

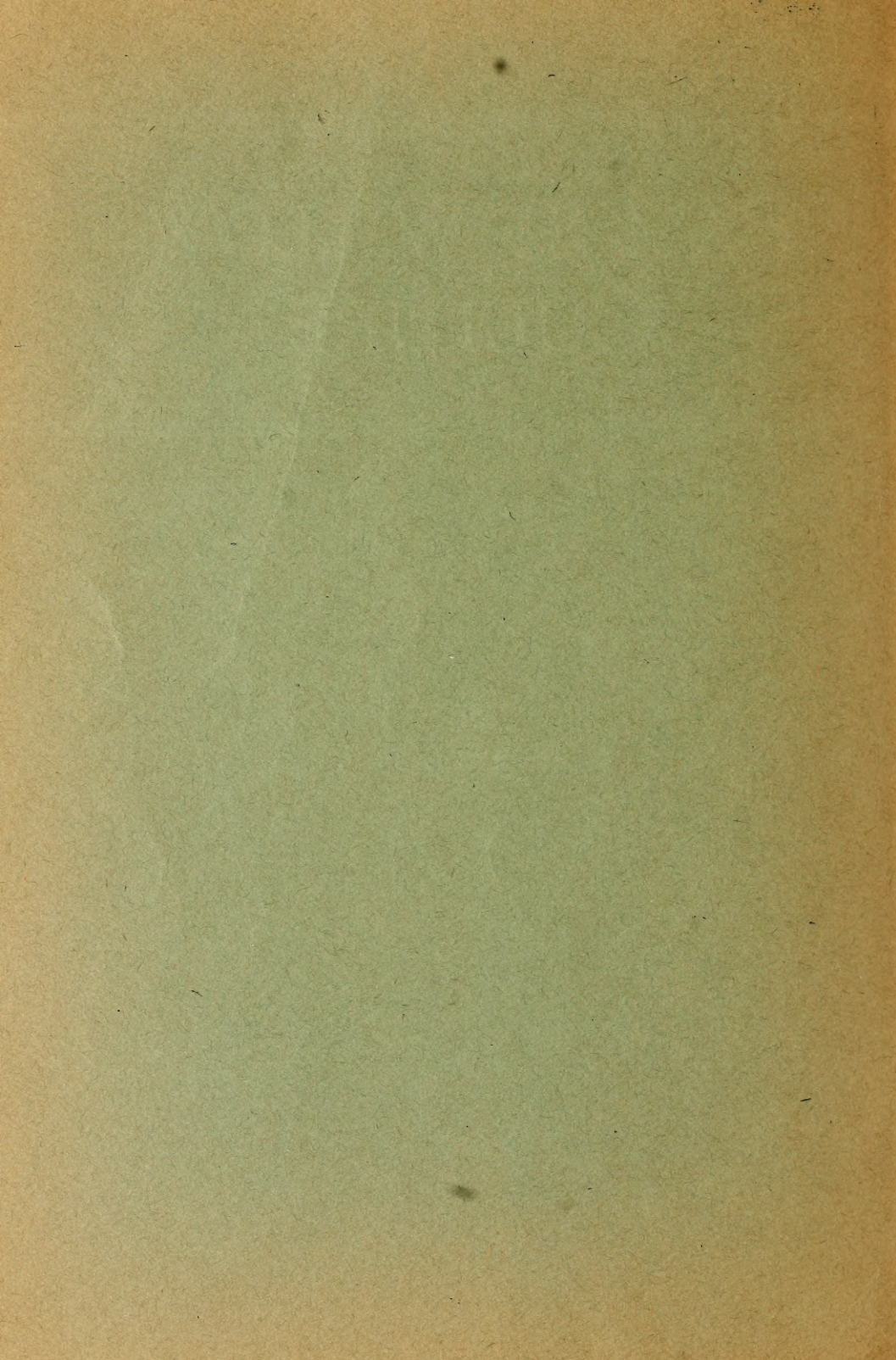
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BASKET WILLOW CULTURE

BY
C. D. MELL, M.F.





BASKET WILLOW CULTURE

Practical Instructions for Planting
Cultivating, Harvesting
and Marketing

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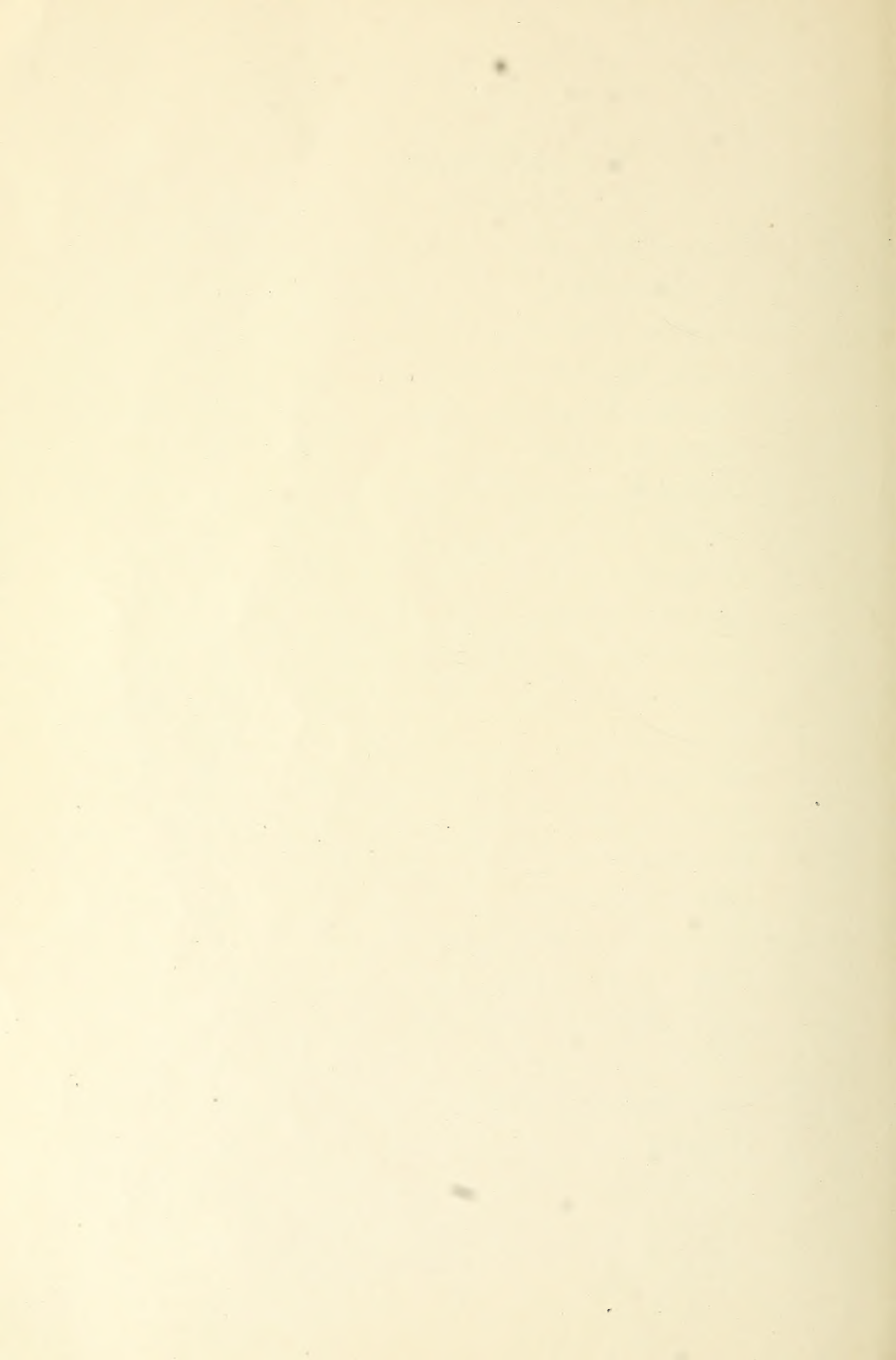
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BASKET WILLOW CULTURE

INTRODUCTION.

THE basket willow is one of the little known farm crops which cannot be too highly recommended. The farmer is compelled more and more to branch out into some special lines of farming in order to avoid competition and at the same time secure the highest possible returns from his land. He is also compelled not only to cultivate rationally and intensively the most fertile acres of his farm, but also to bring under cultivation the least fertile acres and render them productive to the fullest extent. The basket willow is one of the easiest of all the farm crops to propagate. Its management is simple, requiring no machinery of complex mechanism, or a great deal of high-priced labor. Almost all the work required in rational basket willow culture comes during a time of the year when other farm work does not claim the attention of the farmer. He is able, therefore, to give constant employment to his farm hands all the year.

The reason why basket willow culture has received so little attention in this country is due partly to the lack of knowledge and partly to the mistrust of new things. Every farmer who is eager to get the most money from his farm, as well as to enhance the value of his land, should give willow culture an unprejudiced consideration. Investigation will convince him that this is a product of the farm of which an over production is absolutely out of the question for many years to come. There are few cultural plants which yield such a good crop in return for so small an outlay of capital and labor. The demand for basket willow rods is very great and every year many thousands of bundles of rods, as well as large quantities of manufactured basket willow ware, are imported from France, Germany and Holland. The growing of this product is so quick and easy that it seems incredible that the industry has not been more fully developed, or more generally introduced. There is a constantly growing demand for willows, sufficient to take care of a largely increased production.

SOIL REQUIREMENTS.

One of the first considerations in the cultivation of basket willows is the selection of the proper soil. Willows do not thrive in all soils. Though they do not require a wet soil, as is often supposed, they do

require one which is permanently moist. Soil which produces a good crop of wheat may also yield a fair crop of basket willows when properly managed. It is best to select moderately loose, moist, loamy sand land. The loam contains the necessary nourishment for the plants and retains the moisture, while the sand mixed with loam keeps the soil loose and the roots can penetrate quickly and easily in all directions. Areas which are low and swampy or subject to frequent flooding must be drained so that the water does not stagnate or the soil become sour. The soil should be deep, with a water level preferably not over 6 feet below the surface.

It was formerly supposed that basket willow growing could not be profitable on land having a high rental value. It has been shown conclusively, however, that basket willows grown under intensive management and in rich soil yield a return equal to or greater than that of most farm crops. On the other hand, very poor soil may be planted with basket willows, provided the proper varieties are selected and the soil is sufficiently fertilized and irrigated. One cannot grow basket willows successfully on dry, shallow soil or on permanently wet and boggy peat land. Locations where frosts are liable to occur during the growing season should be avoided since the tops of the tender young shoots are easily injured.

PREPARATION OF THE GROUND.

Draining, wherever necessary, must be attended to at once. The drains should be straight and open from the lowest part of the ground, giving them a depth of two or three feet, according to the conditions. They should be about 5 yards apart in wet, and ten yards in moderately wet ground. The land should be plowed as deep as possible in the fall prior to planting in the following spring. The object of the deep plowing is to turn the top layer of the soil completely under and in this way bury the weed seeds in the surface soil so deep that they cannot spring up during the following season. The soil does not settle or become compact during the first winter, but becomes thoroughly pulverized by repeated freezing and thawing. The depth to which the soil should be turned depends somewhat on the soil and subsoil. For a sandy soil, which is naturally loose and porous, a digging of 10 to 12 inches is sufficient. Where the soil is compact and contains heavy clay a digging of 15 to 18 inches is necessary. Prior to plowing, the area should be thoroughly cleaned of all its rubbish and weeds. It is advisable to plant the area to potatoes the year before willows are planted, so that the soil becomes thoroughly pulverized during the cultivation and digging of

this crop. It is essential that weeds are kept down, and therefore they must not be allowed to come to seed.

In locations where the soil is poor it is best to spread well-rotted stable manure over the surface just before plowing. Lime is recommended for soil which is chiefly composed of sand.

SELECTING THE VARIETIES FOR PLANTING.

Too much care cannot be exercised in the selection of the varieties for planting. A great many kinds of basket willows have been introduced into this country from Europe, but only a few have proved worthy of cultivation. Those most commonly planted in the United States are American green, Welsh, Lemley, and common white. It is not always wise to plant extensively the most highly recommended varieties until they have been tested on the particular area to be planted. Each variety has its special requirements and unless the soil constituents and soil moisture are definitely known great care is required in the selection.

Salix amygdalina—American green. This willow requires a moderately rich sandy loam, in which it frequently produces rods from 8 to 10 feet high in a single season. The rods, although heavy at the base, grow very tall, straight, and flexible. It produces a higher yield in weight per acre than any other variety and is often considered the most profitable for general use.

Salix purpurea—Welsh. This willow grows in a great variety of soils, and produces rods of excellent quality. In rich loam it crops heavily and the rods grow very slender, straight, and cylindrical, and seldom produce side branches. The Welsh yields less in bulk per acre than the American green, and surpasses it in market value and in the quality of the rods. This willow has the highest specific weight. For planting along shallow river banks, where ice or high water is apt to do some damage, this willow recommends itself more particularly than any other.

Salix pruinosa acutifolia—Lemley, which is also known as Caspian willow, is a good cropper in rich, fresh loam. Unless the stools of this variety are planted close the rods develop side branches near the top, especially during the first few years of the life of the holt. Lemley has been reported to thrive very well in loose, sandy soil with a moist loamy subsoil. It demands a very rich soil when the rods are cut off every year.

Salix viminalis—Common white. This willow has been planted rather extensively and with good results in some sections of the United States. It produces a great many new shoots every year, and

the rods are extremely tough and almost perfectly white after peeling. By correct handling the holt may last many years with only a slight decrease in the crop as the stools become older. This willow thrives in a great variety of soils but demands a considerable degree of soil moisture.

Salix purpurea viminalis—Blend willow. This is one of the earliest and best basket willows cultivation in North Germany and is now introduced here with success. It produces beautiful, slender, and branchless rods which are both smooth and cylindrical. The first year's rods are generally curved at the base, but the second year and thereafter they grow up straight. The pith is considerably smaller than in those of the Welsh, and the rods are more flexible. There is no basket willow which produces more rods per stool than this one. The stock is valued very highly both in the peeled and unpeeled conditions. The blend willow thrives in rich, sandy loam with a moderate degree of moisture, but it does not grow in wet soil.

Salix Americana—American willow. This willow is said to have had its origin in the United States and has been cultivated in eastern Germany for a number of years. It has large and glossy leaves and a pinkish stem. The rods are smooth and slender and are considered among the best for the production of peeled stock from which the best grade of wicker work is made. The American willow is seldom attacked by insects, and for this reason may prove to be the basket willow of the future. It requires a moderately rich, moist soil.

There are other varieties yielding good results only in limited sections of the country where local conditions are favorable. It is important to select varieties possessing the most desirable qualities and at the same time fitting the local soil and climatic conditions. Those above mentioned usually give the best results in this country.

Many common names are used for the same varieties of willow in various parts of the country. This confusion of vernacular names is unfortunate and an attempt is made here to give the name most generally used for each variety.

PREPARING AND STORING THE CUTTINGS.

Basket willows are propagated on a commercial scale wholly by cuttings. The best time to prepare the cuttings is during the last half of February or the first half of March. It is best to select them from the shoots of the most thrifty stools and only from one-year-old rods. It has been the experience of a great many growers that cuttings of one-year-old rods produce roots and shoots more quickly and easily than cuttings from older wood or from rods cut from

weak stools. Although it is generally advisable to have the cuttings prepared just before planting, they may be cut in advance and stored until needed. It is best to store them in a barn where it is neither too moist nor too dry. They should be partially buried in moderately moist sand, with the buds pointing upwards.

The cuttings should be of equal lengths for a given soil and site. For ordinary conditions, where the soil is moderately moist and porous, 8 or 10 inches is sufficiently long. Where the water level is rather deep the cuttings may be made 12 inches long. The rods should be cut in a slanting direction by means of a sharp pocket knife. Cutting should not be done during frosty weather.

Plant early in the spring as soon as the frost is out of the soil. The ground should be prepared the preceding fall. The cuttings may be planted in holes made with a dibble, which consists of an iron rod about 18 inches long and $\frac{5}{8}$ of an inch in diameter sharpened at the lower end, while at the upper end a convenient handle may be attached. By means of this a hole may be made in the ground rendering it easy to push in the cutting to within one inch of the top. Care should be taken to have the buds on the cuttings point upwards.

Nothing adds more to the neat appearance of a holt than accurate planting. Cuttings should be set in straight lines in both directions.

SPACING THE CUTTINGS.

The best spacing is still a matter of dispute among a number of growers in this country. European growers have passed the experimental stage and adopted the system of close spacing, which will sooner or later come into general practice here. Most species may be planted in rows 18 inches apart and 8 inches apart in the row. For small-leaved varieties, such as the purple, it is better to plant in rows 15 inches apart and 6 inches apart in the rows. The advantages of close spacing compared with wide spacing are as follows:

- (a) The rods grow straight, cylindrical, and branchless.
- (b) The yield per unit area is larger than in wide spacing.
- (c) The area becomes fully stocked and the soil remains moist, since the dense crown cover prevents the sun's rays from drying out the soil.
- (d) Weeds are choked out in the dense shade after the second year.

WEEDING AND CULTIVATING THE HOLT.

Weeds must be kept out of the holt from the start. This may be done at a moderate cost if they are carefully checked during the first

two years. After the second year the weeds will be choked out by the dense shade of the willows. The weed seed should not be allowed to ripen. Wild morning glories are very troublesome in a great many localities and unless they are pulled up before the seed matures the holt will be over run in a few years. The vines of this weed twine about the young shoots and in many cases render them useless. Dodder, or wrap as it is commonly called, is another persistent pest in holts where drainage is not well regulated, or where the area is completely flooded during the growing season. After these two weeds have taken complete foothold in a field of willows it will be next to impossible to grow a profitable crop. The number of times the holt must be weeded and hoed during the first two years depends entirely upon the character of the ground and its preparation prior to planting. In moist, rich loam weeds are more apt to be troublesome than in moist sand land and, therefore, must receive considerably more attention. A thorough hoeing is necessary early in the spring. It is best to hoe out all the weeds between the rows, and a few days later those between the stools in the rows may be pulled up by hand. This should be repeated as often as necessary. Too much attention cannot be paid to keeping the holt clean from weeds. Where holts are large and labor high it may be advisable to use a small horse cultivator, but great care must be taken not to ruin the stools by allowing the cultivator to strike them, or to break off the young shoots. This will not dispense with the hoeing and weeding between the stools in the rows. The soil may in this way be broken up and pulverized to the depth of from 2 to 4 inches, depending upon the nature of the soil. Great care should be exercised not to break up the soil too deep since this would injure the roots of the willows. In some cases the roots are disturbed slightly by ordinary cultivation, but this injury is compensated for in a great measure by the vigor imparted to the willows through loosening and pulverizing the soil and killing the weeds. In locations where the soil is well drained the root system is deep and very little injury results from cultivating. A willow plantation in which the stools are set in regular rows and in which all troublesome weeds are kept out, presents a very attractive appearance.

FERTILIZING THE HOLT.

Where the soil is poor one should fertilize before planting as if it were intended for wheat or corn. Well-rotted stable manure, wood ash, and gypsum and lime are all excellent fertilizers, and should be spread on the land prior to plowing. It is a very good plan to ferti-

lize an area thoroughly and then first sow clover, alfalfa, or some other legume, which should be allowed to grow up. This crop may then be plowed under, which will not only serve as a very good fertilizer but will also keep the soil loose and moist for several years. Fertilizing old plantations frequently becomes necessary in order to prolong the life of the holt. Well-rotted stable manure should be spread broadcast over the holt immediately after the willows have been cut. Great care should be taken to use manure free from weed seeds. Fertilizers containing phosphoric acid are very highly recommended. The quality of the rod in old plantations is considerably improved when this fertilizer is used.

VITALITY OF THE HOLT.

The length of time during which a willow plantation yields a profitable return to the owner depends upon a number of things: variety, soil, drainage, climate, preparation of the ground, fertilizing, irrigation, or soil moisture, care and cultivation of the holt, manner of cutting the shoots, and the protection of the holt from winds, animals, or insects. The duration can be easily prophesied when one is familiar with these factors. Under favorable conditions a holt should last from 18 to 25 years. As soon as the production is considerably diminished on account of the loss of vitality in the mother stools, it becomes necessary to grub them up. A crop of corn or wheat should then be raised on the area before it is again planted to willows, but it is best to select a different variety of willow from the one originally grown in the holt.

It is claimed by expert growers that the profitable life of a holt may be increased by allowing the willows now and then to grow for two years without cutting them.

RESTOCKING OPEN PLACES.

Although willow growers realize that it is absolutely necessary to plant in places where stools are missing, they very seldom attend to it with sufficient care. The vitality and productiveness of the holt depend largely upon the proper replacing of dead and decrepit stools with vigorous new shoots. Every year a number of stools die from insect and fungous diseases, or from injuries inflicted while cultivating the holt. Stagnant water or an insufficient amount of soil moisture frequently causes stools to die. It is best to grub up all the unproductive stools every year and plant in their places thrifty new shoots. This may take place any time from late fall until the middle of April. For this purpose ordinary short cuttings should not be

used, but entire one-year-old rods, which must be vigorous and branchless. The shoots should be forced into the ground as deep as possible. Cuttings require more time to sprout in the spring than the neighboring older stools which already have fully developed root systems, and in order to prevent the shoots of new cuttings from being over-topped and choked out, long rods are planted. Rods used in restocking open places must be free from branches so that they are not swayed and twisted too much by the wind, which would interfere with their root development.

PROPER ROTATION FOR BASKET WILLOWS.

After a number of years the rods show a diminished height growth even in the best regulated holts. This is the first sign of the deterioration of the stools, or of an insufficient supply of soil moisture. It is often a waste of time and labor to attempt to revive an old holt after it has shown marked signs of diminished yield. A young holt gives better returns and it pays to grub up the old stool early and seed the area to wheat, corn, or potatoes. After several years the area may again be planted to willows. Proper rotation should not only be practiced with the ordinary farm crop, but also with the different varieties of willows. The Welsh may be followed by the American green. The most experienced willow growers in Europe find it most profitable to rotate the crop every 12 or 15 years, depending upon the soil and variety of willow.

CUTTING THE RODS.

The rods may be cut as soon as the wood has fully matured and the leaves have fallen. As a rule, rods are cut in this country during February and March, but they may be harvested any time between the end of October and the middle of March. If cut after the sap rises, the stools suffer from loss of sap and the shoots themselves become less valuable. Rods intended to be dried with the bark on should be harvested during December and January.

It is very essential to cut the rods close to the stool. This will aid a great deal in keeping the stools low. A very objectionable feature in a poorly managed willow holt consists in high stools. As a rule, stools heave considerably in rather moist soil, and where careless cutting is practiced they are apt to become especially high. It is best to use a short-bladed knife, shaped somewhat like a sickle, which should be kept very sharp. The cutting stroke must be clean and decisive. Each rod should be held tightly in the left hand and cut by a single stroke.

PRUNING THE RODS.

A certain percentage of the rods of all varieties of basket willows and under all methods of management develop side branches. If the grower does not care to separate the branched from the unbranched rods, pruning is most conveniently done just before cutting them. A very sharp, sickle-shaped knife is used for this purpose. Care should be taken to shave off the branches as close to the rod as possible. It is often advisable, however, to separate the branched from the unbranched rods, and when this is done considerable is gained by pruning after cutting, since it is much quicker and easier to sort the branched from the unbranched rods before than after pruning.

SORTING THE RODS.

The rods are sorted in four height classes immediately after cutting. This is commonly known as drafting and consists in sorting the rods according to sizes by means of a measuring stick placed upright on the side of a barrel in which rods are stood on end. They are then removed according to their height, the tallest first.

When the rods are intended for peeling they must be tied firmly in bundles of convenient size and weight (about 40 pounds) and placed standing on their butts in water to the depth of 4 or 6 inches. These bundles must be firmly fixed in position so as not to be disturbed by the wind. In this shallow pond, which is commonly called a pit, a rack must be arranged to keep the bundles upright and secure. The rods must remain in this position until the sap rises and they begin to sprout. They are then ready to be peeled.

If they are to be used green or with the bark on, they must be set up thinly and loosely on the butts in any dry place until the sap has left them. As soon as they dry they must be put under cover, preferably in a place where the moisture is uniform. They may be sorted either before or after they are dry, but they should not be tied into bundles until they are thoroughly dried and carefully sorted. Tie the bundles firmly and securely. In cases where the rods are long, it is advisable to sort them into 5 grades, and great care should be exercised to have the rods in each bundle as nearly uniform in length as possible.

PEELING THE RODS.

Two methods are employed in the preparation of rods for peeling, both quite simple. In one case the rods are placed in a pit containing 4 or 6 inches of water as above described and left there until the

sap is up and the bark can be easily removed. This is known as sap peeling. The other method, commonly referred to as steam peeling, consists in steaming or boiling the rods until the bark is loose and readily comes off.

In the ordinary method of sap peeling, the rods remain almost pure white. The apparatus for peeling consists of a round steel rod from $\frac{1}{2}$ to $\frac{5}{8}$ of an inch in diameter and about 4 feet long, which is doubled over so that the two ends are brought together making a double rod 2 feet long. This instrument is known as a brake, and there are a great many different designs. The lower or welded end of the parallel rods must be inserted in a log placed at a convenient height. The brake must be perpendicular and have the upper ends of the prongs slightly curved out one inch from the top so that the rods can easily be put in the brake. The operator places the thick end of the rod between the prongs of the brake and draws it towards him and the bark is at once separated from the wood. The small end is then treated in a similar way which completes the peeling.

The white peeled rods should be bleached quickly in the sun and thoroughly dried in the open air, after which they should be stored in a dry, dark place. When thoroughly dry, they must be tied in bundles about 3 or 4 feet in circumference at the base, three bands to each bundle, one near each end and the third in the middle. The rods in the bundle must all be as nearly parallel as possible. It is a good plan to place a small armfull of rods in the middle of the bundle, so that the ends extend out about one foot beyond the bottom and tie it in this state. By lifting the bundle a few times, and letting it fall on its base on the ground, the protruding butts act as wedge and tighten the bundle.

Rods peeled by using boiling water or steam are known as buff in distinction from white rods peeled in the ordinary way. In the process of boiling, the coloring matter or tannin in the bark stains the willow a buff color. White rods are used almost exclusively for high grade wicker work, but it is often claimed that steam-peeled rods are the more durable.

Another method of preparing the rods for sap peeling is coming into use. They are cut and sorted in the usual way and placed in a steam-heated room having a temperature as nearly as possible at summer heat. The bundles are stood upright on a dirt floor of thoroughly saturated clayey loam. This serves the same purpose as a pit for storing rods preparatory for sap peeling in the spring. When

rods are thus treated after the first of January they begin to sprout and are ready for peeling in a very short time.

SALE OF PEELED RODS.

The price of willow rods depends upon quality and size. The sale value of the same quality varies, however, in the different sections of the country. The grower may be able to sell his rods to basket makers in the neighborhood, and thus can offer them for less than those who have to ship to a distant market. It is always advisable for growers to find market for their stock with local manufacturers because he will be in constant touch with customers and can cater to their requirements in special varieties or grades.

There is always a great demand among willow ware manufacturers in this country for white or peeled willows, and they are eager to buy in large quantities, provided, the rods are carefully sorted. Unfortunately, it is difficult to convince most growers that there is a constantly increasing demand for high-grade willow rods. It is, indeed, a singular fact that in a country where all lines of work have taken immense strides during the past two decades, that the willow industry has not been more fully developed. Every year large quantities of willow rods and manufactured willow ware are imported from Europe.

SALE OF UNPEELED RODS.

The management of a holt of willows to be sold with the bark on is the same as for the production of peeled willows. The object in both cases is the largest possible yield of beautiful, slender and branchless rods. After cutting begins the operation is more simple, cheaper, and requires less time, which is a matter of consideration with many growers. The rods are not sorted according to height, but all branched and crooked must be separated from branchless and straight. In well regulated holts, planted with the best cuttings, worthless rods seldom occur. Immediately after cutting, the rods should be bound into bundles about one foot in diameter. These bundles are stood on their butt ends. As many as 100 bundles weighing approximately $2\frac{1}{2}$ tons are brought together. They remain in this position until shipping time, when they are taken to the railroad station where they may be weighed. Good willow sells for 1 to 3 cents per pound, and growers who manage their holts on the intensive plan will experience no difficulty in realizing from \$60 to \$80 per acre by selling their willows green. It is always best to sell direct to the manufacturer.

Basket willows, like corn or wheat, are subject to the ravages of insect pests. Rods thus injured are generally rendered useless, since the injury inflicted on the tender young shoots causes the part of the rod above the injury to die and side branches are produced immediately below. The entire stool is weakened at the same time. Prominent among the insects destructive to basket willows is a class of beetles which readily fall to the ground when the host plant receives a sudden blow.

Some growers combat the ravages of these beetles by drawing a rope over the young shoots to shake the beetles to the ground. Two men, one at each end of the rope about 20 feet long, can cover in this manner 10 acres in less than a day. The beetles require some time to crawl up the stem to the tip of the shoot, that being the principal point of attack by the female when depositing her eggs. If the beetles are shaken down every day for a week or ten days during the time they are apt to do the greatest damage, considerable loss may be avoided. It has been observed that in holts to which chickens have access, insect injury is very slight. Sparrows and other birds destroy a great many insects which attack basket willows and it is advisable, therefore, to encourage these birds to multiply in the immediate neighborhood of a holt. This may be done by putting up a great many small sparrow houses on poles from 12 to 15 feet high.

Spraying with one or more deterrent mixtures is frequently recommended but none of the pests has yet been fully controlled in this way. Several special machines have been devised for the capture of the beetles but they have not been brought into general use.

A simple remedy for controlling insects which deposit their eggs in the tip of the tender young shoots is to prune the affected shoots several inches below the point of attack.

PROFIT OF A BASKET WILLOW HOLT.

The profit to be obtained from a crop of basket willows depends upon a number of factors. Favorable soil and climatic conditions are among the first requirements, but as in other crops, an extraordinary profit can not be expected without extraordinary care and cultivation. The yield, or profit, of any crop stands in direct ratio to the degree of intensity of cultivation. Farmers who intend to plant willows for basket rods should not calculate upon realizing extreme profits except in case where all the determining factors are

very favorable, which they seldom are. With proper care willow growers realize as good returns as from any other crop usually grown in this country. The profit is more largely regulated by the quality of the stock produced than by the amount. One ton of good rods may be worth more than three tons of poor quality.

To realize the highest net returns from a willow holt, one must strive to produce rods with the following essential qualities: Willows intended to be used with the bark on must be smooth, tough, branchless and cylindrical, and the color of the bark must remain a light brown. Those intended to be peeled must possess the above-named qualities and in addition should have an almost pure white color after peeling, a small pith and straight grain.

Considering that willow rods with the bark on can not be kept for more than a year, it is in most cases best to peel them. Peeled rods do not depreciate in value if they are stored in a suitable place. An average acre of well-managed holt yields about 4,000 pounds of peeled rods, varying somewhat with the variety. At 5 cents per pound, this amounts to \$200, of which three-fifths may be considered as a net return per acre.

COST OF ESTABLISHING A HOLT.

The items of greatest expense in the establishment of a holt are the preparation of the soil and procuring and planting the cuttings. The cost of plowing and harrowing depends upon the locality. The expense involved in buying cuttings is determined by spacing.

The numbers of cuttings required for an acre are as follows:

Distances apart in the rows.	Distances between the rows.	No. of cuttings per acre.
5 inches	15 inches	83,635
6 "	18 "	58,080
9 "	20 "	34,848

Cuttings can be bought for one dollar and upward per thousand. It is difficult to estimate the expenditures in establishing a holt since so much depends upon local conditions. The following may be considered an average expense per acre:

Preparation of land	\$ 0.00
Cost of cuttings	58.00
Cost of planting	11.00
	<hr/>
Total cost	\$75.00

The bark obtained by peeling the willow rods generally is considered of no economic value by willow growers. Although no use has been made of the bark in this country it undoubtedly will be utilized in the future for a great variety of purposes. It is very important to dry the bark thoroughly immediately after peeling. In this state it may be stored in a dry place with uniform moisture conditions.

It may be used for the production of tannin, which it yields in quantity and quality equal to that of oak bark. The tannin obtained from willow bark is used almost exclusively in Denmark for tanning the leather used in making high-priced gloves. A reddish-brown coloring matter known as Bismark brown is extracted from the bark of Lenley and related varieties. This color is used in staining leather.

As soon as the bark can be obtained in sufficiently large quantities by tannin extract concerns, willow growers will have no difficulty in realizing an additional revenue from the sale of this product.

In parts of Europe the bark of all varieties is used for fodder and bedding for cattle and sheep. For this purpose it has a market value of \$15 per ton. It is also used in the manufacture of door mats which outlast those made from straw or rush. The inner portion of the bark has been used recently in weaving a coarse linen useful in the arts.

OVERPRODUCTION OF BASKET WILLOWS.

It has been said that within a few years the production of basket willow rods in this country will be so great that the price will be materially lowered. Present indications do not point in this direction, and it is safe to assert that under normal developments during the next two decades the overproduction of raw material is not likely to be equal to the amount consumed. As soon as the quality of the stock grown in this country is improved by proper management in the holt, competition will be brought about with rods imported from Germany and the price for home-grown stock will be materially advanced. An increased production unquestionably calls forth an increased consumption of raw material and the price will not be affected. At present peeled rods sell from 5 to 12 cents per pounds, depending upon the quality, and if they should sell for one-fourth less than the present prices the growers would still realize a higher net return from an acre of good basket willows than from an acre planted with wheat or corn.

CONCLUSION.

It is considered unnecessary to give the reader who is not familiar with the different basket willows a long list of names of varieties not fully tested in this country. Those who wish to plant willows for basket rods are advised to secure stock of varieties most likely to thrive best on the greatest variety of soils. The American green and Welsh give good results under the widest range of soil conditions. New varieties may be gradually introduced into the holt but it is always best to test them on a small scale in different soils before extensive plantations are made. There are a great many points in the cultivation of basket willows which the grower must learn by experience. One must familiarize himself with the requirements of the willows he wishes to plant and with the soil and moisture conditions of the holt. In order to avoid a great many mistakes, it is especially advisable that willow growers in a community form an association, and hold meetings at convenient places, where their experiences may be communicated to others and thus be mutually benefited.

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