
Black Locust	30000	0.40
Black Cherry	4000	0.60
Black Walnut	25	0.05
Box Elder	15000	0.60
Catalpa	20000	0.80
Elm, White	92000	1.50
Hackberry	3000	0.80
Honey Locust	2500	0.40
Osage Orange	10000	0.40
Red Cedar	8000	1.00
Russian Mulberry	200000	2.00
Shell-bark Hickory	50	0.15
Soft Maple	2000	0.70
Sycamore	120000	0.80

COLLECTING, STORING, AND PLANTING THE SEED.

The time for collecting forest tree seed extends from April to November. The seeds should be gathered as soon as they are ripe. The earliest ripening seeds fall as soon as they are ripe. The elm and soft maple ripen their seeds in the early spring and these should be planted the same season and produce plants during the summer. The best success can usually be had with tree seeds that ripen before the middle of the summer by planting them as soon as they are ripe. These early maturing seeds germinate and grow readily, and if well cared for will produce plants a foot or more in height the same season.

The late-maturing seeds will frequently cling to the trees for some time after they are ripe. Ash and box elder seed will frequently cling to the trees long after they are ripe and have become so dry that but few of them will germinate. All of these late maturing kinds should be gathered as soon as they are ripe and placed in storage. The degree of ripeness of the seeds can be determined by the brown and yellow tints of the seed coverings. Seeds that have fleshy pulp like the hackberry and mulberry should be gathered when the flesh of the fruit is ripe. If the flesh is thick it should be removed from the seed before it dries. The large seeds like walnuts and pecans can be gathered from the ground after they have fallen from the trees. Seeds that are in pods as the locust should be thoroughly dried, shelled out, and stored. Many of the seeds will be freed from the hulls if well dried and thrashed. Walnuts can easily be hulled by running them through a hand corn sheller. Seeds that are covered with pulp like the mulberry and red cedar should be macerated and the seeds washed out with water and dried before storing or planting.

Acorns and nuts and the seeds of the black locust, honey locust, ash, hackberry, sycamore, kentucky coffee tree, and red cedar should be buried in sand or soil in the fall and left till planting time in the spring. The seed should be kept moist, not wet, and should be exposed to freezing temperature. If spread on a cellar floor most of them will keep well. Seed of catalpa and osage orange should be kept in a dry, cool place, but the latter will do very well if stored in cold, moist earth.

As there are few kinds of tree seed that will germinate well after they are more than one year old, great care should be exercised to have the seed fresh when planting. It may be tested by planting a small quantity in soil in a flower pot or box and keeping them warm and moist till they germinate. By keeping an account of the number that are planted

and the number that sprout, a good estimate can be made of the percent of good seed and the thickness that they should be planted in the field. A good deal of information about the age and vitality of the seed can be obtained by splitting a few open and closely examining the seed and the hull. A seed should fill its case or covering and should be fresh and plump when cut open. If they do not fill these three conditions they should be thoroughly tested before planting. In some kinds like the locusts the good seed will sink and the bad seed will float in water. In case of nuts the fresh ones can usually be distinguished by the bright, fresh appearance of the hulls.

Seeds that have thick, woody, or bony coverings require more time to germinate than those that have weak, thin, absorbent coverings. Those with thick shells that have been kept moist and subjected to frost during the winter will usually germinate well without being soaked before planting. Cracking the shell with the hammer or nut cracker is not advisable as there will be more seeds injured than helped in the operation. If they have been well stored and are strong, those with thin coverings should germinate in ten days to two weeks and those with hard shells should germinate in two to three weeks, depending on the kind of seed, its vitality and the conditions of the soil.

Scalding and soaking in lye water will hasten the germination of seed that has not been well stored. If scalding is attempted, care must be exercised to avoid cooking the seed. If a small quantity of boiling water is poured over a large quantity of thick shelled seed the temperature of the water will be reduced to such an extent that no harm will be done. It is a better plan to use warm water and a little more time and be sure that no harm is done. If the seed has been properly stored during the winter and is in good condition, special treatment should be avoided as it is liable to do more harm than good. The seed of the red cedar does not germinate well until the second spring and it is not a good plan to attempt to germinate it before that time.

Nuts and large seed that require storing over winter in moist soil may be planted in the fall in well drained land. Moles, gophers and other field rodents will usually destroy some seed and in extreme cases will destroy most of it. Seeds that are stored in moist soil during the winter should be planted before growth begins in the spring and should not be taken from the soil in which they are stored and allowed to dry before they are planted. If they are dried very much at this time it will weaken them and frequently destroy their vitality. Seeds with thin

covering that do not require special treatment to soften the shell should be planted about the same time that other crops are planted in the spring.

Tree seed should be planted and treated about like garden seeds in all respects. The soil should be well prepared and in such condition that cultivation can be carried on from the time the planting is complete. The condition of the soil, size of the seed, and time of planting all have some influence on the depth that the seed should be covered. Seeds should be planted deeper in sandy and loamy soil than in clay land. They should be drilled in rows from three to four feet apart. If the plants are to be taken from the row when one year old the seed should be about three inches apart in the row, but if the plants are to stand in the row for two or three years the seed should be drilled from six to ten inches apart in the row. The soil should be pressed firmly about the seed and the row covered with loose soil.

Seed of the slow growing kinds may be planted in beds about the same as onions and the plants transplanted to the nursery when one year old. This plan requires more labor and may necessitate hand cultivation for the first year. Seedlings that require shading from the hot sun during their first summer should always be started in beds. Many of the evergreens require this kind of treatment, and ash, box elder, elm, and red cedar can be very conveniently grown in a bed for one year and then transplanted to the nursery row.

For bed culture the soil should be enriched and placed in the best possible condition, and the very best of cultivation and care must be given to the plants during the summer. If the bed can be so located that it will be sheltered from the wind a great deal of moisture will be saved for the use of the plants. All weeds and grass should be kept out of the bed with the hoe and by hand weeding. A garden wheel hoe can be used to great advantage in a bed of seedlings.

STARTING FROM CUTTINGS.

Many of the common forest and fruit trees can be started from cuttings with but little more effort than is required to grow them from the seed. The cottonwood and willows are easily and commonly started in this way. Plants grown from cuttings are usually larger and stronger than those grown from seed. Cuttings made from slow growing trees having hard wood, like oak and hickory, do not take root and grow as readily as cuttings made from rapid growing varieties.

The cuttings should be made from one or two year old wood, and

stored in moist earth or sand during the winter. They should be cut eight to twelve inches long and the butts laid together as this will save time in the spring when the cuttings will endure but little exposure.

If a large number of cuttings are set they should be set in rows about three and one half feet apart and six inches apart in the row. The cuttings are set butt end down with about two inches of the top above ground. The soil should be prepared the same as for a good seed bed. Furrows for the rows are thrown out with a turning plow and the cuttings laid along the side of the furrow in a slanting position or stood perpendicular and the soil thrown in and firmed about the base of the cuttings by tramping. The cuttings can be set more rapidly and the soil firmed about them better when they are set slanting and as this form of setting seems to have no bad features it is usually employed. Cutting may be set with a spade as follows: Sink the spade into the soil and pry it forward to open the soil. Set one or two cuttings into this opening and withdraw the spade, and firm the soil by tramping. This is a slow process and is used only when a few cuttings are set at a time. In very mellow or sandy soil the cuttings may be pushed into the ground and the soil pressed about it by tramping. These methods can be modified to suit the convenience of the planter but whatever method is used the soil must be pressed close about the base of the cutting.

CULTIVATION IN NURSERY.

The cultivation given while the plants are in the nursery should be shallow, and frequent enough to keep the ground free from weeds and the surface well pulverized. Frequent, shallow cultivation will do a great deal to prevent the loss of water from the soil by evaporation from the surface. The cultivation should be continued from early spring till the growth has stopped in the fall. The ordinary corn cultivators are good tools to use for this work.

The faster growing trees should be transplanted from the nursery row to their permanent positions when one year old. The slower growing kinds may be planted thick in the nursery and at the end of the first year transplanted to new rows and given more room and when two or three years old transplanted to their permanent positions. Trees two or three feet high are sufficiently large to transplant to their permanent position in the wind-break or wood lot. The nut bearing trees and the evergreens may be transplanted while much smaller. The trees will grow more rapidly after they are transplanted than while in the nursery row

and the work of transplanting can be done with less expense while the trees are small.

If the trees cannot be transferred direct from the nursery to the field they should be heeled-in in good shape to keep them in good condition. If the soil is dry the roots of the plants should be puddled in thin mud before they are heeled-in. A good method of heeling-in trees is to dig a trench or bed about a foot deep. Distribute the trees along one side of this and cover the roots well with damp soil. Place another layer of trees against the soil covering the last layer and cover the roots as before. Continue this process till all the plants are heeled-in. Care must be exercised to cover the roots well and work the soil in around the plants.

PREPARATION OF THE LAND AND TRANSPLANTING THE TREES.

The land for the permanent planting should be prepared the same as for orchard planting. The trees will grow better if the land has been in cultivation for a few years and is in a good state of cultivation. The land should be stirred deep with the turning plow and harrowed down smooth before the trees are set. The land should be free from weeds and grass for after the trees are set it will be more difficult to destroy such pests. If the top soil is shallow and is underlaid with a clay subsoil the land may well be subsoiled when plowed. The subsoil thrown up by the subsoiler should fall back into the furrow and be covered by the plow and not brought directly to the surface. The same system of cultivation advised for the nursery should be followed in the permanent planting.

In transplanting the trees should be set the same depth or a little deeper than they stood in the nursery row. The roots should spread in their natural position and damp soil should be pressed firmly about the roots and trunk of the tree. It is a good plan to shake the tree while the soil is being thrown in around it to make sure that there are no open spaces under the roots. It requires but a little time to work the soil in well around the roots and yet this very important point is very frequently neglected and causes the death of the tree.

The roots are unavoidably pruned when the trees are dug and usually require no further attention in that direction. The tops should be cut back when the trees are set or soon after that time. Some of the kinds that are inclined to fork and branch like the soft maple, catalpa, and black walnut may be allowed to grow for a year in their permanent positions and then the tops cut back to the ground. Trees treated in this way grow better trunks and better tops than those that are allowed to continue

the growth of the original top. Repeated cutting back will cause the trees to sprout badly at the base. All sprouts and suckers should be removed while young and tender.

SEASON OF TRANSPLANTING.

Fall and spring setting each have their advantages and their corresponding disadvantages. Trees set in the fall have the advantage of any root growth that may take place in the winter. The soil will settle around the roots in the winter and be in better condition for growth in the spring. More time can be given to the work if the trees are set in the fall and early winter and the trees will usually be in better condition to pass the winter if planted than if heeled-in. Spring setting gives more time for the preparation of the land for the setting. Plants heeled-in can be better protected from the rabbits and mice than trees set in the fall. Good results can be obtained by either fall or spring setting if the work is well done and the ground is in good condition for the work. More depends upon the weather than upon the season in which the work is done. If there is plenty of rain in the fall to put the ground in good condition for the work the trees should be set in the fall. If there is not sufficient rain in the fall to prepare the land for the trees, planting should be postponed till spring or until enough rain has fallen to prepare the land for the work. There are many warm spells during the winter in which this work can be done.

WIND-BREAKS.

The most disagreeable feature of the climate of Oklahoma and the neighboring states is the great amount of hard wind. A planting of trees around the house and farm yards does much to diminish the effect of the wind and increase the comforts of farm life. Such plantings may also be of great value in providing shelter for stock. The comforts and conveniences created about the farm home by a good wind-break are so commonly recognized that no attempt will be made to point them out here. In fact the benefits so derived are so commonly appreciated that a great many farmers plant their orchards so they will serve the double purpose of an orchard and a wind-break and their greatest value often lies in the latter office.

The orchard will fill its place in the economy of the farm as an orchard if well cared for and should not be used permanently for a wind-break. There are few of the fruit trees that are sufficiently hardy to

make a good wind-break and endure the exposure to which they are there subjected and still bear even a fair crop of fruit. It is a far better plan to set the orchard in a block form and plant rapid growing forest trees for a wind-break. The orchard will be greatly benefitted if it is protected from the southwest wind by a belt of timber. A dry wind blowing across a field dries the surface of the soil very rapidly and carries away a great deal of soil moisture. A wind-break checks the force of the wind and in this way saves a great deal of moisture for the crop that is on the land. A wind-break formed of trees draws large quantities of water from the land on which it grows but this loss is more than offset by the amount of water saved in the adjacent field or orchard.

Orchard trees sheltered by a wind-break or shelter belt of timber grow in much better form and are not leaned to the north by the wind. The trunk of the tree will be better shaded by the top and thus many cases of sun-scald and borers will be avoided. Pruning may counteract the effect of the wind to some extent but a good wind-break is far more effectual. Trees sheltered by a belt of timber or a grove are not broken like those more exposed, and carry a greater percent of their fruit to maturity. It is not an uncommon experience for three-fourths of the fruit to be shaken from the tree before it is mature. The codlin moth is the cause of a great deal of the windfall fruit in Oklahoma but the hard wind has about as much immature fruit to its credit. A good wind-break will reduce the amount of windfall fruit and will make it possible to do better work in spraying and thus check the ravages of insects and diseases on the fruit and foliage. Good spraying cannot be done in a hard wind.

Some fruit growers object to a wind-break for an orchard on the ground that it is a harbor and breeding ground for insects and diseases, and that the row of trees next to the wind-break suffers for the water which has been drawn from the soil and used by the trees forming the wind-break. If the wind-break is a harbor and breeding ground for insects and diseases it is a fault of the care and cultivation given it. It should be cultivated and cared for the same as the orchard and any insects and diseases injurious to the orchard should be combatted the same as in the orchard. The insects and diseases that are most common in the orchard seldom attack the kind of trees used for the wind-break, and the reverse is also true. If the wind-break robs the outside row of trees of food and water it is a fault in its location. A space of thirty to forty feet should be left between the wind-break and the first row of fruit trees.

The ideal wind-break is a belt of timber or a grove of trees taller than the trees in the orchard. Such a shelter belt cannot always be grown on

the average ~~near~~ farm and a hedge or at best a narrow belt of timber may answer the purpose. If possible, this planting should be completed two or three years before the orchard is set, so the young fruit trees may be protected from the hard wind when they are first set in the orchard. The trees that are to form the wind-break may be set in the form of a hedge, or far enough apart in the row so they can develop and make good trees. Both plans are good and make good wind-breaks when suitable kinds of trees are used. The amount of land that can be devoted to this purpose should be the principal point in deciding the formation of the planting. The hedge row form of wind-break requires a plant with a thick growing top like the russian mulberry, and osage orange. Seedling peach trees are some times used to good advantage for this purpose. The plants should be set about one to two feet apart, and should be well cultivated to encourage as great a growth as possible. These trees make a very dense top when in full leaf and the Russian mulberry and osage orange are not commonly attacked by diseases and insects that live upon orchard trees and fruits. The Russian mulberry is the best tree, commonly grown in Oklahoma, for such purposes.

If there is room for a more extensive planting it is a better plan to set the trees four or five feet apart in rows four feet apart. In this form of planting the trees can be cultivated for a few years and made to supply posts and wood for use on the farm. The outside row of trees should be left unpruned or some low, spreading kind of tree should be planted with the tall growing varieties. The tall growing trees if pruned to grow good posts and poles will not make a good low wind-break. If the two outside rows are not pruned they will make sufficient undergrowth. The Russian mulberry and tamarisk are two of the best low spreading trees to use in a mixed planting of this kind. Seedling peach trees are some times used for this purpose to good effect. Elm, catalpa, soft maple, and black locust are the best of the tall growing trees used for a wind-break in Oklahoma.

A few farmers are growing good wind-breaks composed of cottonwood, black locust, and plum trees. The cottonwoods are planted twelve to sixteen feet apart and two or three black locusts between. The plums are planted in another row outside the row of larger trees. Either the wild plums or some cultivated varieties can be used. This combination can seldom be used successfully on upland. On loam and clay lands the black locust, soft maple, elm, catalpa, and Russian mulberry should be used. The black locust and Russian mulberry make a very good combination. The soft maple is not adapted to close mixed planting and

when it is so planted provision should be made for its removal in a few years. The other trees named may be planted in mixed or pure plantings and will usually give good results.

PLANTING FOR A WOOD LOT.

A wood lot is a planting of trees for the purpose of growing wood. The aim of the planter is to grow the most wood possible in such form, and size that it can be used for fencing and fuel, with the least expenditure of time, money, and labor. Inasmuch as the trees are expected to produce wood of marketable size within the life time of the planter, only the fastest growing trees can be used. In this climate the time required to grow trees to post size can be greatly reduced by care and cultivation, during the early life of the planting. Usually the only money expended in growing a few acres of timber is the original cost of the seed, or seedlings and the taxes on the land. The amount of time required to grow wood of valuable size makes it desirable to use all reasonable efforts to increase the rate of growth. The first thing of importance is the quality of soil on which the planting is made. Good soil is most valuable for wood production as well as for the common farm crops. Small nooks and patches in creek bottoms that are difficult to tend in the regular farm crops answer for wood lots very well. Hillsides, washed land, knolls and waste land too poor to cultivate in farm crops should not be planted with trees with the hope of securing good timber in a few years. The dry summers and the extreme barrenness of some such land places wood production thereon practically out of the question. It would require more than the ordinary lifetime for trees set on such land to bring the fertility up to the standard required to produce good wood growth. Stony land that cannot be cultivated but contains a fair quality of soil will grow good timber.

Trees grown for wood should produce long trunks free from branches. There are two ways of growing such trees; 1st constantly pruning off the branches, and 2nd planting the trees close together so that after four or five years the trees will prune themselves. The latter method is used in wood lot planting. In close planting the growth of the top is augmented and the growth of the side branches is checked, and after a few years no pruning is necessary.

Trees set far enough apart to give plenty of room for cultivation will require pruning for a long time. The tops cannot shade the ground sufficiently to prevent the growth of weeds and grass, and the annual

mulch of leaves and twigs will not be heavy enough to produce a forest soil. The best results have been obtained by setting the trees four or five feet apart each way. The trees are pruned as long as cultivation is continued which should be until the trees have possession of the land to the exclusion of other plants. When the trees can shade the ground well enough to prevent the undergrowth of weeds and grass, cultivation may be discontinued. Trees with small or pendant leaves like the black locust and cottonwood cast a poor shade and are slow to prevent the undergrowth of weeds; these varieties should be cultivated until they are quite large. The broad-leaved trees like the elm cast a good shade and will prevent the undergrowth of weeds in three or four years and then are able to take care of themselves. Mixed planting does not give as good results as the foregoing would seem to indicate. There is so great a difference in the hardiness and rate of growth of the different kinds of trees set, that a mixed planting soon becomes a pure planting or at most contains but two or three of the strongest varieties. The few stunted trees of the weaker varieties that do survive for a few years seldom make good trees when the larger trees are cut. The varieties of trees most commonly grown for posts and fuel are capable of reproduction by sprouts from the stump and roots, and this crop of second growth trees will be better than the old stunted trees.

The trees that are set in the wood lot on the farm are not set for the purpose of growing timber for lumber, and all the trees will be cut before they are large enough for saw logs and many will be cut as soon as they are large enough to make good posts. The trees of the fastest growing varieties will be young when cut and will sprout well, if the cutting is done in the winter. The stumps should be cut with a smooth, sloping surface to prevent rot as much as possible. Post timber should be cut in the winter and seasoned thoroughly before it is placed in the ground.

TREE PLANTING AT THE EXPERIMENT STATION.

The first planting of trees for the purpose of a wood lot on the experiment station farm was made in the spring of 1898. This planting consisted of three plats designated as numbers 35, 36, and 37. Trees one year old were used except in the oaks, walnuts, and pecans and seeds of these trees were planted in the position in which the trees were desired in the planting. The trees were placed four feet apart each way and were given clean cultivation for the first three years.

Plat No. 35 contained 1599 catalpas, 270 black cherries, 270 bur oaks,

and vacant places were left for 1599 Russian mulberries, which were never planted. In December 1903 there were 1538 catalpas, 188 black cherries, and 142 bur oaks living.

Plat No. 36 contained 1500 white elms, 1500 soft maples, 600 bur and red oaks, and 330 black locusts. In December 1903, 329 black locusts and 260 oaks were living. Part of the elms were taken out but less than one percent have died in the plat. Part of the maples were also removed and all of those left in the plat are now dead. Seventy five per cent of the dead maple trees were infested with flat headed apple tree borers at the time of their death.

Plat No. 37 contained 2558 red maples, 511 black birches, 374 pecans, and 320 white ash. In December 1903 there were 310 white ash, 76 pecan and 126 black walnut trees living. The black birch trees were all dead, root and branch. The red maple trees are all dead but about one half of the stumps are still alive and sent up sprouts last summer. These sprouts are very weak and practically worthless.

In the spring of 1900 another planting of forest trees was made, consisting of thirty four plats. The trees used in this planting were white ash, box elder, catalpa, white elm, black locust, honey locust, and soft maple. Plat 1 to 24 inclusive and plat 27 are mixed plantings containing from three to seven kinds of trees systematically arranged. Plats 25, 26, and 28 to 34 inclusive are pure plantings. All the trees were seedlings of one season's growth when set. The black locust is the only tree that has made a better growth in the mixed plantings than in the pure planting. It is much the fastest growing tree in the list and in every case has proved an injury to the trees set next to it. This planting is not old enough to show final results and may be reported upon at some future time. All of the information that could be obtained from this planting at this time is given in the discussion of the different kinds of trees.

Ash: (White Ash, American White Ash.) This tree is valued more for its beauty of form and foliage than for its wood production. It attains a height of fifty feet and a trunk diameter of two feet. It grows very slowly for the first four or five years after which time it grows more rapidly. The top of the tree is narrow, with a main central stem forming a clean straight trunk. The wood is heavy, hard, strong, and becomes brittle with age. It is not durable when placed in contact with the ground but is a very good fuel.

Box Elder: The box elder grown on moist bottom land often attains a height of forty to fifty feet and a trunk diameter of two feet. In

this situation it is a rapid growing tree with a broad top and casts a good shade. It is a failure when planted on the upland. It is frequently attacked by borers and leaf eating insects. The wood is light, soft, not strong, rots quickly in contact with the ground, and is a very poor fuel.

Catalpa. The catalpa is a rapid growing tree, often attaining a height of sixty feet and a trunk diameter of three to four feet. It grows best on a deep rich soil and a satisfactory growth can seldom be secured on light, thin soil. In a pure planting the trees will completely shade the ground in three or four years. It sprouts well from the stump when the trees are cut in the winter. The wood is light, soft, not strong, coarse grained, and extremely durable when placed in contact with the ground. It is poor fuel but makes first class posts and fencing material.

There are two species of *Catalpa*, *Catalpa speciosa*, commonly called Hardy, or Western Catalpa, and *Catalpa Catalpa*, commonly called Southern Catalpa. The Western catalpa is a tall upright tree with few large branches. It requires close planting to develop a good trunk. The Southern catalpa is a low growing tree with a broad top. These characteristics are influenced by soil and location. On poor soil in open plantings both kinds form low, branching heads. The Western catalpa as a rule produces only one to three seed pods in a cluster, and each pod is from fourteen to twenty inches long and one half inch in diameter. The seeds are large, broad, and about the same width the entire length. The filaments at the end of the seed are parallel or spreading. The bark of tree is thick and deeply furrowed. The Southern catalpa produces from four to eight pods in a cluster, and each pod is from eight to ten inches long. The seeds are small and tapering at the end. The filaments are drawn together and are sometimes twisted. The young branches of one season's growth are enlarged at the joints. The bark of the tree is thin and scales off in large thin scales.

White Elm (American Elm.) This is a large tree and when full grown often attains a height of one hundred feet and a trunk diameter of six feet. It forms a round or broad and spreading top. It is a rapid grower and adapts itself well to all kinds of soils. The wood is hard, heavy, strong, tough, difficult to split, not durable in contact with the soil. It makes a good fuel when it is reduced to such form and size that it can be used, but is very difficult to work. This is the best shade tree that has been planted in Oklahoma. The tree is hardy, seldom attacked by insects and diseases and casts an ideal shade. It is a first class tree to plant about the house and yard but is only a second class tree for posts and fuel.

Hackberry. The Hackberry attains a height of sixty to seventy five feet and a trunk diameter of three to four feet. When planted in good soil and given cultivation it is a rapid growing tree but is capable of living when set in the driest and poorest soil. As a cultivated tree it is very much like the elm but it more hardy and the wood is less difficult to split. The wood is heavy, rather soft, not strong, good fuel, not durable when placed in contact with the soil. It is a good tree for planting around the house and yard and for a wind-break.

Black Locust, (Yellow Locust.) This tree grows rapidly and attains a height of sixty feet and a trunk diameter of three feet. The top is of good form with a main central stem when grown in close plantings, but it frequently branches and forms a large round head when grown in the open. It grows fastest when set in mixed plantings but does not form as good a trunk. It usually grows more rapidly than the other trees and branches and spreads over the tops of the other trees. It casts a poor shade and is slow to occupy the ground to the exclusion of other plants. It sprouts vigorously from the stump and roots broken by the plow or spade. The wood is heavy, exceedingly hard, strong, and durable when placed in contact with the ground. It is a very good fuel.

This tree has been extensively planted as a timber tree in the United States, but its cultivation is now generally abandoned in the older states on account of the locust-borer. The locust-borer has been so destructive of this tree in Kansas that it is not planted there now to any great extent. The central and western part of the state was at one time supposed to be exempt from the borers but they have gradually spread over the entire state. So far as can be learned this borer has not appeared in Oklahoma, but it is only a question of a few years till it will be found in abundance. Although thorough search has been made no reports have been found which indicate that the locust borer ever works on fruit trees.

Honey Locust. This tree attains a height of fifty to sixty feet with a trunk diameter of three feet. It is not one of the most rapid growers but is capable of making a good growth under the most adverse conditions. It is liable to suffer when transplanted and should be carefully handled at that time. It stands pruning remarkably well and is often used as a hedge plant. It casts a poor shade and is slow to occupy the ground to the exclusion of other plants. It requires thick planting to form good trunks. The wood is heavy, hard, strong, very durable in contact with the ground and is a good fuel.

Soft Maple. (Silver Maple.) This tree often attains a height of

sixty feet and a trunk diameter of four feet, but the mature trees are usually much smaller. It grows rapidly and forms a broad, round top. This tree responds very quickly to cultivation and suffers if neglected. In close planting it grows rapidly for a few years and then dies out badly. The trees suffer if the roots are exposed to any extent in transplanting. Winter and spring setting have given the best results. The trees are frequently destroyed by borers and the foliage is attacked by insects and fungus diseases. The wood is soft and easily broken while green but becomes hard and strong when well seasoned. It is light, poor fuel, and rots quickly when placed in contact with the ground.

The value of this tree has been over estimated in Oklahoma and it has been planted more than its true value warrants.

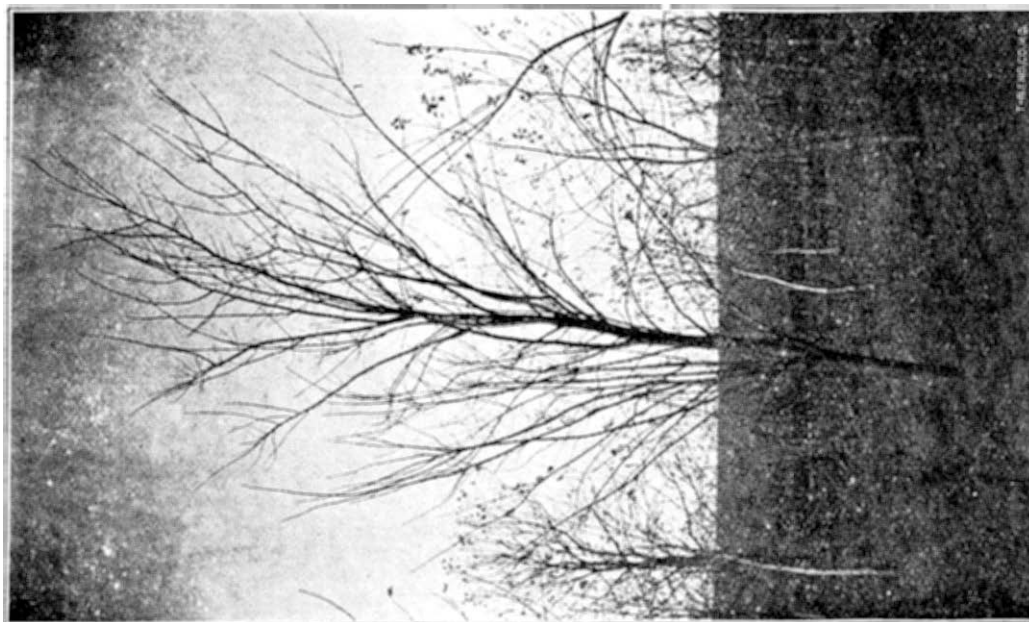
Osage Orange. (Bois d' Arc.) This tree attains a height of forty to fifty feet and a trunk diameter of eighteen inches. It is a rapid grower on moist bottom land but is not adapted to light, upland soil. It sprouts vigorously from the stump and broken roots. The wood is heavy, hard, strong, flexible, good fuel, and very durable in contact with the ground.

The Russian Mulberry is a medium sized tree introduced into the United States from Russia and it is not known how large it will grow in Oklahoma. Trees fifteen years old and twenty feet high are not uncommon. The tree branches profusely and forms a very dense top and a poor trunk unless it is constantly pruned. It is very hardy, grows rapidly and is a first class tree for a wind-break. The wood is heavy, hard, strong, and is a good fuel. Its durability in contact with the ground has not been thoroughly tested but the indications are that it is as durable as the Red Cedar.

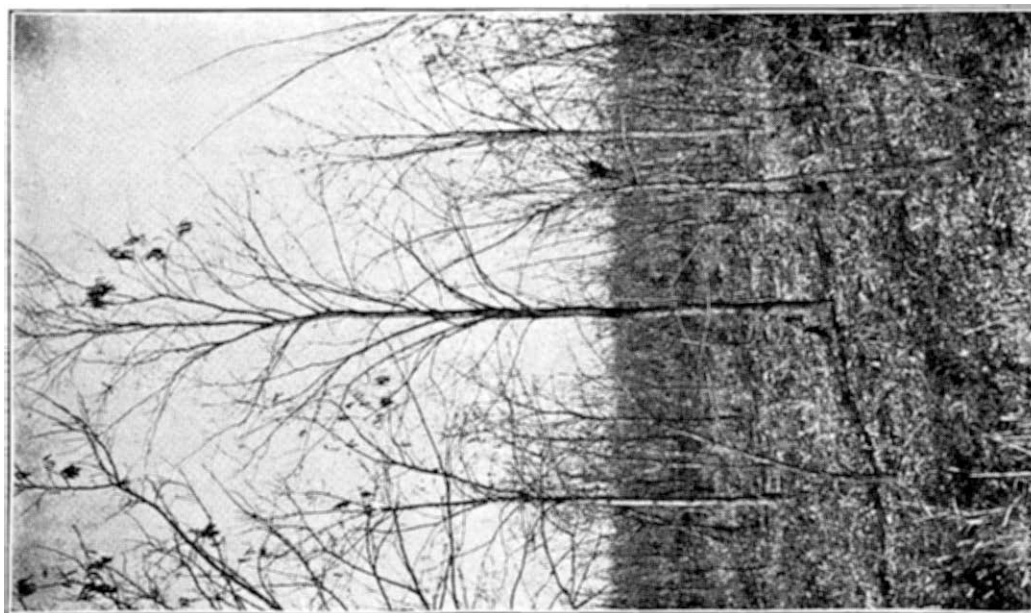
Sycamore. This is the largest tree east of the Rocky Mountains. It often attains a height of one hundred feet and a trunk diameter of ten feet. It grows rapidly and forms a good top. It is a very good tree for ornamental planting. The wood is of little value and hard to work.

Black Walnut. This is a very large tree sometimes attaining a height of one hundred feet, and a trunk diameter of eight feet. It is of slow growth and is adapted to planting only on rich bottom land. It is difficult to transplant. The wood is heavy, hard, strong, easily worked, and durable in contact with the ground. It is good fuel but is too valuable to use for that purpose.

O. M. MORRIS,
Horticulturist.

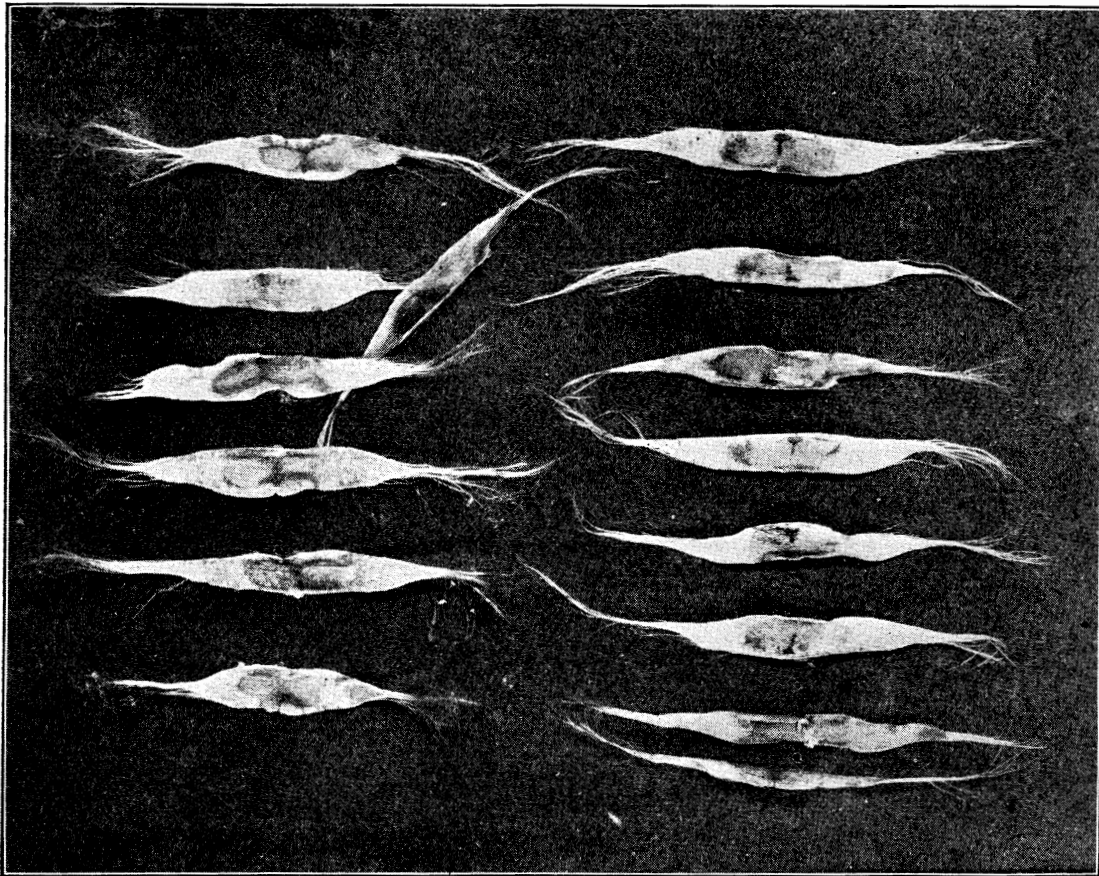
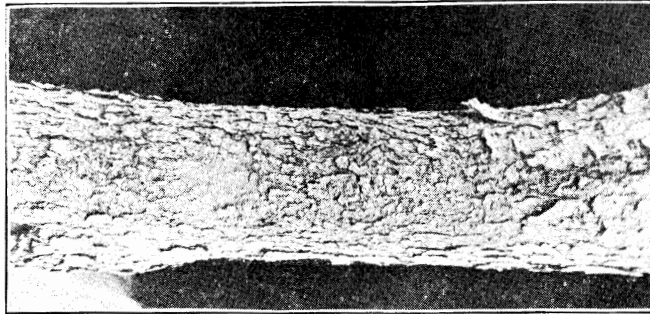


Thin Planting.

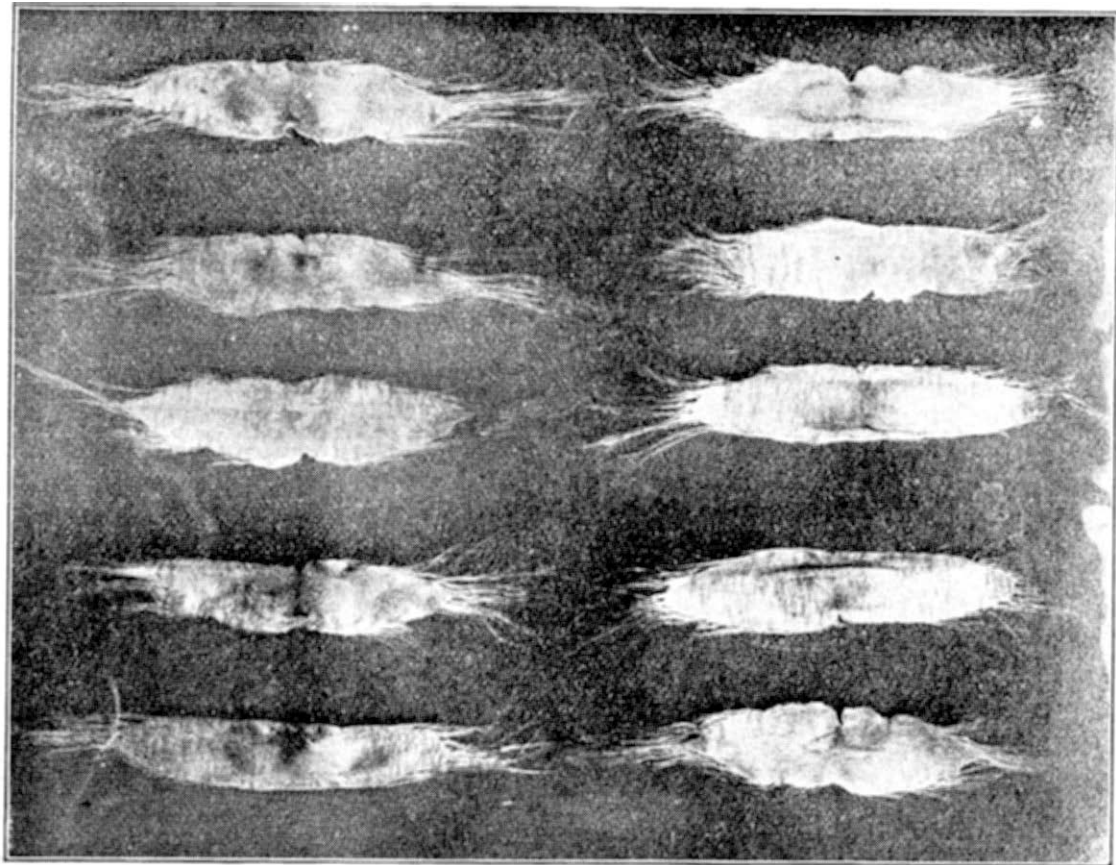
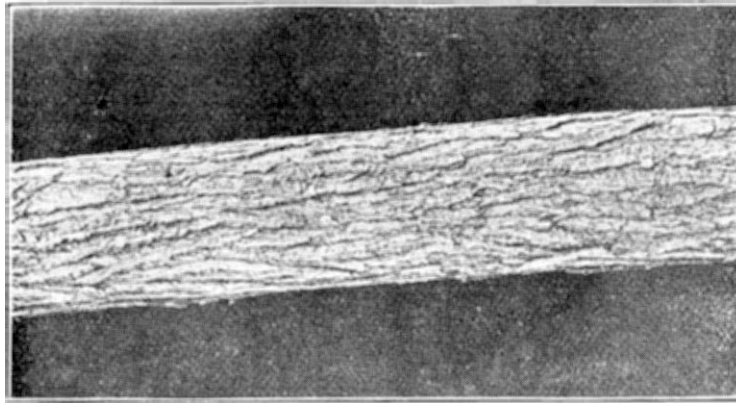


Thick Planting.

BLACK LOCUSTS.



Character of bark and seeds of Southern Catalpa. (Cut of seeds from Kansas Station.)



Character of bark and seeds of hardy or Western Catalpa.
(Cut of seeds from Kansas Station.)

