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HARVARD UNIVERSITY

BULLETIN

OF THE

BUSSEY INSTITUTION

[JAMAICA PLAIN (BOSTON)]

VOL. II — PART VIII

1899

*Hersey - The basket Willow*



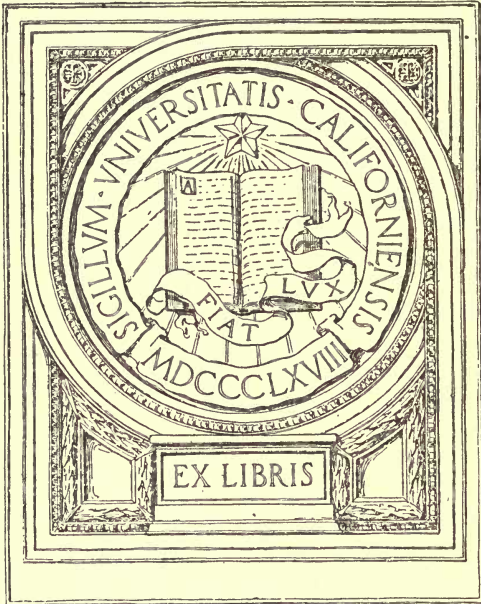
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No. 38. — *The Basket Willow*. By EDMUND HERSEY, Instructor in Agriculture at the Bussey Institution and Superintendent of the Bussey Farm.

Nearly half a century ago, on learning that a party in New York had imported from Europe cuttings of the European Basket Willow, I ordered several hundred cuttings for trial; for I had long been convinced that the introduction of any new tree, shrub, or vine that can be cultivated with profit, tends to improve the condition of the farmer, and to add wealth to the country.

The cuttings came to hand in good order on the 20th of April, 1853, and were set out in Hingham, Mass., in a soil of sandy loam, which had been prepared for a crop of potatoes. The slips were 12 inches long, and were set in rows 12 inches apart, and also 12 inches apart in the rows. Each cutting was set 9 inches below the surface of the ground, leaving 3 inches above, and on an angle of 45 degrees from the perpendicular; for many years of experience have proved to my own satisfaction that cuttings are more likely to live when set in this way than if set in a perpendicular position. Of the thousand cuttings set, every one lived and made a growth of from 3 to 6 feet the first season. No more time was spent in cultivation than would be required to cultivate a crop of potatoes. Since the crop of the first year was wanted for cuttings to set the following spring, it was gathered in November. Each shoot was cut into slips 12 inches in length, and they were all buried in a sand bank until the following April.

After the crop was harvested, the stumps from which it was cut were unprotected during the winter; they were found to be in good order in the following spring. During the summer the crop was neither fertilized nor cultivated, but was permitted to grow in its own free, natural, yet graceful way. When harvested in November, a measured rod of land produced 112 pounds of osiers, or within 80 pounds of nine tons to the acre; most of the osiers measured 5 to 6 feet in length, and some of them were within a few inches of 9 feet. A few of the osiers were sent to the editor of the *New England Farmer*, who in some remarks printed in 1855, vol. 7, page 85, concludes as follows: "We have specimens of his growth of willows now before us, very smooth and even, and about 9 feet in length."

*Salix viminalis* and *Salix purpurea* were the two varieties ordered from New York, but on investigation it was found that the importer, or his agent, had made a mistake, and had marked the *purpurea*, *viminalis*, and the *viminalis*, *purpurea*. I am ignorant whether this mistake was confined to the cuttings sent to me, or whether it embraced all that were imported at that time. After several years trial with these two varieties, grown side by side, the variety bought for *viminalis* but proved to be *purpurea*, produced osiers so much superior to the other variety that all of the latter were destroyed, and only the *purpurea* plants were permitted to grow.

On my land the *viminalis* does not make so rapid growth as the *purpurea*, and it sends out more lateral branches; in fact with me it has proved a failure for both basket work and hoop-poles; but the *purpurea* has proved a great success, especially when grown on a soil of warm, sandy loam. For more than twenty years a small area was kept covered with this variety, which without any cultivation or fertilizer, continued to produce every year good crops of osiers from 5 to 7 feet in length, which were sold to a party who cut and peeled them, and disposed of them to a party in Boston at a price of from 8 to 10 cents per pound; a higher price than the imported osiers sold for in Boston at that time. The party who bought the crop, paid for it what he thought it was worth, which was always more than could have been realized from any ordinary crop grown on the same area of land.

At the time of the death of the man who bought osiers of me, other business demanded my attention, and as the land was wanted for other purposes, most of my plantation of willows was destroyed, but enough were left to continue the experiment, to show that this variety of willows can be grown for many years on high, sandy land without cultivation or the application of fertilizers, and yet produce good osiers. Forty-three years have passed since I began to grow these willows on the high land, and the yearly crops have never shown any signs of weakness.

Forty-five years ago, Mr. Lincoln Jacobs of Hingham, Mass., planted about one half of an acre of land with *Salix purpurea*; the soil selected was a rich, moist loam; a good soil for potatoes or grass; but it proved a very poor soil for the variety of willows he planted; many of the osiers were less than 4 feet in length,

and few of them more than 5 feet. Mr. Jacobs, failing to get good osiers on rich, low land, planted a few on high, dry land, near his residence; and from this field he got osiers from 5 to 7 and even 8 feet in length every year, without applying any fertilizer or expending any labor in cultivation; this he continued to do as long as he lived, which was probably ten years after the cuttings were planted out. Other parties planted the *purpurea* for hedges on high, dry land, but the growth was so rapid that it proved not suitable for hedges.

The question has arisen in my mind, why do most, if not all American writers who are considered good authority on the subject, recommend the *viminalis* and condemn the *purpurea*? and why is it that after forty-six years of trial, I find the *purpurea* an excellent variety for osiers, and the *viminalis* not worth growing? Can it be that the soil of Hingham differs so much from that of any other part of the United States, that another variety of willows is required elsewhere to make a success in the business? Can it be that so many writers have made a mistake in the variety of willows? May it not be that the persistent efforts which have been made to grow the *purpurea* on wet land have led many to believe that this variety is of but little value, when if they had made the same efforts to grow it on dry land, they would have found it to be a variety of great value for osiers; if so, then it is time that this fact should be made known to the public; that those who are about to plant willows on high land may not make the mistake of planting varieties that are sure to make the business a failure.

So many associate the willow with running water, or low land, that it is very difficult to convince the public that there are varieties which grow best on sandy plains; yet years of close observation have proved to me that *Salix purpurea* not only grows best on dry land, but grows best in hot, dry weather. By actual measurement it has been found that this variety in hot, dry weather with bright sunshine, will grow in a dry soil from 3 to 4 inches in twenty-four hours; while in rainy weather the growth does not exceed one half of an inch, though it be within a few days of the period when the growth was from 3 to 4 inches.

For more than forty years I have had a row of the *purpurea* willow growing on top of quite a high hill; about ten years ago,





a road was built on the south side of it, digging down some 4 or 5 feet, and quite a steep slope was made, the top of which was within a few feet of the willows; yet many of the osiers in this dry position have continued to grow as well as ever; during the past forty years, without cultivation, or the application of fertilizers, a yearly growth has been made of from 5 to 7 feet. I regret to say that road improvements require the removal of this row of trees the present year. Having kept them so long as a proof of their adaptability to dry land, I only submit to their destruction because it is important for me to do so.\* During the forty-six years that the *Salix purpurea* has been grown by me, no injury has been caused to the roots or leaves by insects or fungi and it has proved to be one of the surest crops the farmer can grow, and also a profitable crop where the osiers are in demand for the manufacture of baskets and baby carriages, or for barrel hoops, nail keg hoops, or binders for boxes.

That the demand for osiers will rapidly increase, there can be but little doubt; and that most of them will be grown in this country is equally certain. From statistics published by the U. S. Government we learn that willow is quite rapidly taking the place of rattan. In the year 1880 the amount of willow manufactures in the United States was \$1,992,851; in 1890 it was \$3,633,592, or a gain of about 82 per cent. In the year 1880 the amount of rattan manufactures was \$526,777; in 1890 it was \$682,977, or a gain of less than 30 per cent. The amount of willow imported was as follows:

1858 . . . . .	\$55,141	1880 . . . . .	\$21,833
1865 . . . . .	28,028	1885 . . . . .	28,665
1870 . . . . .	50,115	1890 . . . . .	27,646
1875 . . . . .	34,440		

\* Since writing the above, the road improvement has been made, and the willows removed. While digging the earth from under the willows, it was found that a tap-root the shape of a parsnip had grown from each of the cuttings set to establish the row of willows; these roots had no fibrous roots below the soil, and extended to an unknown depth; one was cut off 6 feet below the soil, and found to measure 4½ inches in diameter at the top, and 2 inches at the lower end. The soil under the willows was very much darker in color than that on either side, and from 3 to 4 inches deeper; it being 12 inches deep. Below the soil there was sand with loam enough mixed with it to slightly change the color, but not enough to hold the particles of sand together when pressed in the hand; under this sand was found a white sand free from stones, and fine enough to make good mortar; the depth of this sand is unknown, but pipes have been driven down 20 feet without reaching the bottom. Water would probably be reached at about 25 feet below the surface.



In selecting a soil best adapted to the growth of the *Salix purpurea*, a warm, sandy loam should be sought for; a soil that will produce good crops of Indian corn, is better adapted to the growth of this variety than a soil well adapted to the growth of grass. To make the business of growing osiers profitable, a home market is needed; therefore if the business is to increase rapidly in this country, the manufacturers who use osiers should keep in close touch with the farmers, increasing their business as rapidly as the demand for their manufactures will warrant, and the farmers can be induced to furnish the osiers.

To prepare land that has not been under cultivation during the previous year, for a plantation of willows, a crop of Indian corn may be planted and several cords more of manure applied to each acre than the crop of corn will be likely to consume; the cultivation of the land should be thorough to prevent any weed seeds from ripening. As early in the following spring as the land will work readily, it should be ploughed about 8 inches deep. The slips for planting should have been cut from the stumps the previous autumn, a few weeks before winter sets in, and cut in lengths of about 12 inches, tied up in small bundles, and buried in a sandbank, a few inches deep; if on the south side of the bank, it will be found when the slips are taken out in the spring, that the new roots have already begun to grow. A few days after the land is ploughed, the cuttings should be planted; if the soil be fine and in good condition, the cuttings may be easily pushed into the ground about 9 inches, leaving 3 inches above the surface; it is best to set the slips on an angle of 45 degrees from the perpendicular; if set upright the roots at the lower end will be too deep to grow as rapidly as they would if nearer the surface, and the sap will not rise to the leaves as readily as on an angle. The cuttings should be set in rows 2 feet apart each way. In case the land be very weedy the first year, the weeds should be destroyed, but in doing so great care should be taken not to start any of the cuttings; for to disturb them before the roots get well started checks their growth if it does not kill them. Experience has proved that cultivation is unnecessary on high land after the first year.

Unless the soil be very rich the crop should not be cut until it has made two years' growth, when if cut in the autumn and kept in a sandbank over winter it will make excellent slips for new

plantations, but of little value for osiers. When the crop is permitted to grow two years before cutting, the roots make a much more vigorous growth than they would have made if the shoots had been all cut off the first year. As the quality of the osiers depends on the size and vigor of the roots upon which they grow, it is not wise to adopt any practice which will check their growth or make them less vigorous. The roots being well established, the crop of the third year, will be valuable for osiers; the shoots should be cut the following year a short time before the sap begins to flow, and if they are to be peeled without steaming, they should be tied in bundles of a convenient size with the osiers very even at the large end, that they may be set upright in water, about 3 inches in depth, where they should remain until the bark is in a condition to slip easily from the wood, when the work of stripping the bark from the osiers should begin and be continued, without interruption, until the work is completed. If the osiers are to be steamed to loosen the bark, the work may commence as soon as the osiers are cut, and when the bark has been stripped off the steamed osiers, they should be dropped immediately into a long trough of cold water, where they should lay a few hours, and then be taken out and dried in a storehouse where there is a good circulation of air. Dropping the osiers in cold water makes them dry a lighter color whether they are steamed, or peeled without steaming. When the osiers are well dried, they should be bound in bundles of from 30 to 50 pounds each, according to size and length, and sent to market.

When willows are to be grown to be used for the hoops of nail kegs or for the binders of boxes, shoots of nearly uniform thickness can be obtained by the device of stripping off, in the spring, all the lower leaves of those growing shoots which have already made one year's growth. In the spring, at the time when the leaves are about half an inch long, the top of the shoot is grasped in one hand, and all the leaves except a few at the top, are stripped off with the thumb and finger of the other hand. After a little practice this stripping can be done very rapidly; it prevents the growth of lateral branches, and secures the production of hoop-poles or box-binders which are entirely free from knots, and almost as large at the upper end as at the lower. A good two



years' growth is large enough for keg hoops or box binders; but for barrel hoops, three years' growth is not too large.

I have no doubt that a large and profitable industry could be built up in this country by growing osiers and manufacturing them into a great variety of useful articles, if the farmers could be induced to get the best varieties of willows for osiers, and to plant them on a soil best adapted to their growth. But because of the "information" which has thus far reached the farmers, it would probably happen in case osier cuttings were given to 100 of them, that 99 would set out their cuttings on a bank beside a stream, or on some low land of but little value for any purpose. There is in this country a belief so firmly established in the minds of all classes, that the home of the willow is by the side of running water that it will probably not be easy to convince any considerable number of persons that there is any variety of willow producing excellent osiers, which grows better on sandy loam than on moist, loamy soil. To establish this truth, and to do away with the erroneous prejudice now current, both precept and example will be needed in full measure.

I cannot but hope that my own success during forty-six years of experiment and observation, may invite others to make such investigations as may be necessary to ascertain what soil is best adapted to the growth of each variety of willow used for manufacturing purposes.

The question will arise naturally, where did my willows obtain food enough to produce vigorous growth each year for forty years in succession, while during the same time it was evident to the eye that the character of the soil in which the fibrous roots grew was improved?

It is quite probable that the large tap roots of the willows reached down to an abundant supply of water containing the mineral elements required for plant growth, in sufficient quantities to furnish a full supply for the rapid growth of the osiers. A portion of the mineral elements may have been obtained by the disintegration of the soil, hastened by the action of acids given off from the willow roots. The deepening and enrichment of the soil was evidently caused by the yearly dropping of the leaves which were kept from being scattered over a wide space by the numerous stumps from which the osiers were yearly cut.

I am led to the above conclusions by the fact that some years ago, for the purpose of keeping some willow cuttings over winter, I buried them in a bare sand bank from which all the original soil had been removed. By accident, a few of the cuttings were left in the sand where they sprouted and grew rapidly. After the second year, they grew from five to seven feet each year for more than twenty years without the application of any fertilizer, and without cultivation. During the past ten years, these willows have been permitted to grow without being cut; on examination I find that the sand beneath them is covered with a good soil.

On submitting some of the fibrous willow roots to my colleague, Mr. E. W. Morse, for microscopic examination, he finds that while there are root-hairs upon some of the roots others are devoid of hairs and that the hairless roots are enveloped by fungus threads. It is to be inferred, therefore, from what is known of the power of fungi on the roots of forest trees to take nitrogen from the air, that a part at least of the nitrogenous food of my willows has been derived from the air—a conclusion which is consistent with the rapidity of their growth upon land which was naturally by no means fertile.











# HARVARD UNIVERSITY.

## THE BUSSEY INSTITUTION.

*A School of Agriculture and Horticulture.*

The School of Agriculture and Horticulture, established in execution of the trusts created by the will of Benjamin Bussey, gives systematic instruction in Agriculture, Useful and Ornamental Gardening, and Stock-raising. The Bussey Institution is situated near the village of Jamaica Plain, about five miles southwest of the centre of Boston, and close to the Forest Hills station on the Boston and Providence Railroad. Students may live either in the immediate vicinity of the School, or in Boston proper, or in some one of the neighboring villages upon the line of the railroad.

### THIS SCHOOL IS INTENDED FOR THE FOLLOWING CLASSES OF PERSONS.

1. Young men who intend to become practical farmers, gardeners, florists, or landscape gardeners.

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3. Persons who wish to study some special branch of agriculture, or horticulture, or to attend the school as a means of scientific training.

Instruction is given by lectures and recitations, and by practical exercises in laboratories, the student being taught to observe phenomena, to make experiments, and to study specimens for himself. The aim of the teachers is to give the student a just idea of the principles upon which the arts of agriculture and horticulture depend; to teach him how to make intelligent use of the scientific literature which relates to these arts; and to enable him to put a proper estimate upon those kinds of evidence which are obtained by experiments and by the observation of natural objects. Students interested in tree-culture have the opportunity of seeing the raising of trees in great variety for the Arnold Arboretum.

Candidates for admission must be at least seventeen years of age, and must present testimonials of good moral character. No formal examination will be required of them, but each student must satisfy the instructors of his ability and of his intention to profit by the teachings of the School. Students who are not candidates for a degree may, upon producing certificates of good moral character, join the School at any time, without examination, to pursue any special course or courses of instruction which they are qualified to pursue with advantage.

For further information, apply to

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