Bulletin 96. **February, 1905.**

The Agricultural Experiment Station

OF THE

Agricultural College of Colorado.

The Shade Trees of Denver.

—BY—

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PUBLISHED BY THE EXPERIMENT STATION
Fort Collins, Colorado.
1905

The Agricultural Experiment Station,

FORT COLLINS, COLORADO.

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THE SHADE TREES OF DENVER.

By W. Paddock and B. O. Longyear.

A great many shade trees have been planted on the farms and in the towns in the agricultural sections of Colorado, but this does not necessarily mean that all who have planted trees did so because of their love of plant life. Perhaps a majority of the settlers formerly lived where trees grow to perfection and their absence here emphasized the fact that a house destitute of trees does not meet all the requirements of a home. Then, too, it is almost necessary to have some relief from the glare of the intense sunshine and from the monotony of the plains. So the settlers have not been slow to make the best of what the country affords and but few country homes are seen in the older agricultural sections that are not surrounded by groves of cottonwood or boxelders. Neither is it uncommon to see country roads bordered with these trees; and in the older towns and cities, shade trees are as common as in many states that are more favored in this respect. Associated as they are with the early development of the state, the cottonwood and boxelder will not soon be supplanted. Their principal virtues, however, lie in the fact that they are easily transplanted and under favorable conditions make rapid growth. They also withstand the extremes of drouth and moisture if not too long continued and do not readily break down during a windstorm or under a load of snow and sleet. But, unfortunately, the quick growth for which these trees are mostly esteemed, leads naturally to early maturity. Trees that were planted by the first settlers twenty-five and thirty years ago, are now mature, and, judging from appearances, it will be only a few years before most of them must be removed. Full grown specimens of either species are rarely beautiful, and the wood has little value from a commercial standpoint.

Still another cause has contributed in no small degree to the popularity of these trees. Large sums of money have been expended in the effort to introduce trees from the East, especially those kinds that were common about the old homes. But as the conditions that obtain in an arid climate were little understood, and a majority of the people who undertook to plant trees were not accustomed to the work, most of these efforts resulted in failure, since but few trees will stand abuse and neglect so well as the cotton-

wood and the boxelder. Is it any wonder then that the idea has been almost universal that trees foreign to the state will not succeed?

But in a large city like Denver, with its parks, cemeteries, avenues, and fine residences, fine trees are such a necessity that failures only stimulated the desire to overcome the obstacles. Repeated trials have resulted in many successes, and as a result there are growing in that city today at least 60 species and varieties of trees which are foreign to the state. Many of these trees occur as isolated specimens, and as they are scattered over a large area they have attracted but little attention. A majority of the residents of Denver will no doubt be surprised to learn of the large variety of trees in their city. Mr. W. G. M. Stone, President of the State Forestry Association, has given much attention to the trees of Denver for several years past, and we are indebted to him for all the data given in this bulletin. Mr. Stone read a paper at the convention of the Board of Horticulture in 1901 in which the following extract occurs: "Whatever trees are found to grow successfully in Denver would thrive at all other points in the state adapted to deciduous tree culture." Believing that this statement is true in the main, it is then desirable that all prospective tree planters should have the advantage of this experience. To be sure, a record of 25 or 30 years' growth is not conclusive evidence as to the final estimate that should be placed on an apparently desirable tree. More especially is this true where data can be secured on only a few trees of a kind; but any experience that will be an indication as to what varieties may succeed must be productive of much good.

These few pages are then intended for those people who are desirous of adorning their grounds with fine trees, and who are thinking of the future as well as for immediate effects.

Most people make the mistake of planting trees just as they receive them from the nursery. It should be remembered, however, that in digging, a large portion of the root system is left in the ground, consequently when trees are planted without cutting the tops back to correspond with the loss of roots many of them die or make an unsatisfactory growth. It may be stated as a general rule that all trees and shrubs, except the conifers, should have a large portion of the tops removed when they are transplanted. All bruised roots should also be cut off with a sharp knife so as to leave a smooth surface which will readily heal.

The use of large trees should generally be avoided, as vigorous young trees, two to four years old, will usually give much the best results. Large trees can be successfully transplanted if a large ball of earth is taken up with the roots, but this is an expensive operation and is rarely carefully done. Where this precaution is not taken the older trees seldom make satisfactory growth and many of them soon fail.

The best time for planting trees in Colorado is in the spring of the year. This is true for the reason that the winds of winter are apt to dry out the trees as well as the soil. The root system not being established, cannot supply the moisture lost by evaporation, therefore the plants die.

Shade trees respond to cultivation and care as well as do other plants. While many trees will make a fair growth in poor soil, yet the best soil will be found none too good. The hole in which the tree is to be planted should be large enough to allow all the roots being spread out naturally, and of sufficient depth to admit of the tree's being set one or two inches deeper than it stood in the nursery. If the soil at the bottom of the hole is hard and uncongenial some of it should be removed and be replaced with a generous layer of loose top soil. After the tree has been placed in the hole and its roots properly spread out, the soil should be filled in a little at a time and firmly tamped around the roots so that no cavities can be formed.

As soon as the tree is planted water should be turned on until the ground is thoroughly moist. Especial pains should be taken during the first summer to see that the ground around the tree does not become dry; neither should it be kept too wet. Later in the season less water should be given so that the trees may ripen their growth for winter, as it too often happens that the foliage is frozen from the trees instead of ripening naturally as is indicated by autumn tints. The injudicious use of water late in the season is undoubtedly the direct cause of much of the winter killing of trees.

On the other hand, care should be taken that the ground does not become dry during the winter. If sufficient moisture is not present in the soil to replace that which is lost by transpiration from the branches the tops "freeze dry." In most soils trees will be benefited by a watering in the latter part of November or the early part of December. The necessity of subsequent irrigations will depend upon the weather conditions, but close watch should be kept through the winter to see that the ground does not become too dry.

The amount of damage that is done to shade trees by careless and aimless pruning is difficult to estimate, but the results are to be seen on every hand. With the advent of spring the mania for "cleaning up" comes on and the trees are often the first objects to be attacked. One reason for this no doubt is that a large showing for one's labor can be made in a short time.

People who attempt to prune trees ordinarily have one of two ideas in mind. The more common idea, perhaps, is that the branches of all trees should be removed from the lower two thirds of the trunk. The result is a stiff, bare trunk with a few branches at the top—the ungainly remains of what might otherwise have been a beautiful tree.

The other idea is that when trees have nearly or quite completed their growth the tops should be cut back—regardless of the size of the trunk or branches. Some trees, like the cottonwood, will stand such abuse fairly well, but they are mutilated for the rest of their lives. Fortunately many kinds of trees do not live long after such heroic treatment.

Although shade trees usually need but little pruning, that which is needed should be done systematically, and the natural shape of the tree should always be borne in mind. Specimen trees should as a rule never be pruned except when they are planted, as mentioned above, and as occasional sprawling branches or bad forks are likely to be formed. Street trees likewise need but little pruning except that the head should usually be started about ten feet above the surface of the ground. In any case each tree should be allowed to assume its natural form as much as possible.

Another mistake which is commonly made is that of planting trees too close together. One is naturally desirous of securing quick effects; and as a means of securing this end close planting is commendable, providing the surplus trees are removed as soon as they begin to crowd. But this appears to be a difficult matter for the average person to do.

In some towns double rows of cottonwood trees, the trees ten feet apart in the row, may be seen, one on each side of the side walk. The result is a thicket of ungainly trees which serve no purpose that would not have been gained had there been but one row and the trees placed three or four times as far apart.

The majority of trees on most streets should be planted 40 feet apart. Then if quick effects are desirable, the rapid growing Carolina poplar may be planted temporarily between the slower growing kinds, thus making the trees 20 feet apart. The temporary trees should be removed at the first sign of crowding and those that remain will soon fill in the gaps.

Most of the trees here mentioned are propagated ordinarily by seeds, a few by cuttings and layers, while some, as the elms, basswood, catalpa and black walnut, sprout readily from the stump. If one strong shoot is allowed to grow a new tree may be secured in a comparatively short time in this way. Seeds of most trees ripen in autumn and may be planted then where they are to grow, or they may be stratified and planted in spring. Stratification consists of mixing the seeds with moist sand, or alternate layers of seeds and sand which may be placed in barrels or boxes and kept out doors. The alternate freezing and thawing to which they are subjected during the winter, when thus exposed, is necessary to enable the seeds of many trees to germinate.

A tentative list is given below of the kinds of trees which are foreign to the state that are known to be growing in Denver:

Elm, American
" Cork
" Red
" Scotch

Ash, Blue
" Green
" White
" European
" Weeping

Mountain Ash,
" " Oak Leaved
" " Weeping

Locust, Black
" Clammy
" Honey
" Honey Thornless

Maple, Soft
" Sugar
" Norway
" Sycamore
" Wiers Cut Leaf
" Japan

Black Walnut
Butternut
Horse Chestnut
Buckeye
Catalpa (Speciosa)
" (Bignonioides)
Linden, American
" European

Birch, White
" Black
" Weeping

Oak, Red
" Burr
" White
" Swamp
" English
" Pin

Willow, Weeping American
" Weeping European
" Laurel Leaf

Poplar, Carolina
" Lombardy
" Silver Leaf
" Siberian

Tulip, or Yellow Poplar
Chestnut, Sweet
Mulberry, Red
" Russian
" White

Sycamore
Hawthorn, sp.
Hackberry
Cherry, Black, of commerce
Kentucky Coffee Tree
Russian Olive
Ailanthus
Red Bud
Persimmon
Cucumber Tree

Many of these kinds have not been tested long enough to warrant further notice at this time, and not a few must eventually prove to be unsuited to our conditions. A few of the more promising kinds, those that now show every indication of being of permanent value, have been selected for description and illustration:

AMERICAN ELM.

(*Ulmus Americana* L.)

Few trees equal and probably none surpass the American elm for street planting in the Northeastern States, and trials have shown it to be one of the most desirable trees for this purpose in Colorado. There are several recognized forms or types of this tree, the commonest being the vase shaped type. This is specially suited to avenue planting, as the trunk divides some distance above the ground into numerous branches which gradually spread toward the tip and, as the tree acquires age, become more or less arched, thus producing that pleasing effect so noticeable in elm avenues of long standing.

While pre-eminently an avenue tree, this elm is equally suited for planting about the home and in parks and public grounds. The top is usually carried high above the ground, especially when grown among other trees, thus furnishing shade without impeding free circulation of air.

The airy grace and majestic bearing of the elm when well grown, likewise make it a most desirable tree to plant where generous artistic effects are desired. It is a rapid growing tree when young and also long-lived, qualities which are not often found in the same species. While this tree does best in a rich, moist soil, it is adapted to a variety of situations and soils where water can be supplied. Its wood is tough and hard to split qualities which enable it to withstand severe winds and storms.

It occasionally happens that sleet storms load the tops with ice to such an extent that the more upright branches are broken down. This trouble is no more liable to occur in this state, however, than in other portions of the country where the elm is grown, and in most cases the trees are capable of making a rapid recovery after the damaged branches are removed, owing to their ability to push out new shoots.

Young trees of this species sometimes show a straggling habit of growth which can be usually corrected by a little judicious pruning. As with most trees the elm does best and makes the most perfect specimens when planted young and when the least amount of root pruning is necessary.

Several other forms of elms can be seen in the city among which may be mentioned the cork, Scotch and English elms. All of these kinds appear to be desirable and some of them may prove to be better adapted to our conditions than the common white elm.

The various kinds of elms are commonly propagated by seeds which usually ripen in May or June. The seeds should be sown at once and the most of them will soon germinate, but a few may remain dormant until the next spring.

Many insects attack the elm, among which the elm leaf beetle has been quite destructive. None of these pests have appeared, as yet, in Colorado.

ASH.

(*Fraxinus sp.*)

There are three species of this tree which closely resemble each other, and any one of which may be meant when the name ash is used for those grown in this state. They are the white, the green and the red ash. Probably in most cases the green ash is the one oftenest seen and is the one most highly recommended by writers on the subject of trees for prairie planting. The ash is one of our most reliable trees for ornamental planting in this state and is capable of making a good showing in any situation where the cottonwood can be grown. It is a rapid grower, producing a somewhat rounded head of clean, dark green foliage, which assumes a bright yellow tint in autumn. Its leaves are compound, each being composed of five to nine leaflets arranged along a common stalk, thus resembling quite closely those of the walnut. Thus its foliage contrasts well with trees having large simple leaves and they are also pleasing when seen in mass.

The ash is well adapted to streets and other places where more exacting trees would fail. Thus it is hardy, its wood is tough and not easily broken down by storms and the tree is moreover capable of withstanding drouth to a considerable extent. It is especially suitable for prairie plantings for wind breaks and for shade. It can be easily grown from seeds which should be mixed with sand and kept in a shed or they may be spread on bare ground in the fall and covered with boxes or boards. In the spring the seeds should be planted in rows in a seed bed somewhat sheltered from wind and full sunlight and supplied with water.

A few years ago borers attacked the ash trees of Denver in alarming numbers and it was feared for a time that all of these trees would be destroyed. But the result has not been so serious as was anticipated, and today the insects are not as numerous as they were three years ago.

HONEY LOCUST.

(*Gleditschia triacanthos* L.)

The honey locust is a tree which has been favorably known for a number of years in the Middle Western States, where it is quite extensively

planted as a street tree and for wind breaks and hedges. It is readily distinguished from the common black locust by its smoother bark, the presence of large branched spines on the trunk and branches, and by its leaves, which are twice compound. The pods also differ from those of the black locust, being much larger and having a twisted shape. A thornless variety of the honey locust occurs which is especially desirable where the presence of spines is objectionable.

The form of this tree is quite variable, being rather broad and low in open situations, but running up pretty well when grown among other trees. It is a graceful tree, the small leaflets closely arranged, giving its foliage an unusually delicate appearance especially when contrasted with that of other trees.

The honey locust, while not quite hardy in the northern parts of Colorado, is capable of making a good growth in most sections of the state and is capable of enduring considerable drouth. The wood is hard and strong besides being very durable, moreover it is not subject to the attacks of borers, so often destructive to the black locust.

This tree is readily grown from seeds which should be collected in the fall and kept dry until spring. The seeds are so hard that they are not apt to germinate the first season unless they are first scalded with hot water just previous to planting. This treatment, if sufficiently thorough, causes them to swell, after which they should be planted at once in a well prepared seed bed. The seedlings should receive some protection during the first winter by either heavy mulching or laying down.

BLACK LOCUST, YELLOW LOCUST.

(*Robinia pseudacacia* L.)

The common locust possesses many of the most desirable qualities as a utility tree for the state of Colorado, since it is readily propagated by seeds and root cuttings, is a rapid grower, resists drought well and is hardy. The wood, moreover, is hard, heavy, of good fuel value and resists decay to a remarkable degree. In thick plantations this tree makes a single trunk of slender growth, suitable for fence and telephone posts and may in time reach a sufficient size to furnish material for railroad ties.

This locust is also much grown as a shade and ornamental tree. Its foliage possesses a delicate texture due to the small size of its leaflets and when in bloom the tree presents a very attractive appearance and gives off a most delicious fragrance. When grown in open places the trunk does not often run up far before dividing several times, in which respect it resembles the elm. The smaller branches are beset with stiff prickers which occur in pairs at the base of each leaf stalk, thus making it an unpleasant subject to handle, but, like the honey locust, smooth forms also occur. This tree frequently sprouts, especially when the roots are injured in any way, and when cut the stump sends up strong shoots.

The most serious drawback to the growing of the black locust in the Eastern States is the fact that this tree is especially subject to the attacks of borers which, while they do not at once kill the tree, yet cause great injury to it. Moreover the wood is so perforated by these pests that the trunk is often rendered practically worthless. While these enemies of the locust have not yet appeared to trouble this tree in places where it is now growing in this state, it is possible that in time they may be found, especially if the tree becomes common. But before this does occur it is probable that locust plantations may be grown to sufficient size to make them paying investments.

The tree is usually grown from seeds, which should be treated the same as those of the honey locust.

SUGAR MAPLE. HARD MAPLE.

(*Acer Saccharum* Marsh.)

It is doubtful if any tree is held in greater esteem than the sugar maple by those who are familiar with the tree as it occurs in the hard wood

portions of the Northeastern States. The maple grove has always been a favorite place wherever it exists, for a local celebration, the family picnic or a quiet stroll. And surely it is difficult to find a pleasanter spot, whether it be in the early spring when the sugar season is on, during the heat of summer, shut off by the dense foliage, or when the glorious tints of autumn are glowing in unrivaled shades of yellow and crimson from the dying leaves.

Being a rather slow growing tree, it is also enduring when favorably situated. In its typical form it is a round or oval headed tree if grown in sufficient room, but specimens occur which possess a tendency to stretch upward, like the one shown in the picture. The foliage of the sugar maple is usually quite dense and clean, making it one of the most desirable trees where strong shade and freedom from litter are wanted.

Its wood is hard, strong and of the highest value for fuel. "Curly" and "birdseye" maple are varieties of timber obtained from this tree and possess a high value in cabinet work. In sections where the sugar maple naturally occurs, it is one of the favorite street trees and many beautiful avenues of this tree exist. Its hardiness, freedom from litter and its beautiful display of autumn tints are qualities not excelled by any other tree in the Northern Middle States.

This tree sometimes suffers from sun scald where the trunk is exposed and in sections where there is great variation in winter temperature, and for this reason some protection is needed for the trunks especially when young. While no extensive trials have been made in growing the sugar maple in Colorado, the many desirable features of this tree make limited plantings worth while in places where the exposure is not too great and where water is available for irrigation.

The soft, or silver maple (A. Saccharinum L.) has been extensively planted in Northern Colorado towns as a shade and street tree. While many of these trees have proven satisfactory, no doubt a greater number have died, and the light colored foliage of those that are failing may be seen on all sides. This species, when growing naturally is at its best on the banks of streams where it is supplied with an abundance of moisture. The extremes of moisture that are common under irrigation, especially if the soil is heavy, appear to result in the death of the smaller roots; at any rate the lack of feeding roots on dying trees is always very noticeable and uncongenial soil conditions must be the cause of the trouble.

This experience has been so universal that we do not hesitate to condemn the use of this tree in most sections of the state.

The maples are propagated by seeds which may be sown in autumn or they may be stratified and sown in the spring. A few kinds ripen their seeds early in the season and these should be sown as soon as they are mature.

NORWAY MAPLE.

(*Acer Platanoides* L.)

In general this tree much resembles the sugar maple, but differs in its lower, more rounded head and dense foliage of a dark green color. Its compact form, clean trunk and thick foliage possess the sturdy aspect of a tree fostered in a rugged country and under the ocean's breath. In addition to these characters the Norway maple holds its foliage later than any other maple, the leaves turning a bright yellow before falling. It has proven to be a very hardy tree and capable of making a healthy growth in the city of Denver.

On account of its low, compact habit of growth, this tree is especially adapted for planting in door yards and parks and where dense shade is desired. It is also an admirable tree for streets and avenues. Some of the varieties of the Norway maple make excellent specimen trees for open situations in parks and yards. For this purpose the purplish leaved varieties may be recommended. The foliage when first put out is a bright purple color, which changes somewhat to a greenish purple as the season advances.

This tree is suitable for planting wherever the sugar maple is capable of growing, and in many cases may prove hardier than the latter. Propagation—by means of seeds sown in autumn or stratified and planted in spring.

BASSWOOD.

(*Tilia americana* L.)

The basswood is one of the most conspicuous trees in the native forests of the Middle States, where it often reaches the height of seventy feet with a trunk diameter of three feet. While possessing somewhat the aspect of the catalpa, the young basswood is lacking in the coarseness of foliage and branches so characteristic of that species and is well suited to take the place of the catalpa for shade and foliage effects. The basswood when grown in open situations assumes an oval or rounded form of pleasing proportions. The large obliquely heart-shaped leaves have the margins coarsely serrate, are of a bright green color and are arranged alternately on the rather slender branches, the latter being covered with a smooth gray bark.

The inner bark of the basswood is extremely tough and is capable of being readily split into very thin strips, which are often used, where the tree is plentiful, for binding fodder. Its wood is soft, light and almost white in color, there being scarcely any difference in this respect between the sap and the heart wood.

In spite of the fact that the timber is of low fuel value and that it decays rapidly when placed in the soil, still the great variety of uses to which the wood of this tree is put and the fact that it is a hardy and rather rapid growing tree suggests it as a desirable introduction into the timber plantation.

So far as it has been tried in this state the basswood has made a satisfactory growth and is to be recommended as a suitable street and lawn tree, especially where variety in foliage is desired. In addition to this the tree is attractive when in bloom, for the flowers, while not large, are numerous and fragrant and are capable, moreover, of furnishing a fine quality of nectar for honey bees.

The usual method of propagation of the basswood is by means of the fruit, which should be stratified in moist sand in an exposed place and planted in the seed bed the following spring. Many of them may fail to germinate the first year.

In timber plantations this tree readily propagates from the stump, which sends up numerous strong shoots, and by thinning these out new trunks of good form may be secured in a comparatively short time.

HACKBERRY.

(*Celtis occidentalis* L.)

This tree, while not as well known as it should be, is of wide range, having been found as far west as the Rocky Mountains. While in general appearance closely resembling the elm, the hackberry is capable of making a satisfactory growth wherever the elm succeeds, in many cases proving hardier than that tree. It has been used to some extent in Western Kansas and in Minnesota, where it is recorded as one of the best trees for ornamental planting.

It does not usually make as large a tree as the American elm, but is the equal of that tree in its slender gracefulness of limb, while the leaves are so similar in shape as to be readily mistaken for those of the elm.

While the hackberry is capable of making the best growth only in rich, moist soil, it is, nevertheless, able to do well in dry situations. It is well suited for street planting and is especially desirable for door yards and small grounds on account of its moderate size and pleasing appearance.

The hackberry is propagated from seeds which are found in the small, cherry-like fruit borne singly on the twigs. These may be sown in autumn or stratified until spring.

THE WESTERN, OR HARDY CATALPA.

(*Catalpa speciosa* Warder.)

A great deal has been said and written in recent years about the catalpa as a utility tree which could be readily grown to supply the great

and increasing demand for fence posts, railroad ties and telephone poles. It does indeed possess some of the most desirable qualities for such purposes, such as ready propagation by seeds, rapid growth and great durability of its wood in contact with soil. Its adaptability to different locations, however, has frequently been overestimated and in consequence plantings of this tree for its timber have sometimes proven unsatisfactory or even complete failures when attempted outside of its natural range. Thus the catalpa has proven undesirable in the more northern parts of the country on account of its liability to winter injury. But when planted in sheltered locations and in rich soil it has made a good showing and is useful as an ornamental tree for parks and dooryards, and where a variety of foliage effects is desired.

The catalpa, as shown in the illustration, is an upright growing tree with coarse twigs and large leaves. It is a showy tree when in bloom, the large clusters of whitish flowers faintly spotted with purple giving it an attractive appearance. In many places this tree has been extensively planted along streets and boulevards, but it seems poorly suited for such purposes, as it is apt to assume an ugly and ungraceful appearance, in many instances showing dead and bare limbs which the coarse foliage fails to conceal. Its most desirable use as an ornamental tree is shown when grouped among or against a background of other trees and where there is plenty of room in the foreground.

Many of the earlier attempts at growing the catalpa failed for the reason that the Eastern species (C. bignonioides) was substituted for the hardier Western kind. The former species is entirely worthless in Colorado, and too great care cannot be taken to get seeds from reliable people. Seeds should be planted in the spring in a well prepared seed bed. In some localities cuttings root easily when placed in moist soil.

BLACK WALNUT.

(*Juglans nigra* L.)

The black walnut has always held a prominent place among the most valuable native trees of North America. At one time the forests of the Middle Eastern States contained many magnificent specimens of this tree, but the high value set upon its timber led to their early removal, so at the present time it is rarely that one sees the black walnut as it grew in the primeval forest.

It is not uncommon, however, to see the black walnut used for street and roadside planting in its native range, as it is of moderately rapid growth when young, presents an attractive appearance and the nuts are highly esteemed by many persons. Plantations of this tree for its timber are apt to be somewhat disappointing on account of the fact that the wood does not assume the rich, dark brown color, which has made it so much used in cabinet work, until the trees are of great age. But before this occurs the young trees may be used for fuel and for posts, the durability of its wood making this tree one of the desirable kinds for the latter purpose.

For satisfactory results the black walnut should have a rich soil and a fairly constant water supply, under which conditions it has made an excellent growth in this state. It is particularly suited to parks and similar places, where it can have room to develop on all sides, when it assumes a rounded top of considerable density.

Its foliage slightly resembles that of the ash but is more attractive, being composed of numerous pairs of leaflets arranged on long stalks, which remain on the tree for some time after the leaflets are shed. The trees begin to bear nuts when ten to fifteen years of age.

This tree is quite readily propagated by means of the nuts, which should be gathered when mature, stratified over winter and planted in spring. Or the nuts may be planted in autumn where the trees are to stand. The black walnut does not transplant readily, when over a year old, unless the precaution has been taken to cut the long tap root while the trees were small.

THE BIRCHES.

(*Betula sp.*)

Among the birches are found some of our most graceful ornamental trees. As a group they are characterized by their slender branches and small open foliage while the bark in many species is smooth and possessed of some characteristic color. The wood of the larger kinds is much used in the manufacture of small wooden articles, while the curly grained individuals furnish valuable lumber for cabinet work.

The black birch (Betula occidentalis) is the principal native tree of this group in Colorado. It is a rather small tree, sometimes reaching a height of twenty to thirty feet, with bark of a bronze color. It is seldom planted, but is capable of being used to lend variety to ornamental tree plantings.

The European white birch (Betula alba) is a native of Europe, but has been extensively used in America as an ornamental tree, where it is becoming naturalized. It is a slender, graceful tree, reaching a height of thirty to forty feet. Its most noticeable feature is the chalk white color of the bark, on the trunks and older branches, which makes it a striking tree especially in the winter when planted in front of a group of evergreens. It is much used on this account for parks and public as well as private grounds.

The cut-leaved weeping variety of the white birch is the embodiment of delicate, airy grace and is largely used in the place of the species especially where daintiness and contrast are desired. It sometimes reaches a good size in favorable locations where moisture is unfailing, but it is not a longlived tree. In spite of this fact, however, it is one of the desirable ornamental trees for lawns and parks.

The birches may be grown from seeds sown in autumn or stratified over winter. The ornamental varieties are increased by budding and grafting on the parent species.

SYCAMORE, PLANE TREE.

(*Platanus Occidentalis* L.)

The sycamore occurs principally along streams and river bottoms in the Middle States and often grows to a very large size. In form the tree considerably resembles the cottonwood, but the branches are usually more spreading and crooked than in that species. On the branches and young trunks the bark is smooth and of a greenish white color, but is partly obscured on the old trunks and large limbs by patches of dark gray outer bark. Thus the sycamore presents a rather striking appearance when set off against a background of dark foliage. The leaves of this tree are large with several pointed lobes and a light green color, making it a suitable tree for securing a variety of foliage effects, especially where dense shade is not desired. The sycamore is sometimes known by the name of button-ball tree, from the fact that the small, seed-like fruits grow in dense globular heads about the size of a walnut and these hang on the tree over winter.

The wood of this tree is fine grained, hard and splits with difficulty. It possesses a handsome silver grain when quarter sawed and is used to some extent for interior finishing and for articles of furniture.

While the sycamore has been but little used in the Western States it is a desirable tree for streets and parks and will evidently thrive where planted in good soil and supplied with water. It is propagated by means of the seeds, which may be sown in spring in a seed bed.

THE HORSE CHESTNUT.

(*Aesculus hippocastanum* L.)

This tree is characterized by its rounded top of dense foliage, each leaf being composed of five to seven leaflets of large size which spring

from the end of the leaf stalk in a radiating manner. This formation of the leaves gives the horse chestnut a very distinctive character and makes it a desirable tree for securing a variety of foliage effects in ornamental plantings. Being a rather large coarse tree when well grown, it is not as suitable for small areas, as for parks and large grounds where generous effects are wanted.

Like the catalpa, this tree is showy when in bloom, the flowers being produced in large erect clusters and having white petals spotted with purple and yellow. The seeds are of a large size and are produced in a prickly pod about the size of a mature walnut. After the leaves are shed the tree is noticeable among others by its coarse, upright branches, each bearing large terminal buds covered with a sticky varnish.

This tree can be readily grown from the seeds, which should be collected in the autumn, buried in sand before they dry and planted in spring. Or they may be planted in a sheltered seed bed in autumn, where they are allowed to grow the next season.

The horse chestnut has been much used as a street and shade tree in the Eastern and Central States, but is not considered sufficiently hardy for Northern localities. A few trees of the horse chestnut have been planted in the city of Denver and are now sufficiently mature to produce fruit.

While this is about all the data we have regarding its suitability for Colorado, it is evident that the horse chestnut can be successfully grown in any location similar to that of Denver and where moisture and fertility are not scarce.

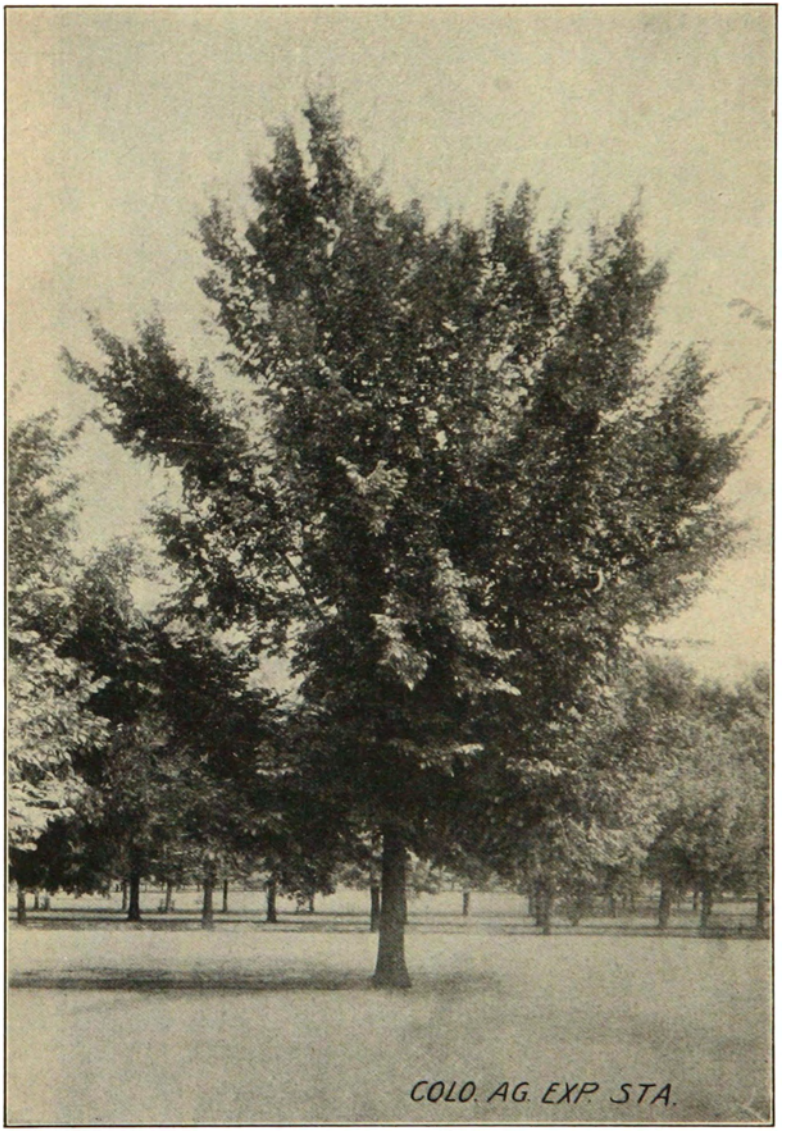

PLATE I.

AMERICAN ELM.—City Park. Planted about 1883; height 50 feet; circumference 54 inches. Photo Aug. 25, 1903.

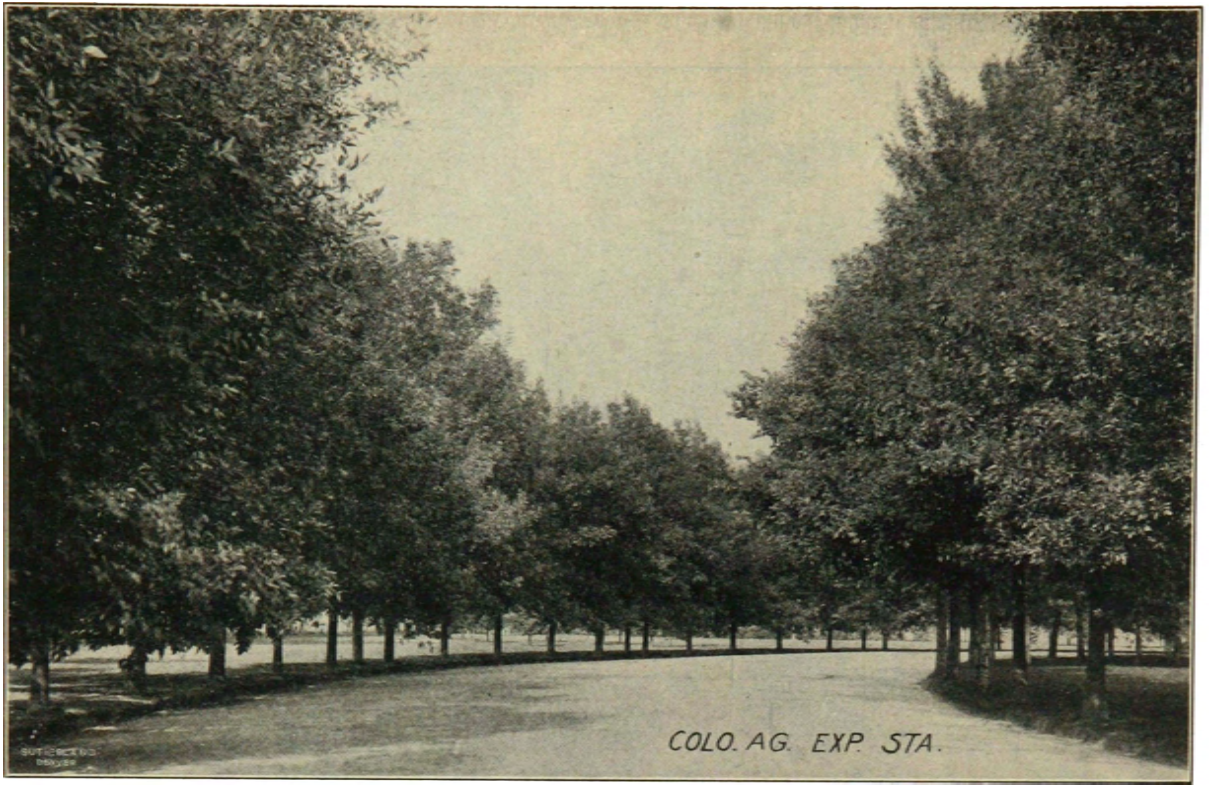

PLATE II.

WHITE ASH AVENUE.—City Park. Planted about 1870; height 33 feet; circumference 30 1-3 inches. Photo Aug. 16, 1903.

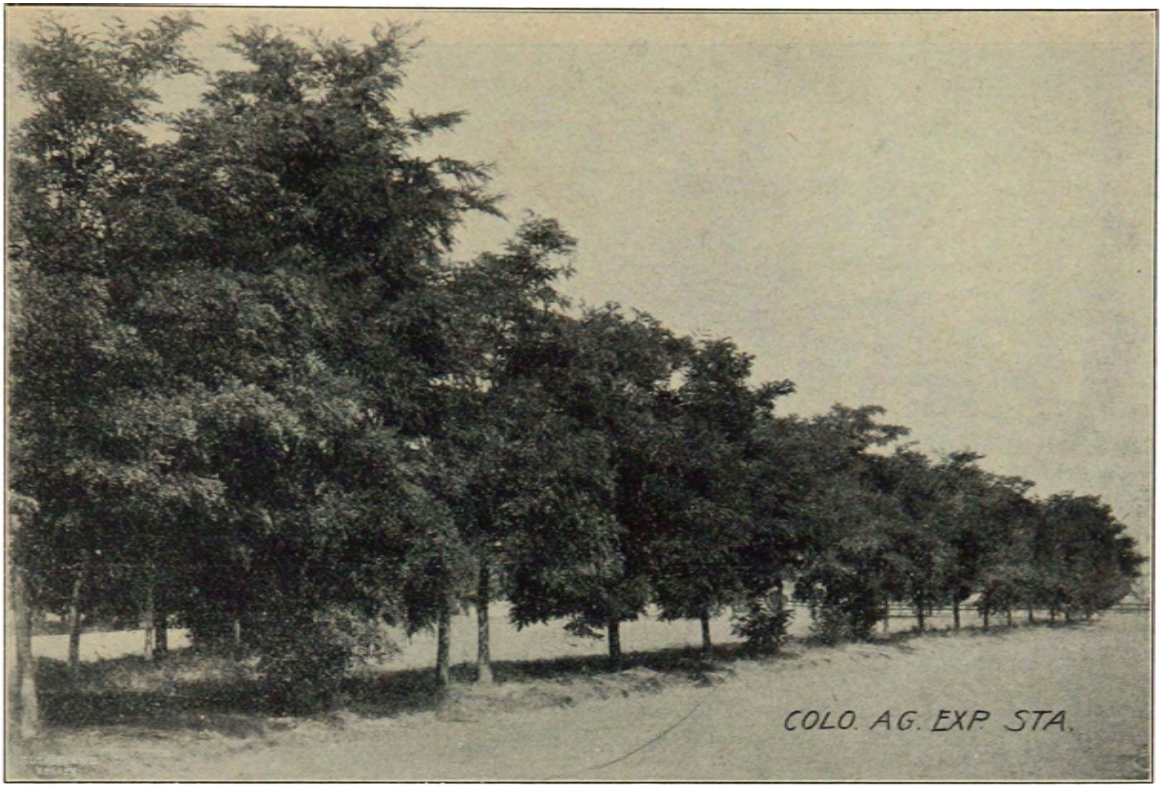

PLATE III.

BLACK LOCUST AVENUE.—City Park. One tree in Denver twenty-six years old has attained a height of 60 feet, and a circumference of 71 inches.

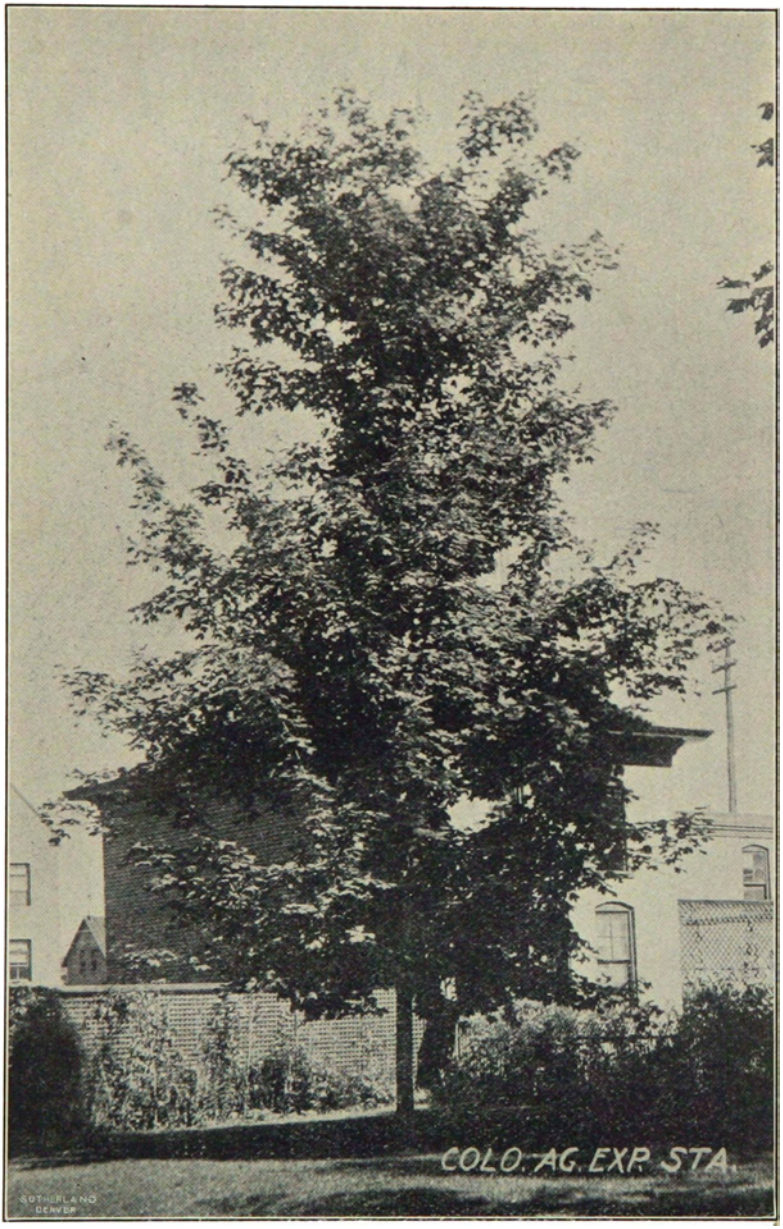

PLATE IV

SUGAR MAPLE.—Grounds of Mrs. L. A. Howard. Planted 1883; height 33 feet; circumference 23 inches. Photo Aug. 16, 1903.

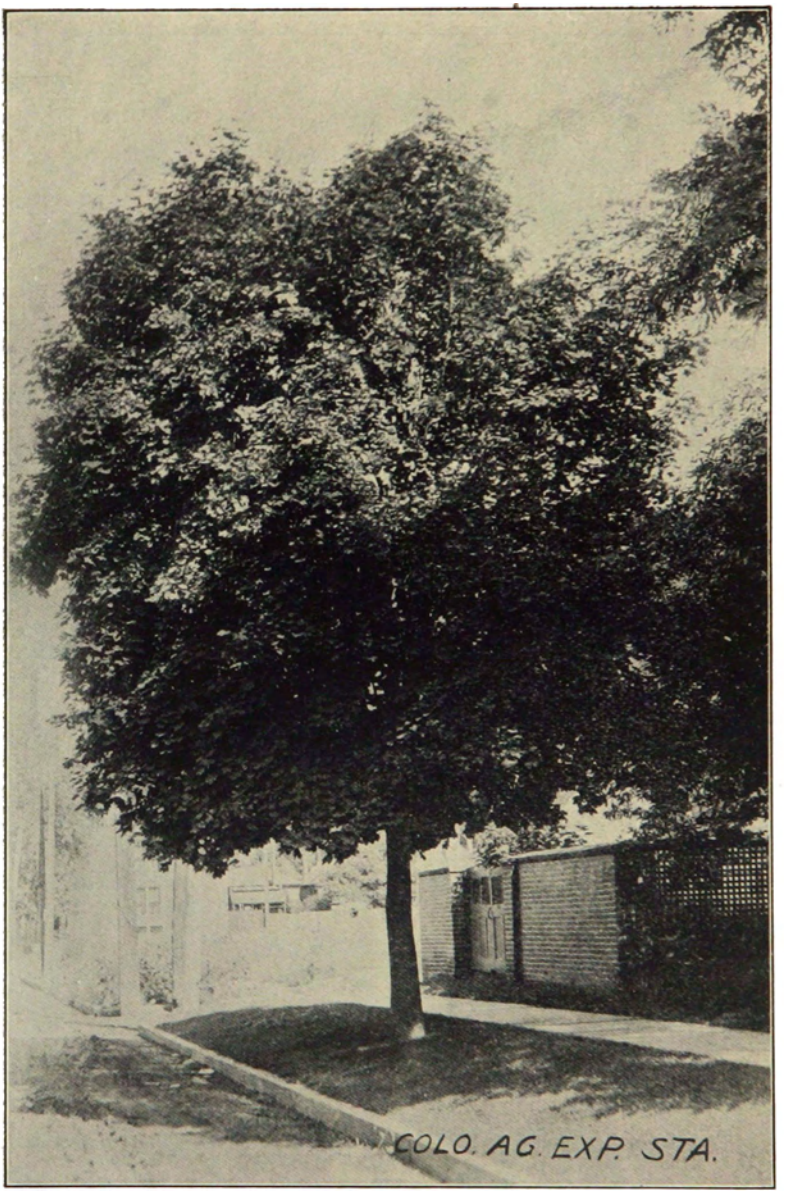

PLATE V.

NORWAY MAPLE.—Grounds of Mrs. L. A. Howard. Planted 1883; height 25 feet; circumference 25 1-2 inches. Photo Aug. 16, 1903.

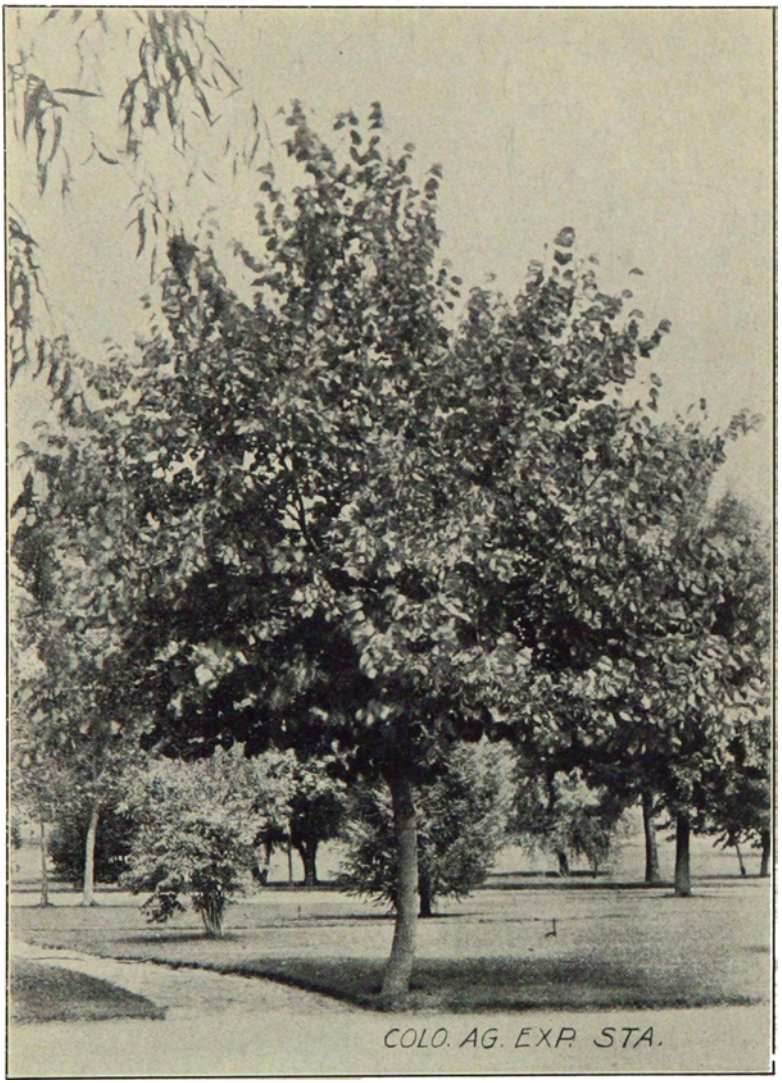

PLATE VI.

AMERICAN LINDEN.—Fairmount Cemetery. Planted 1891; height 23 feet; circumference 23 inches. Photo Aug. 16, 1903.

PLATE VII.

HACKBERRY.—Fairmount Cemetery. Planted 1891; height 28 feet; circumference 26 inches. Photo Aug. 16, 1903.

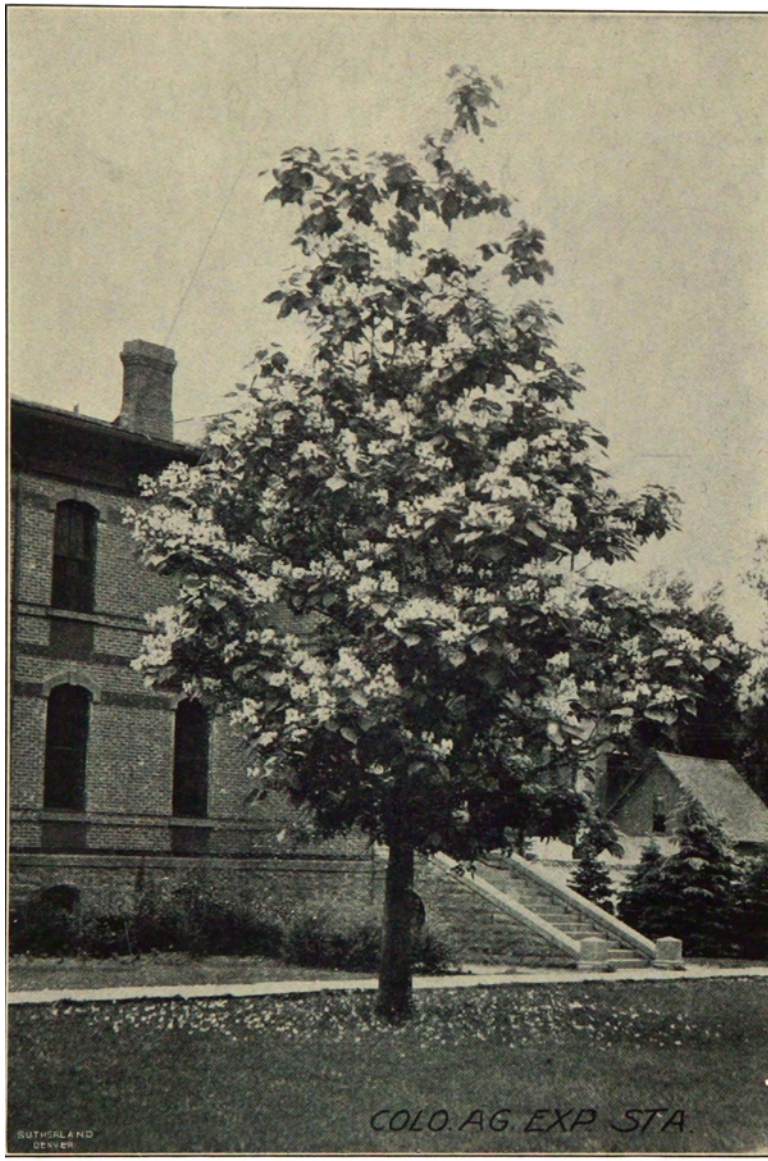

PLATE VIII.

CATALPA SPECIOSA.—Campus, Agricultural College, Fort Collins. Planted 1889; height 30 feet; circumference 48 inches. **Photo May, 1903.**

PLATE IX.

BLACK WALNUT.—Walnut Street. Planted about 1873. Ten of the larg est have a circumference of 30 inches and over. Photo Aug. 16, 1903.

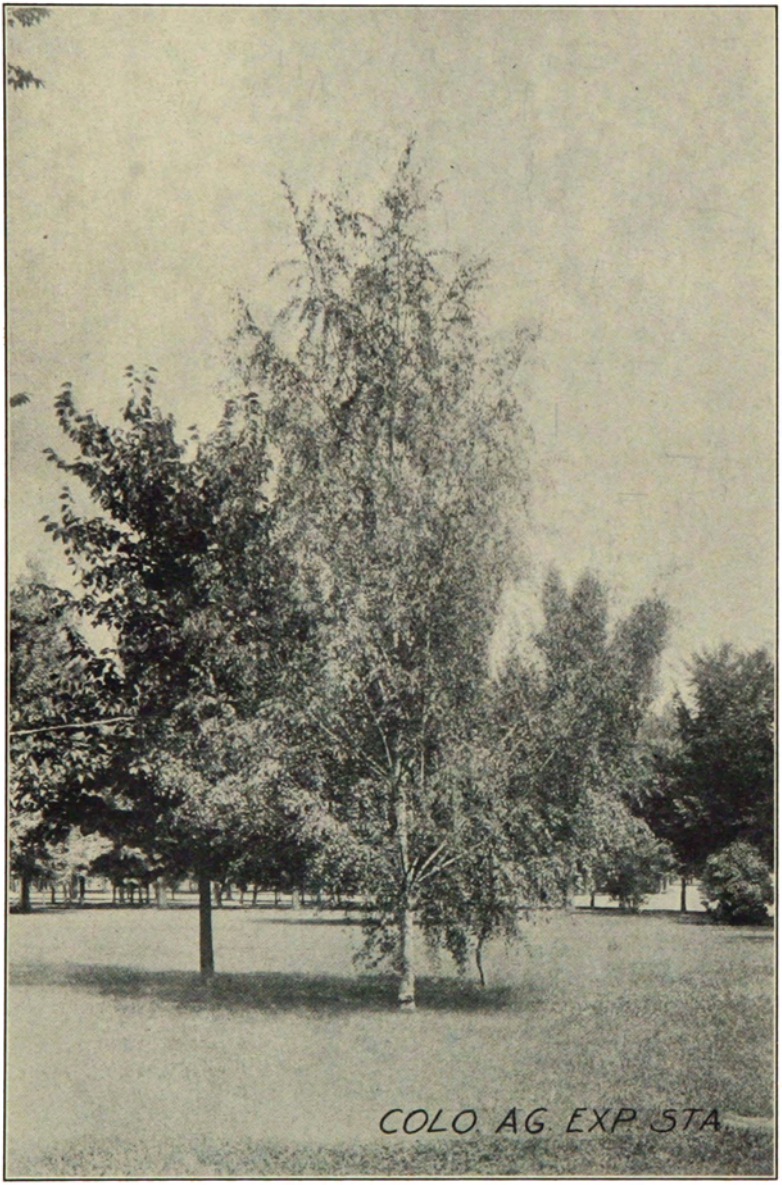

PLATE X.

CUT LEAF BIRCH.—City Park. Planted about 1885; height 30 feet; circumference 18 inches. Photo Aug. 16, 1903.

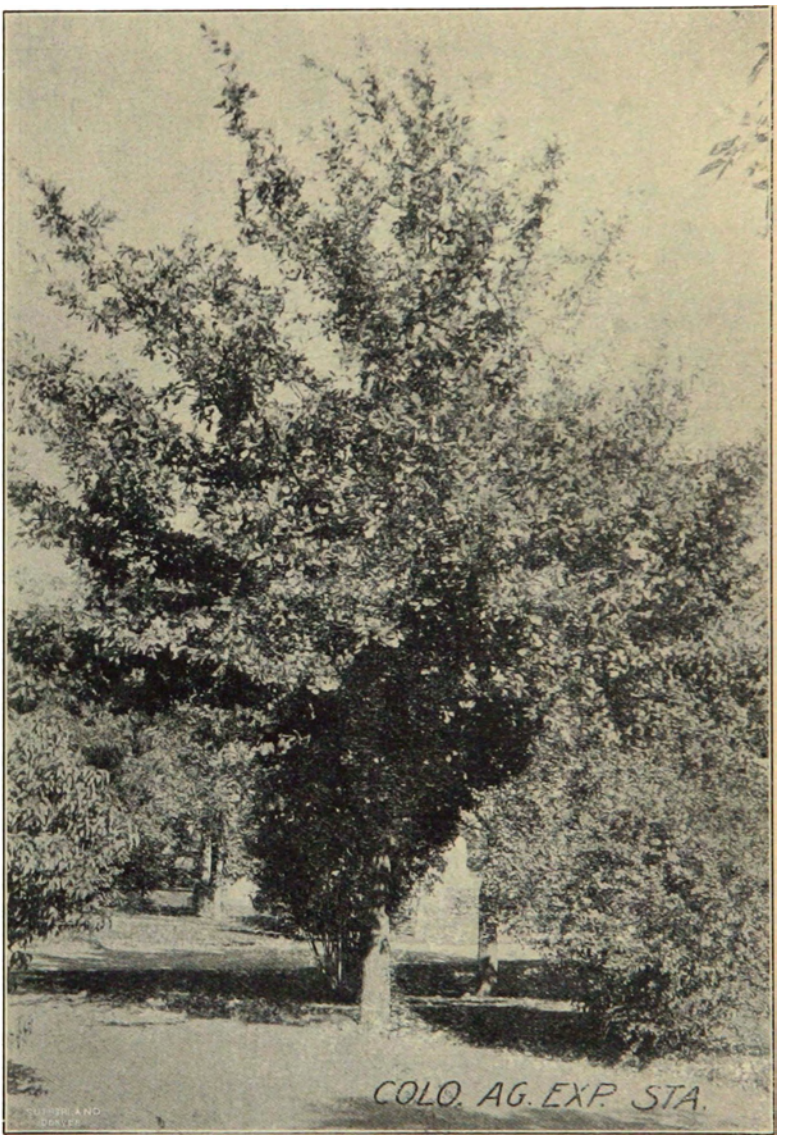

PLATE XI.

ENGLISH OAK.—Fairmount Cemetery. Planted 1891; height 30 feet; circumference 31 inches. Photo Aug. 25, 1903.

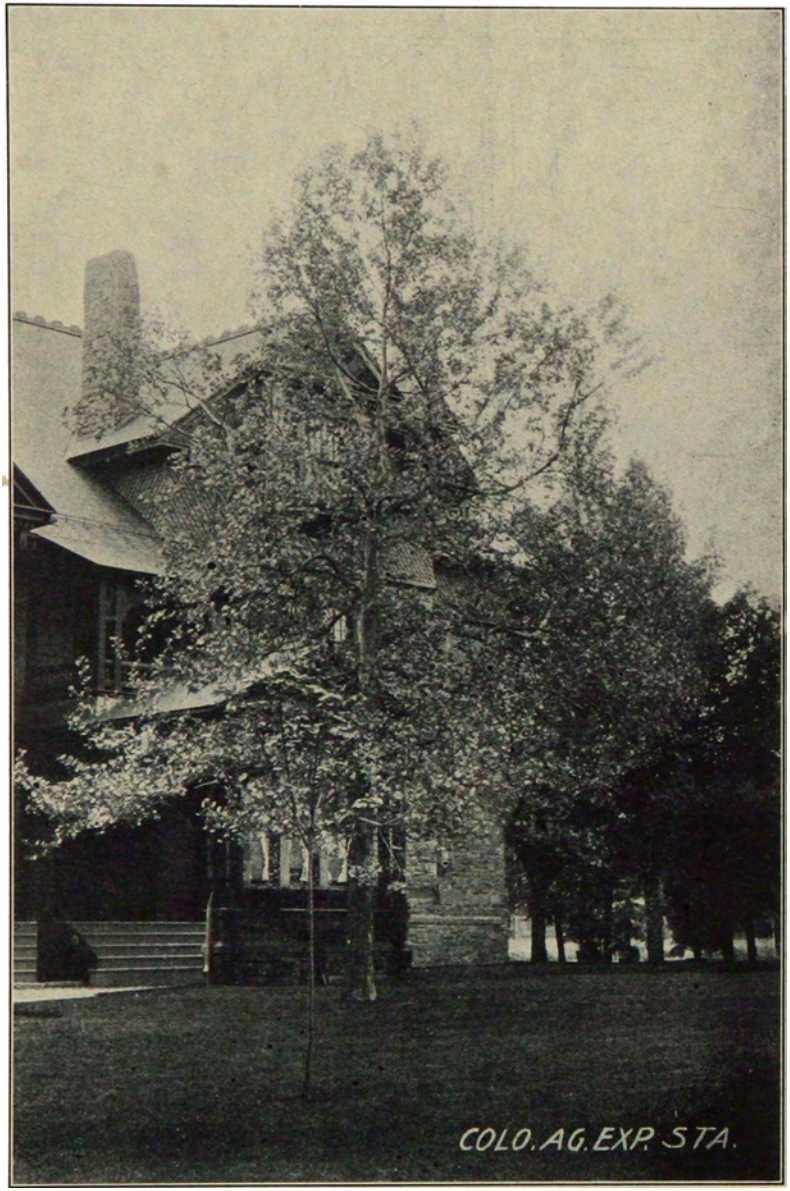

PLATE XII.

SYCAMORE.—Grounds of C. B. Kountze. Planted 1880; height 37 feet; circumference 47 inches. Photo June 7, 1903.

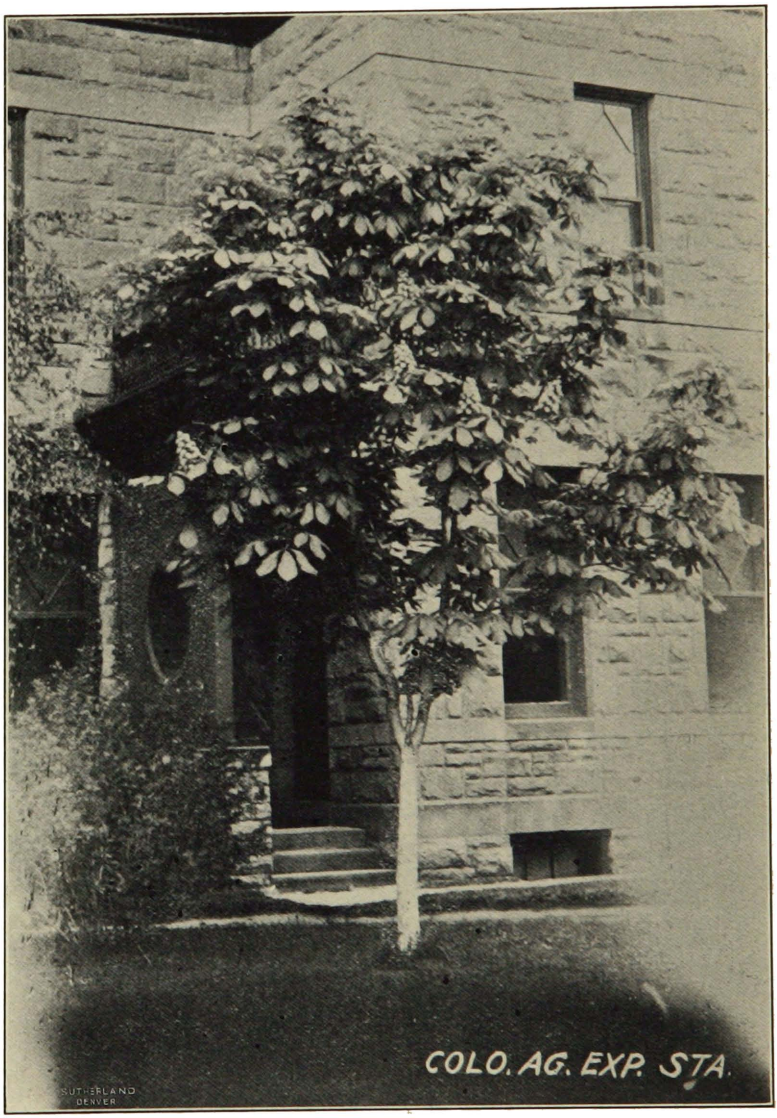

PLATE XIII.

HORSE CHESTNUT.—Grounds of W. N. Byers. Planted 1897; height 15 feet; circumference 14 inches. Photo June 7, 1903.